

ELECTRICAL INDUSTRY OF BURMA/MYANMAR ON-LINE COMPENDIUM

Third Edition

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GENERAL INTRODUCTION (3rd edition)

The compendium consists of approximately **three hundred key articles** about Burma/Myanmar's electrical industry. This introduction provides general information on the organization of the compendium and tips on **navigating** around the various sections.

'Electrical industry' has been defined in a broad sense. The articles cover aspects of the industry dealing with the generation, transmission and distribution of electric power in Burma/Myanmar. They also include matters concerned with the use of electricity, the production of electrical and electronic goods, industries that support the development of electric power output, government plans and regulation of the industry and the increasing intervention of both foreign and national construction companies in the development of power sources in Burma/Myanmar. With a few exceptions, the entries are of a non-technical nature.¹

Most of the key articles in the compendium have been taken from recent publications but some date back as far as a couple of decades. Many are followed by excerpts from other publications or websites updating the subject of the key article or by cross-references to other key articles in the compendium. Some of the projects and topics covered in the compendium are of long duration, so users should be aware that there could be updates stretching over a period of ten or a dozen years under some of the key articles. Map references are also provided where appropriate.

The articles are listed under thirteen subheadings in the **topical index**. ([TI](#)). Explanatory comments have been added to some of the topics covered under the subheading. In the third edition a few titles in the topical indices are emphasized with **bold lettering**. The articles under these titles have a more complete listing of references and offer a quick way of finding other articles that deal with the same topic. For instance, the 'Additional References' section in the article '[Mini hydropower plants](#) planned for rural areas' has links to many other articles related to the subject of mini hydropower in the compendium.

Users of the compendium who are interested in locating information about a particular thermal or hydro power project should consult one of the following appendices: [CP010: DOMESTIC HYDROPOWER PROJECTS UNDER IMPLEMENTATION OR PLANNING](#); [CP011: MAJOR DOMESTIC HYDROPOWER STATIONS: OPERATIONAL DATA](#); [CP012: THERMAL POWER STATIONS: OPERATIONAL DATA](#); [CP013: THERMAL POWER PROJECTS UNDER PLANNING OR IMPLEMENTATION](#); [CP014: FOREIGN INVESTMENT DRIVEN HYDROPOWER PROJECTS](#). They provide up-to-date summaries and links to each of more than ninety major stations and projects in the country.

The compendium is **arranged chronologically** according to the date of publication of the key articles with the most recent articles appearing at the beginning of the compendium. The chronological index ([CI](#)) provides a complete listing of the titles of each of the key articles in order of publication. The original headline or title of many of the key articles has been altered to reflect their content more accurately. To find the most recently published key articles, use the link ([AH](#)) to the **article head**.

Items found in the appendices ([AP](#)) are of a more general nature or ones for which no key article has yet been published. A key to commonly used **abbreviations, acronyms and measurements** in the compendium is also included. ([AA](#))

Most articles included in the compendium have been **freely edited and revised** to make their meaning clearer. Many have also been condensed and shortened. Users are advised to consult the originals using the URLs which can be found under the titles of the articles, especially if quoting for publication.

Since the publication of the 2nd edition of the compendium, many of the files in the URL archive beginning with the call letters www.myanmar.gov.mm are no longer available on-line. Alternative listings for editions of the New Light of Myanmar can be located in the news archives of the On-line Burma Library <http://www.ibiblio.org/obl/show.php?cat=1449&lo=d&sl=0> or of the Myanmar Mission to the U.N. in Geneva. <http://www.myanmargeneva.org/NewsArchives/newsindex.htm>. Some of the articles in the early editions of the Myanmar Times can be traced through on-line list-servs such as the Yahoo's Myanmar Information discussion group: http://dir.groups.yahoo.com/group/myanmar_information/ or through the archives of Burma Net News or the On-line Burma Library. An archive for editions of the Myanmar Times beginning with Issue 369 (04 June 2007) is available through a box in the upper right hand corner on the index page of the current edition. Many '**dead links**' in the 3rd edition of the compendium have been left in place to indicate the original source of the information cited. The creative use of search engines available through Google, the Burma Net News and the On-line Burma Library can sometimes produce an alternative source for the researcher who needs to check the source of articles where the original has temporarily disappeared. Hardcopy editions of some publications may also be available in university and other public libraries.

The articles in the compendium represent many different viewpoints. No attempt has been made to reconcile **contradictory statements and data** presented in the articles, but charts in the appendices, clearly identified with the compendium as the source, represent a 'best guess' with regard to conflicts in the data presented on various projects.

No attempt has been made to standardize the spelling of the various versions of international English used in the originals of the articles reproduced in the compendium. The same applies to the wide variation in the spelling of Burmese place names, although in some cases alternative spellings are included in parentheses. For more information on efforts being made to standardize the English spelling of place names in Burma/Myanmar, compendium users should consult maps and other publications of MIMU, the Myanmar Information Management Unit. The best brief introduction with accompanying township map can be found at: http://www.themimu.info/MapsInfo/Others%20Planning%20Maps/MIMU001_A3_SD%20&%20Township%20Overview.pdf. Unfortunately, the political and linguistic considerations involved in the standardization process have not been made explicit.

Foreign currency exchange rates noted are as of the original date of publication of the articles. A listing of the average annual US\$ exchange rate for the kyat over the period covered by most of the articles in the compendium can be found in the section dealing with measurements. ([KTR](#))

Comments, corrections, suggested additions and inquiries are welcomed by the compiler.

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¹A growing number of technical studies related to the electrical sector in Myanmar are now available on-line. Many of them appear to be theses prepared by graduating students at technological universities. This is a welcome sign of the increasing importance of publishing research related to the field of electrical engineering in the country. Future editions of the compendium will devote more attention to issues and articles concerned with technical subjects as well as with education and training in the field of electrical studies and vocational preparation.

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HYDRO AND THERMAL POWER EXPORT PROJECTS

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The definition of 'independent power producer' in the present context in Myanmar is in a state of flux. At the village level there are dozens of mini-hydro and bio-fueled generating projects where electricity is generated and distributed to users under local or commercial auspices. Similarly in suburban areas of the larger cities and towns local commercial interests operate diesel fuel generators which distribute electricity to a limited number of households at the ward or precinct level for a few hours a day.

Some of the cease-fire pacts signed by insurgent military groups with the Myanmar military after the 1988 *coup d'etat* also contained provisions for setting up independent hydropower projects in the areas controlled by these insurgents. With the change to civilian government in 2011, it is unclear under what conditions these facilities will continue to be operated, as some of the insurgent groups have agreed to operate as militia units under the Myanmar *tatmadaw* while others have yet to indicate what role they see for themselves and the infrastructure facilities under the new constitution.

On a larger scale, the government has recently signed agreements with several national construction firms that authorize the latter to develop medium-sized hydro or thermal power plants on a 'Build-Operate-Transfer' (B.O.T.) basis. The electricity generated at these facilities would presumably be sold to MEPE which currently has a monopoly on all long-distance transmission in the country and then resold by MEPE to local consumers. Under the 'transfer' part of the agreement, the generating facilities are eventually to be handed over to the government after a period of anywhere from 20 – 40 years. Considerable confusion has arisen in cases such as Baluchaung-3 and Thaukyegat-2 hydropower projects because news items in the state media sometimes refer to them as projects of EPM-1 while on other occasions as projects of the companies concerned.

On a much larger scale, the government has signed B.O.T. agreements with several of the largest electric power companies in the PRC, Thailand and India for the development of at least two dozen mega-hydropower stations and coal-fired generating plants. From what is known of these contracts, they include provisions for most of the power produced at these facilities to be exported from Myanmar, while reserving rights to the national system in Myanmar to draw on these sources to meet its own demand. For more on the development of Myanmar's potential for electricity production by foreign companies, see the section 'Hydro and thermal power export projects' ([EP](#)) in the topical index.

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This section of the compendium deals with major state-sponsored hydropower projects in Burma/ Myanmar that are operating or being developed primarily to provide electricity for use inside the country. In the Burma/ Myanmar context a 'major' project is considered to be one that generates 10 megawatts or more. Since the 1960s all major hydropower projects in the country were undertaken by the state for use within the country, but two new trends have emerged in recent years. On the one hand, plans have been announced to harness the waters of important rivers near border areas of the country in order to export electricity to China, Thailand and India. These are covered in the section dealing with the export of electricity. ([EP](#)) More recently, independent producers have completed or come up with plans for small but significant hydropower projects for internal consumption of the electricity produced. These are covered in the section dealing with independent power producers. ([IP](#))

Up to the present, four large hydroelectric projects have emerged in Burma Myanmar. The first was the still unfinished Lawpita project in Kayah state, begun in the mid-fifties and added to on various occasions until it reached its present operating capacity of 192 MW in 1992. The text article ([LP](#)) covers a wide range of material available on the Lawpita stations. The second, the 280-MW Paunglaung dam with its underground station, ([PL](#)) was begun in 1996 but not completed until 2005. Work on the Yeywa project (790 MW) on the Myitnge river south-east of Mandalay ([YY](#)) was begun in 2000 and is scheduled for completion in late 2009. The fourth major facility on the Shweli (Mao) river in northern Shan state has been capped at 600 MW ([SL](#)). Power production, now scheduled to start up in 2008-09, was originally slated for domestic consumption in Burma/Myanmar, but a recent news report indicated that as much as 85pc may be exported to neighbouring Yunnan province in the PRC.

During the eighties, the Kinda (56 MW) (KD) and Sedawgyi (25 MW) (SD) multi-purpose dam projects with both irrigation and hydropower components were undertaken in Mandalay division with multilateral financing. These developments spawned a whole series of medium-sized multi-purpose dam projects in the nineties and since the beginning of the present decade in rivers of the Sittaung basin. The largest of these has been the Paunglaung dam (PL) near Toungoo. Other functioning multi-purpose dams and power plants in the Sittaung basin include the 25-MW Yenwe creek (YW) plant in Kyaukdaga township and the 20-MW Zaungtu (ZT) plant on the upper Bago river in Bago township, while the 60-MW Kunchaung (KN), the 30-MW Khabaung creek (KB), the 40-MW Pyu creek (PU) and the 75-MW Shwegyin creek (SG) projects are scheduled for completion before 2010. West of the Ayeyawaddy, the multi-purpose Monechaung dam and power house (MN) that has a 75-MW capacity became operational in 2004. In the upper reaches of the southward flowing Mu River in Sagaing division, the long-planned Thaphanseik dam (TP) to control the waters used in the extensive irrigation system of the Mu was completed in 2001, was followed a year later by the commissioning of a power house capable of generating 30 MW.

One trend that has become increasingly evident over the last few years is the development of secondary support dams on rivers that have already been harnessed for hydropower and irrigation purposes. The need for support dams of this type is clearly put in the key article for Upper Sedawgyi project (SD). The first of these was developed in the nineties on the Zawgyi (ZG) in Lawksawk township in western Shan state where an 18-MW run-of-the-river hydro station was opened in 1998, followed by the construction of a dam and a second hydro power station about 10 miles upstream on the Zawgyi in 2000. The long –delayed opening of the Paunglaung dam and power station in 2005 was accompanied by an announcement that work was to begin immediately on support dams on the Upper Paunglaung and Nancho (UPN) rivers because the new facility would not be able to function at full capacity even in the rainy season unless other dams were built in the watershed above it. Work is also proceeding on similar support dams for the Sedawgyi (SD), Monechaung (UB) and the Kengtawng Falls (KF) power plants. In mid-2007, it was announced that plans were underway for a support dam for the 790-MW Yeywa power dam on the Myitnge at Pyaungsho (PS) in Nawngkhio township. Construction has also begun on multi-purpose dams on the lower Zawgyi (MG) and lower Mone (KK) which will be supported by already completed dams on the upper stretches of these two rivers.

Work has begun on diversion tunnels or site preparation for several other projects in more isolated areas of the country. These include the Pyntha (40 MW) and Manipur (380 MW) (PM) dams in the Myittha river valley near the border of Chin state and the Thahtay Creek (102 MW) (TT) and Ann (15 MW) dams in southern Arakan state. Other projects for domestic consumption under study or survey are the 20-MW Thakyet river station (TK) in Taninthayi township, the 25-MW Daying creek station (DY) in Hlaingbwe township, the 660-MW Shwesayay dam (SY) in Budalin township on the Chindwin and the long-postponed Bilin river (280 MW) (BL) dam in Mon state.

The outdated but readily available set of US Army topographic maps of Burma (1:250,000) has been referenced to pinpoint the location of each of the projects and hydropower stations for which an entry is provided. <http://www.lib.utexas.edu/maps/ams/burma/>. Dams that were established before 2002 are clearly visible on Google Earth and are so noted.

Not surprisingly, most of the attention in the official media is devoted to describing visits by senior officials of the military junta to dam construction projects which are carried out by or under the supervision of state corporations, while very little information is provided about the generating equipment that is provided for these facilities. This is now almost entirely contracted to PRC firms which also undertake the installation of the equipment. The main construction work at the large, recently completed Paunglaung project, and the still uncompleted Yeywa and Shweli No 1 diversion and dam facilities and power houses has also been undertaken almost entirely by PRC companies and financed through soft loans from official and private sources in the PRC.

Feasibility studies and project design for the following hydropower projects have been or are being carried out by Kansai Electric Power Co of Japan: Yenwe, Khabaung, Pyuchaung, Shwegyin, Bawgata, Shwesayay,

Nancho. Colenco Power Engineering Consultants of Switzerland is under contract for studies and design of the Yeywa, Htamanthi, Upper Paunglaung and Pyaunghylo projects.

With the exception of the Lawpita hydropower facilities, very little information is available about the maintenance of dams, diversion facilities and generating equipment once they are put into operation. Apparently, little has been done to exhaustively evaluate the economic rate of return and social and ecological impacts of major hydropower projects except for the Kinda project ([KD](#)) which was studied by an ADB team in 2001. Unfortunately, even this review was limited in scope when the study team was prevented from visiting the project area in person.

MAJOR THERMAL STATIONS AND SUPPLY NETWORKS

TS

N.B. The highlighted article below includes links to key articles for understanding the pipeline system that connects the major gas fields to the more important thermal power stations.

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 SPECIAL [PROJECTS COMMITTEE BRIEFED](#) ON ELECTRIC POWER PLANS (NLM: 07/03/10)
[ENERGY EXPORTS](#) TO FUEL GDP GROWTH (Myanmar Times: 04/01/10)
[PLENTIFUL WATER](#) RESOURCES TO GENERATE ELECTRICITY (NLM: 31/12/09)
[SECOND SEMINAR ON HYDROPOWER](#) DEVELOPMENT HELD (MT: 14/09/09)
[FULL RESERVOIRS](#) TO BOOST HYDROPOWER (MT: 19/11/07)
[FULL POWER](#) SUPPLY PROMISED FOR JULY (MT: 04/06/07)
[LOW WATER](#) LEVELS HINDER POWER DISTRIBUTION (MT: 02/04/07)
 COMPLETION OF HYDROPOWER PLANTS ASSIGNED [HIGHEST PRIORITY](#) (MT: 12/02/07)
 POWER SUPPLY IMPROVES AFTER [YEARS OF ABNORMAL STATUS](#) (XN: 02/09/06)

[INVENTORY OF GENERATING PLANTS, TRANSMISSION GRIDS, PROJECTS](#) (NLM: 30/07/06)
 GOVERNMENT WILL [PRIORITIZE HYDROPOWER](#) PROJECTS OVER GAS (MT: 10/07/06)
[NATIONAL UPDATE](#) ON ELECTRIC POWER PLANTS (NLM, 18-22/01/06)
[PRIVATE SECTOR PROMOTING](#) INTEREST IN RENEWABLE ENERGY
 STATE'S ELECTRIC [POWER PROJECTS](#) (NLM: 25-27/04/05)
 REVIEW OF ELECTRIC POWER [DEVELOPMENTS UP TO 2000](#) (BT: July 2002)
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[CP020: EXISTING TRANSMISSION SYSTEM: MID-2007](#)

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POWER GRID AND DISTRIBUTION NETWORKS

PG

N.B. The highlighted article below includes links to some of the key articles for understanding the national power grid.

MINISTER CLARIFIES [GRID CONNECTION PLANS FOR CHIN](#) STATE (NLM: 22/03/11)
[GRID SUPPLY CONTRACTS](#) SIGNED WITH ELECTRICAL SERVICE FIRMS (NLM: 05/03/11) TOWERS
 ON [HLINETHAYA-AHLON POWER GRID](#) UNDER CONSTRUCTION (NLM: 31/01/11) ADVANCED
[INSULATOR FACTORY](#) OPENED IN CHAUK TOWNSHIP (NLM: 24/03/07)
[CHINESE ENGINEERS PLANNING](#) GRID CONNECTION WITH BURMA PROJECTS (IRROL: 23/01/10)
 RISKY JOB FOR LINE CREW ON [BAGO RIVER CROSSING PYLONS](#) (NLM: 27/02/09)
[FACILITIES AND SERVICES](#) OF THE YANGON ELECTRICITY SUPPLY BOARD (NLM: 31/08/08)
 YESB: FIVE BILLION KYAT SPENT ON POWER [LINE REPAIR IN YANGON](#) (MT: 16/06/08)
 POWER CUTS WIDESPREAD FOLLOWING [CYCLONE](#) (AP, Reuters: 05/05/08)
[POWER HUNGRY MYAUNG DAGAR INDUSTRIAL ZONE](#) NEARLY READY (MT: 25/02/08)
[FISHERIES FACTORIES](#) OFFERED 24-HOUR POWER (MT: 09/07/07)
[MYANMAR ELECTRIC POWER ENTERPRISE](#): FUNCTIONS AND OBJECTIVES (ESCAP: July 2007)
 ELECTRICITY [MINISTERS BUSY](#) IN BEIJING AND KUNMING (NLM: 13/06/07)
 FACTORIES URGED TO SPEED UP PRODUCTION OF [LAMPPOSTS AND WIRING](#) (NLM: 30/05/07)
[THAKETA](#) POWER STATION IMPORTANT DISTRIBUTION HUB (NLM: 13/12/06)
[LETPANPIN VILLAGE PLUGGED](#) INTO NATIONAL GRID (Embassy of Japan: 03/10/06)
 SOUTH KOREA'S [KEPCO](#) TO STUDY IMPROVING POWER TRANSMISSION SYSTEM (MT: 31/07/06)
[INVENTORY OF GENERATING PLANTS, TRANSMISSION GRIDS, PROJECTS](#) (NLM: 30/07/06)
 YANGON ELECTRICITY SUPPLIES GET BOOST FROM [YESB PLAN](#) (MT: 24/07/06)
[THAHTAY CREEK](#) DAM AND OTHER HYDROPOWER PROJECTS IN ARAKAN (NLM: 20/04/06)

MYANMAR [EXPORTS FIRST](#) DOMESTIC TRANSFORMER (MT: 30/05/05)
[CABLE FACTORY](#) AND FOUNDRY OPENED IN INDAGAW INDUSTRIAL ZONE (NLM: 04/04/05)
 PAUNGLAUNG PLANT TO SUPPLY [MANDALAY WITH 24-HOUR ELECTRICITY](#) (MT: 16/08/04)
[SHWELI TRANSMISSION](#) LINE CONTRACT SIGNED (People's Daily Online: 10/10/03)
 LOCAL TRANSFORMER MANUFACTURERS FACE [TOUGH COMPETITION](#) (MT: 27/01/03)
 MORE INPUTS NEEDED TO POWER A [HYDRO FUTURE](#) (MT: 04/06/01)
[EXPERTS DIFFER](#) OVER HOW TO FINANCE IMPROVEMENTS IN POWER SUPPLY (MT: 11/12/00)
[POWER PARTS PROVE LUCRATIVE](#) BUSINESS FOR GUNKUL ENGINEERING (MT: 28/08/00)
 GENERATION, DISTRIBUTION, CONSUMPTION OF [ELECTRICITY IN MYANMAR](#) (WB: 18/08/99)
[POWER TRADING](#) IN THE GREATER MEKONG SUB-REGION (GMS) (Appendix 14)
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Burma/Myanmar's transmission system and distribution networks have not attracted much attention outside of the country itself. The best recent source for an overview of the system is a report made by Myanmar representatives at an ADB consultation in November, 2008 and an [ASEAN seminar](#) in September 2007. This presentation can be compared with the [inventory](#) of the country's transmission and distribution networks in July 2006 by the newly appointed Minister of Electric Power No 2. The commentary and references accompanying the [grid system maps](#) in Annex 1 provides a useful context for understanding the barebones details of both of the reports noted above. Clues as to where the country's transmission and distribution systems are headed are also provided by articles reporting on a series of studies funded by South Korea and carried out by [KEPCO](#) since 2001.

International [power trading](#), particularly among the countries of the Greater Mekong region, is attracting greater attention, as is cross-border transmission of electricity from Burma/Myanmar with its rich hydropower potential. In particular, power purchase deals have been arranged or are under discussion with companies of three of Burma/Myanmar's neighbours in connection with more than twenty large hydropower projects in border areas of the country. A recently published national grid map ([ELPG003D](#)) shows these projects linked with the national transmission system through a network of 500 kV lines. News reports indicate that up to 20% of the power generated by these stations will be fed into the national system through this network. For details about each of this hydropower export projects consult Index [EP](#) above

Burma/Myanmar is still heavily dependent on foreign suppliers for the equipment and expertise needed to develop its high-voltage transmission system. [Chinese firms](#), in particular, have become key bidders and suppliers of power station equipment. But some local companies are responding to the challenge. [Soe Electric](#) and Machine Tools Co in South Dagon IZ and [Yangon Transformer](#) and Electrical Co in Shwepyitha IZ are both producing transformers of varied ratings for the expanding network of sub-power stations throughout the country. A state-owned [cable factory](#) in the Indagaw industrial subdivision near Bago is said to be producing 1,600 tons of aluminum cable annually for MEPE's transmission grids and distribution networks. India's [Exim Bank](#) has recently granted Myanmar a \$20-million dollar line of credit to build a second ACSR wire factory in Magway. Local factories are also producing [power poles](#) (lamp posts), wiring and [insulators](#) for use in distribution networks.

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RENEWABLE SOURCES AND SMALL GENERATING FACILITIES

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N.B. The titles in bold provide a rich source of links to other key articles on the same subject.

LOCAL ELECTRICITY PLANT POWERS [VILLAGE METAL WORKSHOPS](#) IN THABYU (NLM: 27/03/11)
 HYDROPOWER MINISTER EXPLAINS [APPROVAL PROCESS FOR PROJECTS](#) (NLM: 24/03/11)
 UNION GOV'T NOT [RESPONSIBLE FOR SMALL-SCALE](#) POWER PROJECTS (NLM: 23/03/11)

MINISTER CLARIFIES [GRID CONNECTION PLANS FOR CHIN](#) STATE (NLM: 22/03/11)
[YWATHAYA VILLAGE LIGHTED UP](#) BY SOLAR POWER (NLM: 26/01/11)
[MADAY DAM SERVING FARMERS](#) OF KANMA TOWNSHIP (NLM: 14/01/11)
 RICE HUSKS USED TO POWER [URBAN WARDS](#) (Myanmar Times: 23/08/10)
[RENEWABLE ENERGY FORUM](#) HELD IN YANGON (Myanmar Times: 04/01/10)
 DEALERS REPORT STRONG INCREASE IN THE [SALE OF SOLAR POWER SETS](#) (MZZ: 06/10/09)
 PM CALLS FOR [BIO-BATTERIES](#) IN EVERY CYCLONE-HIT HOUSEHOLD (NLM: 07/04/09)
 THAILAND TO ASSIST MYANMAR IN [STUDY OF WIND GENERATION](#) OF ELECTRICITY (Xin: 12/03/09)
 INDIAN [SOLAR LANTERNS](#) TO LIGHT UP MYANMAR HUTS (PTI: 07/02/09)
 ELECTRICITY FLOWING FROM [MONK-DRIVEN PROJECTS](#) IN MON STATE (MNA: 05/02/09)
[SELF RELIANT HYDROPOWER PLANT](#) SERVING 600 HOMES IN KANAN (NLM: 30/01/09)
 PADDY [HUSK-FIRED ENGINE USED TO IRRIGATE](#) CROPS IN BALAR REGION (NLM: 08/01/09)
 MINI-HYDRO FACILITIES SLATED FOR [DAMS IN KYAUKTAW TOWNSHIP](#) (NLM: 26/11/08)
[BONTALAR](#) HYDROPOWER STATION IN MATUPI VISITED (NLM: 23/11/08)
[GENERATOR FIRED BY PHYSIC NUT OIL](#) SUPPLYING POWER IN WAMMAISON (NLM: 28/09/08)
[NATCHAUNG MODEL VILLAGE](#) WELL SUPPLIED WITH ELECTRIC POWER (NLM: 15/09/08)
[HOMEMADE LIGHTING SYSTEM](#) FOR NOODLE VENDOR (MT: 21/07/08)
 RICE HUSK [GASIFIERS TO SPUR RURAL ELECTRIFICATION](#) (MT: 21/07/08)
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 MYANMAR TO BUILD FIRST [STORM-RESISTANT MODEL VILLAGE](#) (Bernama: 12/06/08)
 ADDITIONAL HYDROPOWER GENERATION PLANNED FOR [PUTAO](#) (NLM, 25/01/08)
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[PYIN-U-LWIN HYDROPOWER PROJECTS](#) SPEEDED UP (NLM: 30/11/07)
[NORTH YAMA](#) SUPPORT DAM TO GENERATE 250 KILOWATTS (NLM: 29/11/07)
 ELECTRIC POWER [PLANTS OPENED IN 2007](#) (NLM: 11/10/07)
 VILLAGE RICE-HUSK POWER PLANT WILL SERVE AS [RESEARCH CENTRE](#) (MT: 24/09/07)
 RISING WORLD LEAD PRICES ZAP LOCAL [BATTERY MARKET](#) (MT: 10/09/07)
 PLANS FOR [7-MILLION-DOLLAR](#) RICE-HUSK POWER PLANT EDGE FORWARD (MT: 27/08/07)
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[INVENTOR CO-OP](#) SOCIETY EXPORTS FIRST RICE-HUSK GENERATORS (MT: 21/08/06)
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 CALL FOR [ENERGY CO-OPERATION](#) (MT: 13/02/06)
 DELTA HOLDS GREAT POTENTIAL FOR [TIDAL POWER GENERATION](#) (Voice Weekly: 13/02/06)
 PADDY HUSK POWER PLANT TESTED TO CUT RICE [MILLING COSTS](#) (MT: 19/12/05)
WIND POWER [SYSTEM IDEAL](#) FOR VILLAGES, SAYS ENGINEER (MT: 05/12/05)
 VILLAGE [ELECTRIFICATION TECHNOLOGY](#) ON DISPLAY (MT: 14/11/05)
[MINI HYDROPOWER](#) PLANTS PLANNED FOR RURAL AREAS (MT: 08/08/05)
 HYDRO POWER STATION COMMISSIONED IN [KAUNGKHA](#) (NLM: 26/07/05)
[NAMWOK HYDROPOWER PLANT](#) RE-OPENED (SHAN: 09/04)
[BIO-GAS POWER PLANTS](#) SUPPLY ELECTRICITY TO RURAL AREAS (MT: 16/08/04)
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[SOLAR POWER](#) SEEN AS SOLUTION FOR REMOTE VILLAGES (MT: 06/10/03)
HYDROPOWER PLANTS IN MYANMAR WITH [CAPACITIES UP TO 10 MW](#) (JICA: Sept 2003)
 SMALL HYDRO PLANT PROPOSED FOR [ZAHAW CREEK](#) IN GANGAW (JICA: Sept 2003)
[VILLAGE ELECTRIFICATION COMMITTEES](#) (JICA: Sept 2003)
[MANUFACTURE OF SMALL HYDRO TURBINES](#) IN MYANMAR (JICA: Sept 2003)
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Rural Burma/Myanmar has more than 60,000 villages and hamlets, the vast majority of which remain unelectrified well into the 21st century. Even the larger towns and many of the smaller cities still have power service for only a few hours a day. The articles in this section of the compendium provide insights into a variety of 'alternative energy' sources that are being experimented with to remedy this situation. References to most of the articles that deal with 'small' hydro (including mini-, micro- and pico-hydro) developments will be found in the key article: [Mini hydropower plants](#) planned for rural areas. The extensive notes to the article: 'Hydro power station commissioned in [Kaungkha](#)' provide details about many of the small hydro facilities that have set up in 'cease-fire' areas close to the international boundaries of Burma/Myanmar.

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NATIONAL HIGH-VOLTAGE [GRID SYSTEM MAPS](#) (Annex 1)

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CHAUNGZON SUPPLIED WITH [ELECTRICITY AT A BIG LOSS](#)

NLM, 29/03/11. Edited and rewritten. <http://www.burmalibrary.org/docs11/NLM2011-03-29.pdf>

At the session of the Pyidaungsu Hluttaw [Union Parliament] on 28/03/11, Representative Naing Hla Maung of Chaungzon constituency in Mon State asked whether the government had a plan in place to lower the rates charged for electricity. He said that in the time of the parliamentary democracy government [in the 1950s] the people on Belu island in his constituency had some success in developing their cottage industries because they had access to electricity, but that now service was insufficient and the cottage industries were in decline.

EPM-2 Khin Maung Myint replied that the township electrical engineer's office had been opened in Chaungzon in December 1955 and that electricity had been supplied for twelve hours a day to four urban wards with a population of 815 using an 80-KVA diesel generator. Four transformers were added in 1957, he said. Three more diesel generators with an installed capacity of 150 KVA were put in place in 1968, 1980 and 1983. Together the four generators had supplied electricity to Chaungzon and five villages. They were replaced in 1987 with a 608-KVA diesel generator which supplied electricity for three hours a day. An extra 350-KVA diesel generator was added in November 1997.

In 1955, when the service had started, the price of a gallon of diesel was K 1.50 and the cost of producing a kWh of electricity was K 0.15, the Minister said. At the present time, he continued, the government was losing K 294 for every kWh of electricity it generated due to the high costs of production. Currently, electricity was being supplied to five urban wards for two hours a day and to nine villages every second day, benefiting 1978 households with a population of 9,891. Thus, the numbers of electricity users was nine times greater than in the time of the parliamentary democracy government.

To supply electricity in Chaungzon, the government was using 22,800 gallons of diesel a year at a loss of K 67 million, plus another K 7.2 million a year spent on the salaries of the 10 employees who worked electrical engineer's office. In addition, maintenance costs for the generators, power lines and sub-power stations amounted to an additional K 13.88 million in the 2010-11 fiscal year. It was clearly evident, the Minister said, that the government was operating the electricity service at a loss in Chaungzon township.

Other townships in Mon state, the Minister said, were getting additional electrical service beyond the normal two-hour limit by forming local committees that paid for the additional costs of the diesel needed.

Additional references

See below: 'Small businesses, [factories struggle](#) to keep up with rising fuel prices' (IRROL: 06/03/08)
['Petrol subsidies](#) and the price of electricity' (Burma Digest: 02/09/07)
['Premium rates](#) for electricity in Mon villages' (IMNA: 03/08/07)
['Electricity metering](#) program taking root' (IMNA, 11/05/07)
['Acute shortage](#) of electricity disappoints Mon residents' (IMNA: 21/02/07)
['Private operators](#) meet need for alternative power service' (MT: 03/02/02)
['Diesel-operated generating plants](#) in Myanmar: Notes' (Appendix 5)

LOCAL ELECTRICITY PLANT POWERS [VILLAGE METAL WORKSHOPS](http://www.burmalibrary.org/docs11/NLM2011-03-27.pdf) IN THABYU

Article & Photos: Tin Win Lay, NLM, 27/03/11. Edited and rewritten.

<http://www.burmalibrary.org/docs11/NLM2011-03-27.pdf>

The village of Thabyu (17°02'N, 96°24'E) is located about 10 km southwest of the township centre of Kawa in Bago Region. The village has over 1110 houses in six wards. Local people engage in growing monsoon paddy on 3000 acres of farmlands in the rainy season and green gram and beans and pulses in the summer.

The village has a new high school donated by U Tin Hlaing and Daw Ohnma Khin and family. There is also a 315-KV power plant which supplies electricity to the village. A second 200-KV power station is under construction. It will supply electricity to residences.

The most unusual feature of Thabyu are the 50 metal-work workshops around the village. According to U Myint Htay, a local entrepreneur, metal working has been an industry in Thabyu since the end of the World War-2. He said that the nearby villages rely on Thabyu for the metal goods it produces.

One of the workshops I visited was making large bell-mouthed canisters and pans for kitchen use. Although these were made of cast iron in the past, today they are made with light metals. Other workshops in the village produce metal parts for motors, motor-boat propellers and the metal pulleys used on power lines. Some of the metal shop owners and workers have migrated from Thabyu and set up businesses in the industrial zones of Hlegu, Myaungdaga, Thakayta, North Okkalapa and Shwepyitha.

At Thabyu jetty on the Bago river just before leaving for Yangon I saw workers unloading raw materials for the village workshops from a river boat and loading finished metal goods on it. Village Chairman Naing Aung Toe told me they could make even more goods at a cheaper price, if a bridge were to be built across the river. That would be a dream come true for the people of Thabyu, he said.

[Photos accompanying the article in the print edition of NLM show workers shaping metal pot and pans on lathes driven by electric motors. Given the location of Thabyu in an area noted for its production of paddy, the two electric power plants mentioned in the article suggest that the generator there is paddy husk-fired.]

Additional references

See below: [‘Power hungry Myaungdagar industrial zone nearly ready’](#) (MT: 25/02/08)
[‘Interest growing in rice-husk generation’](#) (MT: 10/07/06)

HYDROPOWER MINISTER EXPLAINS [APPROVAL PROCESS FOR PROJECTS](http://www.burmalibrary.org/docs11/NLM2011-03-24.pdf)

NLM, 24/03/11. Edited. <http://www.burmalibrary.org/docs11/NLM2011-03-24.pdf>

At the session of the Pyithu Hluttaw [People’s Chamber] of the Parliament on 23/03/11, Representative N’ Htu Phon Hsan of Kachin State said that feasibility studies with regard to the generation of hydropower at Htakhachaung waterfall in Machanbaw township had been carried out on various occasions. He wanted to know whether a project was to go ahead and when it would commence.

EPM-1 Zaw Min explained that all hydropower projects have first to receive the approval of the Special Projects Implementation Committee. After that, feasibility studies that take into account the annual rainfall, year-wise water inflow, geological conditions, and the advantages of locating the project at sites upstream and downstream of the proposed site in the river have to be conducted. Generally, it takes 18 months for these studies.

Based on the results of these studies, detailed observations are carried out. Sometimes, feasibility studies are conducted at three or four different locations, the best is chosen and then detailed studies follow. A detailed design for the project is then created – a process which can take up to 12 months. Altogether it

takes about two and half years to complete the feasibility studies for and design a project. After that construction work can take from three to ten years, depending on the size of the project.

Currently, there are 34 small-scale hydropower projects and plants and 16 medium- and large-scale hydropower projects and plants. Since 2001, when the 30-year electric power long-term national plan was adopted, companies belonging to national entrepreneurs and to foreign investors have also taken on projects. At present, there are 68 projects under implementation and study which could generate up to 45,000 megawatts.

[The Minister said] that approval for the Htakhachaung hydropower project had already been sought from the Special Projects Implementation Committee. The project was under observation and it would be classified as a small-scale project to be implemented by a company belonging to national entrepreneur company.

According to Paragraph (4) (a) of Schedule 2, Section 188 of the Union of Myanmar Constitution (p189) reads as follows: "Medium and small scale electric power production and distribution that have the right to be managed by the Region or State not having any link with national power grid, except large scale electric power production and distribution having the right to be managed by the Union."

Therefore, private entrepreneurs and cooperative societies have the opportunity to invest in regional small-scale hydropower projects under the supervision of the [respective] State government.

Compiler's note: The Special Projects Implementation Committee (SPIC) referred to in the Minister's answer has been a key committee of the State Peace and Development Council directly under the leadership of SPDC Chairperson General Than Shwe. In the current circumstances of transition to a republican form of government, it has not been divulged whether and under whose direction the SPIC will continue to exist. Given the importance of the SPIC in determining the non-military priorities of the SPDC administration, it seems safe to assume that it will continue to exist in some form or other under the direct supervision of the President of the republic.

With regard to the legislative jurisdiction related to the electric power sector, Schedule One of the 2008 Constitution defines the legislative prerogatives of the Union Government under Section 96 of the Constitution. It reserves to the Union Government matters concerned with "the production and distribution of electricity of the Union" (pp 181-87). Schedule Two of Constitution defines the legislative prerogatives of the State and Region governments (pp 188-90). The translation of Paragraph 4 (a) quoted by the Minister does not read well in English. It would appear that the sense is as follows: "Medium- and small-scale electric power production and distribution that are not linked with the national power grid come under the jurisdiction of the respective Region or State governments, whereas large-scale electric power production and distribution come under the jurisdiction of the Union government."

It would appear from the remarks made by the hydropower minister with regard to the Bontalar falls project in Chin State that projects with a generating capacity under 10 megawatts are considered to be "small-scale". The upper limit of "medium-scale" projects is not stated. However, the main factor in determining whether or not responsibility for an electric power project would come under Union jurisdiction would appear to be its connection to the national power grid.

An on-line edition of the 2008 Constitution is available at
http://www.burmalibrary.org/docs5/Myanmar_Constitution-2008-en.pdf

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UNION GOV'T NOT RESPONSIBLE FOR SMALL-SCALE POWER PROJECTS

NLM, 23/03/11. Edited. <http://www.burmalibrary.org/docs11/NLM2011-03-23.pdf>

Chin State Representatives Paul Lyan Lwin and Paul Than Htai submitted a proposal to build a 'heavy' hydropower station at Bontalar waterfall in Matupi township to the Amyotha Hluttaw [Nationalities Chamber]

of the Parliament on 22/03/11. U Paul Than Htai said that a large-scale generating facility at the falls, which is 15 miles from the town of Matupi, could supply power not only to Matupi but also to villages in the neighbouring townships of Mindat, Haka and Thantlang.

Replying to the proposal EPM-1 Zaw Min noted that up to 2008 the State had already built 33 small power plants not linked with the national grid. The smallest were equipped with generators which were able to generate 120 kW, while other larger ones could generate up to five megawatts. Even a power plant which can generate 10 megawatts is still considered as small, he added. According to a survey, the Minister said, waterpower at Bontala falls could be used to generate at least 1.8 megawatts. That would only be sufficient for the local community and would not qualify as a 'heavy' hydro power station.

[Further to the proposal, Minister Zaw Min pointed out that] Schedule 2 of Section 188 of the 2008 Constitution, (p 189), Paragraph 4 (a) reads as follows: "Medium and small scale electric power production and distribution that have the right to be managed by the Region or State not having any link with national power grid, except large scale electric power production and distribution having the right to be managed by the Union."

Since the building of small hydropower plants falls within the jurisdiction of the respective state governments, [the Minister continued], the proposal should be submitted to the Chin State government. Besides, private and cooperative sectors are allowed to invest in building power plants and selling the electricity. Therefore, the proposal to build a 'heavy' hydropower plant at Bontala waterfall in Matupi Township should not be brought to the Amyotha Hluttaw as the proposal is not eligible to be carried out by the Union and should be withdrawn.

Following the discussion, the Speaker of the Amyotha Hluttaw dismissed the proposal.

Compiler's note: For a discussion of the meaning of Paragraph 4(a) quoted by Minister Zaw Win see the article 'Hydropower minister explains [approval process for projects](#)' above.

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MINISTER CLARIFIES [GRID CONNECTION PLANS FOR CHIN STATE](#)

NLM, 22/03/11. Edited. <http://www.burmalibrary.org/docs11/NLM2011-03-22.pdf>

Replying to a question in parliament from Amyotha Hluttaw Representative Zung Hlei Thang of Chin State as to when towns in the state would be connected to the national electricity grid, EPM-2 Khin Maung Myint clarified present arrangements for supply of power and outlined plans for future connections to large-scale power plants under development in areas close to the state.

The minister said that currently eight small hydropower stations with a total installed capacity of 3013 kilowatts are operating throughout the state. Libar [Laiva, Hlaingba] (600 kW) station serves Haka and four nearby villages as well as Thantlang and four villages near it; Daungbar (400 kW) station also serves Haka and two villages; Ngasitbar (1000 kW) supplies power to Falam and nine villages in the vicinity; Zarlwee [Zalui] (400 kW) serves Tiddim and three nearby villages; Htwehsaung [Tuisaung] (164 kW) supplies Tongzan and two villages in the vicinity; Chichaung (260 kW) serves Mindat; Namtlaung (139 kW) provides electricity to Matupi and Paletwa hydropower station (50 kW) serves the township centre of Paletwa. These eight small-scale hydropower stations can supply 24-hour electricity to eight towns and 24 villages for seven months of the year from July to January.

For the other five months, 19 diesel generators with an installed capacity of 1119 kW supply electricity six hours a day. In addition, nine more diesel engines with an installed capacity of 423 kW provide electricity to the towns of Kanpetlet, Yayzwa [Rezua], Reidkhawdah [Rikodar] and Kyikha for two hours a day. The government makes up for a shortfall K 128.4 million a year in supplying power from 28 diesel generators that serve the twelve towns of Chin state. On average the diesel stations use 3640 gallons of fuel per month

Arrangements for the supply of electricity are carried out by 15 electrical engineering offices with personnel of 197, of whom 177 are Chin nationals. Monthly salaries of all staff amount to K 7.29 million. During fiscal 2010-11 the government has spent K 1535.667 million on the extension of power lines and the construction of subpower stations as well as the maintenance of the hydropower stations and diesel engines in the state.

As for connecting Chin state to the national power grid, plans are underway to supply electricity through 66-kV lines to be set up from the 40-MW Myittha hydropower station in Gangaw township and the 380-MW Manipur hydropower station in Kalay township to substations in Haka, Falam and Tidim. These hydropower projects are presently under construction. Matupi will be supplied with power from Gangaw through a 66-kV line running through Mindat. Plans are also underway to build a 33-kV power line linking Paletwa in southern Chin State to a subpower station in Kyauktaw and the grid that will connect 76.5-MW Saidin, the 500-MW Laymyot and the 111-MW Thahtaychaung hydropower projects presently under development in Rakhine State.

Additional references

See below: 'MoU signed on [Mawlaik and Kalewa](#) power projects' (NLM: 29/05/10)
 'One third of the [Myittha dam](#) embankment finished' (NLM: 11/12/08)
 '[Bontalar](#) hydropower station in Matupi visited' (NLM: 23/11/08)
 'Speedy completion of [Manipura dam](#) urged' (NLM: 22/12/04)
 '[Manufacture of small hydro turbines](#) in Myanmar' (JICA: Sept 2003)
 'Rural [power services in Chin State](#)' (Appendix 10)
[Grid Map 7](#): Long-term plan for transmission system in mid-2008

RURAL REPS RAISE [ELECTRICITY SUPPLY QUESTIONS](#) IN PARLIAMENT

NLM, 15/03/11. Edited. <http://www.burmalibrary.org/docs11/NLM2011-03-15.pdf>

At the regular session of the Pyithu Hluttaw on 14/03/11, U Ye Tun from Thandwe Constituency asked whether there was a plan to equalize the charges made for electricity in Rakhine State with other parts of the country. He said in Thandwe users are charged from 450 to 1000 kyats for a kWh and that they also have to pay for the electricity used by government departments.

EPM-2 Khin Maung Myint responded that Rakhine State still does not get electricity from the national grids. He said the government uses 355,080 gallons of diesel a year to supply electricity through 100 generators in 28 townships of the state. In fiscal 2010-11, there were expenditures of K 1776.72 million for the salaries of departmental staff and for generators, pylons, power stations, and maintenance of the system. In fact, the government showed a loss of K 453.6 million in supplying electricity to the townships in Rakhine State including the 13 townships that get electricity for two hours a day. He said there was no township in Rakhine State where electricity users are charged K 1000; that, overall, a charge of K 400 a unit was a reasonable rate, but if the fuel price went up, the charge rate would also have to go up; that only when the hydropower projects in the state were completed, could the rates be lowered to K 25 a unit for households and K 50 for enterprises. He said further that the profit the ministry makes from electric power supply is very low; and that the government is carrying out non-profit projects in the national interests.

The Pyithu Hluttaw speaker said, however, that U Ye Tun's question carried a fact that Rakhine State has to share charges for electricity used at the departmental rate by governmental departments, and that responsible persons should review that point.

U Khin Maung Myint also replied to a question from U Aung Thein of Ywangan constituency as to whether or not there is a plan to distribute power from the Myogyi dam station to the Danu region. The minister said electricity from Myogyi would be evacuated to the Taungtagwin and Ingon main power stations and connected to the national power grids through these stations. For the present, he said, electric power is being supplied to Pindaya and Ywangan through the national power grid; ten transformers supply 800 KW of electric power to six villages in the environs of Pindaya, while two transformers in Ywangan distribute 300

KW of electric power to two villages near Ywangan, so the Danu region is already using electricity from the national power grid.

In answer to another question from Representative Aung Thein as to whether whether there was a plan to supply more electricity from the Kinda dam station for the conservation and effective management of the watershed area of Ywangan, the minister said that Ywangan is already being supplied electricity through a 12-mile long, 11-KV power line from Kinda. Depending on the demand for water for agricultural irrigation, the Kinda power station generates for eight hours a day. Arrangements are being made to increase the power supply for both Ywangan and Pindaya via the Aungban power station and there would be no need for another power line from Kinda.

Additional references

Myanmar Times, 28/03/11. Excerpt. <http://mmtimes.com/2011/news/568/news56814.html>

When asked by reporters about the issue of the rate charged for a unit of electricity in Rakhine State that was raised in the recently concluded parliamentary sessions, Dr Aye Maung, chairman of the Rakhine Nationalities Development Party replied that some government departments need to provide services even though they are called enterprises which are supposed to make a profit. He said the Myanmar Electric Power Enterprise is a case in point. "If the government can't [provide electricity at a reasonable price] the enterprise should be privatised. As we are in a union, we should share what we have. It is not good to see that the rates for electricity are so high in Rakhine State [which is off the national power grid] while the rest of the country has the advantage of being connected to the grid."

NLM, 15/03/11. <http://www.burmalibrary.org/docs11/NLM2011-03-15.pdf>

At the regular session of the Amotha Hluttaw on 14/03/11, Industry Minister-1 Minister Aung Thaung replied to a question from U Maung Aye Tun of Rakhine Constituency-9 as to whether or not there was a plan to build a pulp factory in Buthidaung township where there is an abundance of bamboo growing naturally. U Aung Thaung said that Saidin bamboo forest in Buthidaung and Ponnagyun regions can be used to produce raw materials for a factory with a production capacity from 200 to 500 tons of pulp a day. But the establishment of a pulp factory requires chemical and chlorine dioxide plants, a generator and boiler plant, a cooking and digesting plant, a pulp sheet making plant and a recovery plant. Inputs to the plants are from about 0.3 to 0.75 million tons of bamboo per year, from 20 to 50 megawatts of electricity, from 30,000 to 75,000 tons of limestone, from 90,000 to 300,000 tons of salt and from 10 to 25 million gallons of water a day. Only if these inputs are fulfilled can the pulp factory be built. Lack of sufficient electricity supply at the present time, capital and technical problems hindered to build the factory. Although five field trips were made with the participation of foreign companies, progress could not be made due to electricity supply, energy and other problems. Nevertheless, there were future prospects for the energy sector in Rakhine State and good prospects for the establishment of a pulp factory by local organizations and foreign investors.

GRID SUPPLY CONTRACTS SIGNED WITH ELECTRICAL SERVICE FIRMS

NLM, 05/03/11. <http://www.burmalibrary.org/docs11/NLM2011-03-05.pdf>

A contract signing ceremony between Myanma Electric Power Enterprise (MEPE) and eight companies -- Central China Power Grid International Economic & Trade Co Ltd, Alliance Global Technologies Pte Ltd, United National Oil & Gas Pte Ltd, Supplier Global Pte Ltd, Gunkul Engineering Public Co Ltd, Barons Machinery & Engineering Pte Ltd, Global Quality & Management Pte Ltd and Royal GK Pte Ltd -- took place at the Ministry of Electric Power No 2 in Nay Pyi Taw on 03/03/11.

Present on the occasion were EPM-2 Khin Maung Myint, Attorney-General Aye Maung, Deputy EPM-1 Myo Myint, Deputy EPM-2 Win Myint, Deputy Minister Ind-2 Khin Maung Kyaw, departmental heads and others.

Minister U Khin Maung Myint delivered an address. On behalf of the companies, Managing Director Thanda Nay Win of Global Quality & Management Pte Ltd, spoke words of thanks.

MEPE MD Aung Than Oo and the managing directors of the companies signed contracts related to the purchase of accessories for the power grids at the Minhla power station, the Thabyewa (Meiktila) - Nay Pyi Taw - Taungoo grid, the Shwetaung- Myaungdaga grid, the construction of a power station at Minhla, and extensions to the Thabyewa, Nay Pyi Taw, Taungoo, Hlawga, Thazi, and Tagondaing power stations.

Compiler's note: Several of the 'Pte' firms listed in the news items above and below are trading companies based in Singapore with a representative office in Myanmar. See, for example, the websites of Alliance Global Technologies Pte Ltd: <http://www.alliancegt-sg.com/profile.html> and Royal GK Pte Ltd. <http://www.alibaba.com/member/sg101618290/aboutus.html>

Barons Machinery & Engineering appears to have been active in drilling work on bridge and power line construction projects in Myanmar for a number of years.

<http://www.exportersindia.com/company/369292/barons-machinery-engineering-pte-ltd/> Other companies involved in work on transmission projects include Parami, Se Paing and DEL. See the article [ELIU016](#) below. The Parami Co involved in the construction of the Kamanat – Myaungdaga transmission line could be the Parami Energy Co <http://www.bmp.osea-asia.com/index.php5?id=203062&Action=showCompany> which has engineering experience in drilling, casing and cement work on energy projects. Further information is not available about Se Paing and DEL.

Central China Power Grid International Economic & Trade Co Ltd (CCPGI) is the foreign trading arm of Central China Power Grid Co Ltd (CCPG), which was set up in 2003 to manage state-owned transmission and power generation facilities in six provinces in central China. Amid plans for the re-organization yet again of state power companies in the PRC, the website of CCPG <http://intl.ccpq.com.cn/> appears to have vanished from the cyber waves. References to other contracts signed between MEPE and CCPGI on equipment for transmission line projects are included below.

Chint Electric describes itself as “the leading player among the low-voltage electrical and power transmission and distribution industries in China”. It makes and sells transformers, insulators, circuit breakers, capacitors, reactors, switchgears, surge arresters, and automation equipment. <http://chint.en.ec21.com/>

For electrical projects carried out in Myanmar by Gunkul Engineering and its subsidiary GK Power, see <http://www.gkmyanmar.com/> and the article [ELDS 016](#) below. A Yangon company active in installing sub-stations, O/H lines, control panels, cable trunking, etc, but not mentioned in these news items, is Aung Zabu Tun Industrial Ltd. Much of this company's work is done on contract to industrial and construction firms. www.aungzabutun-indltd.com For another company heavily involved in the installation of sub-stations, O/H lines, transformers, etc, in industrial, commercial and housing projects, see the website of Yoma Engineering Services. <http://www.yomaengineering.com/services.html> A recent check showed almost 70 projects listed. SuperMega Engineers Group and Trading Co Ltd is a Yangon company that specializes in electrical instrumentation and electrical and mechanical work in the construction of power plants, substations, transmission lines, etc. <http://www.super-mega.com/index.htm>. IGE Pte Ltd is a Myanmar trading company that has a variety of connections to the electrical industry in Myanmar. <http://www.ecvv.com/company/kyitunwin/profile.html>. Glover Electrical Industries has a list of projects it has carried out for MEPE and private industrial and commercial firms on its website: <http://www.glovermyanmar.com/profile.htm>

Map reference

For a map showing the location of most of the power stations and grids referred to in the grid contract news items see Slide 22 of the Country Report on Power Development Plans and Transmission Interconnection Projects presented by the Myanmar delegation at an ADB conference in November, 2008.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf> See, also, the discussion on the significance of the grids and power stations mentioned in these news items in the section on [Grid Map 6](#) below.

Additional references

NLM, 17/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-17.pdf>

Myanma Electric Power Enterprise (MEPE) signed contracts with five private companies for the purchase of electrical equipment for power stations at the Ministry of Electric Power No 2 in Nay Pyi Taw on 14/02/11. The contracts were signed with Barons Machinery & Engineering Pte Ltd, Sino Hydro Corporation Ltd, Gunkul Engineering Public Co Ltd, United National Oil & Gas Pte Ltd, and Chint Electric Co Ltd. MD Ei Phyusin Htay of Barons spoke words of thanks on behalf of the companies. MD Aung Than Oo of MEPE and executive directors of the companies signed the contracts for purchase of electrical equipment for the 230-KV power grid (in/ out) for the Sittoung, Thaphanseik and Ngapyawdaing power stations.

NLM, 05/12/10. <http://www.burmalibrary.org/docs09/NLM2010-12-05.pdf>

Contracts for the purchase of [a] power transformer, a capacitor bank and substation materials for the 230-kV Thaton main power station and the Mawlamyine main power station were signed between MEPE and Chint Electric Co Ltd, Gunkul Engineering Co Ltd and Central China Power Grid International Economic & Trade Co Ltd at the EPM-2 building in Nay Pyi on 02/12/10. Dr Aung Soe Win of Chint Electric expressed thanks on behalf of the companies.

NLM, 24/12/09. <http://www.burmalibrary.org/docs08/NLM2009-12-24.pdf>

EPM-2 Khin Maung Myint received Chairman Li Chao of Central China Power Grid International Economic & Trade Co on 21/12/09. They discussed matters related to cooperation between the ministry and CCPGI.

NLM, 13/06/07. <http://www.ibiblio.org/obl/docs2/NLM2007-06-13.pdf>

On 6 June, EPM-2 Khin Maung Myint met Chaiman [] of Central China Power Grid (CCPG) Co, Vice-Chair of CCPG Li Haiping and Director of CCPG Pusang at the Grand Hotel in Beijing. The minister thanked the company for supplying the necessary equipment to be installed along the Hlinethaya-Myaungdaka-Athoke power line and sub-power station. The minister and company officials discussed the supply of equipment for [other projects of the] power grid.

NLM, 04/01/07. <http://www.ibiblio.org/obl/docs2/NLM2007-01-04.pdf>

Central China Power Grid International Economic & Trade Co Ltd (CCPGI) and MEPE signed a contract on the purchase of electrical appliances for 230-KV power lines between Belin [and] Monywa, Meiktila and Taungdwingyi and for the sub-power stations at Shweli-1, Mongsan and Shwesaryan on 30/12/06. President Xie Ming Liang of CCPGI extended greetings. MD San Oo signed the contract for MEPE and GM Bai Shumming for CCPGI.

NLM, 25/03/04. <http://www.ibiblio.org/obl/docs/NLM2004-03-25.pdf>

Myanmar and the PRC signed a number of agreements today at the Zeyathiri Beikman in Yangon on 24/03/04 in the presence of PM Khin Nyunt and the Vice Premier of the State Council of the PRC Madam Wu Yi. . . . MD San Oo of MEPE and Vice-President Zheng Baosen of the State Grid Corp of China signed a commercial contract on the supply of 230-kV transmission lines and sub-station for the Myaungtaka-Hlinethaya-Yekyi project.

POWER DAM PROJECTS TO BENEFIT FOREIGNERS: ENVIRO GROUPS

Sai Zom Hseng, Irrawaddy, January 31, 2011. http://www.irrawaddy.org/article.php?art_id=20638

Almost all of the electricity expected to be generated by hydropower dams now under construction in Burma will be sold to China and Thailand, with just one percent going to domestic consumers, according to environmental watchdog groups.

During a recent seminar on the Thai-Burmese border, groups researching the impact of the dams on rivers in Burma and neighboring countries noted that Chinese companies are involved in all but one of 21 major dam projects currently underway in Burma. "Since China is the main investor in the dam projects, it will receive most of the electricity. China will get 48 percent, while 38 percent will go to Thailand and 3 percent to India. Only one percent will be available for domestic consumption," said Sai Sai, the coordinator of Burma Rivers

Network (BRN), one of the groups that took part in the seminar. The remaining 10 percent, he added, will be used by the Burmese military and on large-scale development projects such as the construction of a natural gas pipeline from western Burma's Arakan State to China.

According to BRN, the 21 dams being built in Kachin, Shan, and Karenni states and Mandalay and Sagaing divisions will produce a total of 35,640 megawatts (MW) of electricity. Following visits to Burma by Chinese officials late last year, Chinese investment in the Tasang dam, located on the Salween River in Shan State, is set to increase from US \$6 billion to \$10 billion, said Sai Sai, who added that the dam will be the largest in the state when it is completed.

While China is laying claim to most of the electricity being generated by the dams, India is also investing heavily in other projects designed to meet its own needs. The Kaladan Multi-Modal Transit Transport Project, which aims increase India's trade with Southeast Asian countries and give it better access to its isolated northeastern state of Mizoram, was also criticized at the seminar for failing to take into account its impact on local people and the environment. "We're not saying the project should never be implemented, but it should be put on hold until there is a more accountable government in Burma that will think about the impact and the effects of the project," said Aung Marm Oo, the director of the Arakan Rivers Network.

The project, which will involve the development of the Sittwe seaport in Arakan State and the dredging of the Kaladan waterway to Paletwa in Chin State, will be carried out by Indian state-owned and private companies in cooperation with the Burmese regime, which will be responsible for constructing a highway from Paletwa to the Burma-India border. According to Indian media reports, the \$110 million Indian-funded project will be completed in 2014-5.

Meanwhile, Bangladesh has also staked a claim to a portion of Burma's growing hydropower capacity. It plans to buy most of the electricity that will be generated by four projects now under construction in Arakan State, including the Laymro dam, which will become the largest in western Burma with a capacity of 500 MW.

Some of the remaining electricity will be used to construct pipelines to send natural gas from Burma's Shwe gas fields to China, according to ARN's Aung Marm Oo. ARN says that its research shows that the projects will deprive local people of their land and livelihoods. Even in the preliminary stages of the projects, there have been many cases of land confiscation and forced labor, the group said.

Additional references

See below: ['Access to electricity](#) in Myanmar' (Appendix 24)

TOWERS ON [HLINETHAYA-AHLON POWER GRID](#) UNDER CONSTRUCTION **NLM, 31/01/11. <http://www.burmalibrary.org/docs11/NLM2011-01-31.pdf>**

EPM-2 Khin Maung Myint inspects construction of the suspension towers of the 230-KV power grid across the Hline river at the compound of Ahlon Power Station on Strand road in Yangon. He is briefed by Engineer Htay Oo of Bridge Construction Special Group-1 of Public Works on the concreting of the RCS-2 bored pile and the installation of the tower crane.

Project Manager Hla Myint of Power Supply Project (South) of MEPE reports on the arrival of beams and related equipment for the four towers which are being imported by Bawa Trading Co Ltd and provides detailed information on the weight and height of suspension tower-2 to be built on the bank in Ahlon and bored pile RCS-1 on the Seikkyi bank of the Hline river.

Additional references

See below: ['Risky job for line crew on Bago river crossing pylons](#) (NLM: 27/02/09)
['Power hungry Myaungdagar industrial zone nearly ready'](#)(MT: 25/02/08)

'[Grid Map 3](#): Transmission System as it existed in mid-2007'

'[Grid Map 4](#): Long-term plan for Transmission System'

NLM, 21/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-21.pdf>

D-G Khin Maung Zaw of Dept of Electric Power of EPM-2 inspects the installation of the conductor line of the 230-KV Hlinethaya-Ahlon power grid near Tuchaung village and construction of the extended Switch Bay at Hlinethaya power station in Hlinethaya Township and the river Crossing suspension-2 at Ahlon Power Station in Ahlon township.

NLM, 15/01/11. <http://www.burmalibrary.org/docs11/NLM2011-01-15.pdf>

At the Ahlon power station Engineer Maung Maung Kyaw briefed PM Thein Sein and party about the construction of the 230-kV Ahlon Twin Bundle Double Circuit power grid line across the Hline river. . . . Afterwards the PM and his party inspected the work being done on the double-circuit power grid project on the Ahlon bank. [Photos of the double circuit power grid under construction are included in the print edition of NLM.]

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

With a view to implementing projects to supply electricity, EPM-2 is undertaking national grids such as the installation of . . . the 15-mile-long Hlinethaya- Ahlon 230-KV Twin Bundle, Single Circuit power grid project [and] the 0.9 mile long Hline River crossing (Ahlon) 230-KV Twin Bundle, Single Circuit power grid project . .

NLM, 08/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-08.pdf>

EPM-2 Khin Maung Myint inspected connection of 230-KV power lines between Hlinethaya and Bayintnaung and distribution of power to output feeders such as Ywama, Seinpanmyaing, Hsinmalaik-1 and -2 power lines in the Bayintnaung main sub power station in Mayangon township on 06/10/08. Using the power distribution panel in the control room the minister was able to monitor distribution along the 230-KV power lines in Hlinethaya and Bayintnaung and the transformers in the switch yard and the application of the communication network carrier system.

NLM, 15/09/08. <http://www.burmalibrary.org/docs6/NLM2008-09-15.pdf>

EPM-2 Khin Maung Myint visits the main power station in Hlinethaya where he is briefed on the supply of power from the Myaungdaga power station to Hlinethaya and linkages to Bayintnaung power station, as well as distribution of electricity through lines to Nyaungdon and Seikkyi-khanaungto-Kawhmu-Kungyangon. The minister looks into maintenance of transformers, linkages of power lines and functions of power supply.

NLM, 13/03/07. <http://www.ibiblio.org/obl/docs2/NLM2007-03-13.pdf>

A ceremony to mark the completion of the 73-mile-long, 230-KV power grid between Hlinethaya and Athoat (Yekyi) was held in Kazintaw village, Pantanaw township on 11/03/07. A total of 319 towers are included along the 230-KV, twin bundle, single circuit transmission line.

NLM, 25/03/04. <http://www.ibiblio.org/obl/docs/NLM2004-03-25.pdf>

ME San Oo of MEPE and V-P of State Grid Corporation of China Zheng Baosen signed a commercial contract [worth US\$ 16 million, on supply of] transmission lines and sub-stations for the 230-KV Myaungtaka-Hlinethaya-Yekyi project.

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[YWATHAYA VILLAGE LIGHTED UP BY SOLAR POWER](#)

NLM: 26/01/11. Edited and condensed. <http://www.burmalibrary.org/docs11/NLM2011-01-26.pdf>

Byline: Maung Maung Myint Swe; Photos: Tin Soe (Myanma Alin)

Ywathaya has become the first village in Myanmar to rely completely on solar power for lighting purposes. The village is located about 12 miles northeast of the city of Myingyan in the central part of the country. It is composed of 247 residences and is surrounded by thriving crop plantations. The solar power project there was launched in September 2010 and completed in the last week of October.

Manager (Engineering) Aung Kyaw Thu of Earth Renewable Energy Systems Co said they had set up 15 solar lamp posts along the four main roads and solar chips on each house in the village. Each lamp post is installed with an 85-watt solar panel, and each house with a 40-watt solar chip. The houses are equipped with 5-watt lamps, while the lamp posts have 25-watt high power LED bulbs.

During our visit, we found that each house was installed with a solar chip, a solar power DC to AC charging system, a 12-V, 70-AH battery, 5-watt lamps, and a set of solar power equipment made up of wire and related accessories. If the solar chip is exposed to the sun for five hours, enough power can be stored to light six bulbs at the same time for eight hours. However, the light from one central bulb thoroughly covers the whole home. So, villagers can use electric power the whole night. Using TVs, cassettes and radios with solar power, all houses in the village enjoy better socio-economic status.

The steel lamp posts in the village are 18 feet high. The light from a lamp post covers an area 100 feet long and 30 feet wide. Each lamp has automatic system to switch it on and off. If a lamp is used for 10 hours daily, it can be serviceable for 10 years.

The Ministry of Industry-2 will soon build a solar chip factory in South Dagon Industrial Zone.

[Photos included in the print edition of NLM show a large panel of solar cells, lamp posts with individual solar panels, and the interior and exterior of a home where electricity produced by the solar cells is used to power lights and a TV set.]

Additional references

See below: [‘Solar power](#) seen as solution for remote villages’ (MT: 06/10/03)

Maung Tway Htet, NLM, 25/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-25.pdf>

Apart from solar-powered equipment, the Ministry of Industry-2 is preparing to produce solar panels ranging from 21 watt to 185 watts at its Machine Tool and Electronics Factory (South Dagon) starting in Sept 2010.

PRIME MINISTER UPDATED ON THE MYITSON HYDROPOWER PROJECT

NLM, 25/01/11. Edited and condensed. <http://www.burmalibrary.org/docs11/NLM2011-01-25.pdf>

PM Thein Sein visits the Myitson hydropower project site near Tanphe village about 25 miles north of Myitkyina. D-G Myint Zaw of the Hydropower Implementation Dept briefs him on the site for building the stonefilled concrete bed of the dam and related structures, the program to divert the river in three phases, preparations for building the spillway and hydropower plant, a comparative study between heights of stone-filled concrete beds and installed generation capacities, and arrangements for construction of a bridge across the Ayeyawady near the project site.

The PM is also briefed by CPI Corp V-P Zhang Xialu and the local GM of CPI, Li Guanghua, on the the company's investments in hydropower projects in Kachin state including work on the Chiphwe project. CPI is using the Irrawaddy river route from Yangon to Myitson to transport materials and equipment for its projects. Also covered in the briefing is the use of seismographs, ongoing tasks for environmental conservation, and assistance for the relocation of villages in the low-lying project areas.

The PM responds that relocated villages in the project area have been provided with water, electric power, buildings and religious buildings. However, there is a continuing need to encourage long-term businesses for local people. In the region, perennial trees such as teak, rubber plant, orange, mango and grapefruit grow well, he notes.

The PM visits Aungmyintha village [where displaced persons are being moved to], and greets the residents cordially, asking about education, health care and livelihoods. At the high school in the village, he discusses education matters with the teachers.

Myitsone hydropower project lies on the Ayeyawady river near Tanphe Village, about 4.3 miles downstream of the confluence of the N'maikha and Malikha. rivers. The concrete-faced rockfill dam (CFRD) at the site will be 4298 feet long and 458 feet high. The reservoir behind the dam will be able to store 9.788 million acre feet of water. Eight turbine-generators installed in the power house near the dam will have a combined capacity of 6000 megawatts and are expected to produce 29,400 million kWh a year.

The Hydropower Implementation Dept, Asia World Co Ltd, and CPI Yunnan International Power Investment Co Ltd of the PRC have been implementing the project since 21/12/09. The project term is estimated to be over nine years. So far, the project has been completed by 8.5pc. It is scheduled to be completed cent per cent by 2019. On completion, Myitsone hydropower project will be the world's sixth highest of its kind.

[Photos included in the print edition of NLM show a scale model of the main gate of the dam looking downstream, and pictures of the Aungmyintha townsite and high school.]

Map references:

A good set of maps for understanding the context in which the Maykha-Malikha valley series of dams will be built is to be found in *Damming the Irrawaddy*. The locations of the major dams are tentatively pinpointed on doc p 17. The maps on doc pp 28 and 62 show the estimated flood area of the Myitsone dam near the confluence of the N'mai and Mali rivers.

<http://www.burmariversnetwork.org/images/stories/publications/english/dammingtheirrawaddy.pdf>

These maps may be usefully compared with the older U.S. Army topographical series listed below.

Burma 1:250,000: Series U542, NG 47-09: Myitkyina

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ng47-9.jpg>

China 1:250,000: Series L 500, NG 47-10: T'eng Ch'ung

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-10.jpg>

The location of the Myitson or Confluence dam and power station is to be found at a point where these two maps join. See grid square 38\2, 9\2 on both maps.

The best map for understanding how the river will be dammed up and rechanneled at the confluence is to be found in *Resisting the Flood* on p A 10.

<http://www.burmariversnetwork.org/images/stories/publications/english/ResistingtheFlood-1.pdf>

See also Google Earth for a bird's-eye view of how the two rivers meet at the confluence. The Myitson river bend is easily located by a pop-up tag at 25°42.38' N, 97°29.54' E.

Additional references

Data summary: [Myitson](#)

See below: 'Agreement signed for Upper Kachin hydel projects ([Myitson](#))' (NLM: 02/01/07)

NLM, 25/03/11. Edited and condensed. <http://www.burmalibrary.org/docs11/NLM2011-03-25.pdf>

At the session of the Union Parliament on 24/03/11, Representative Khin Maung Yi of Ayeyawady Region raised a question concerning the impact of the dams being implemented at Myitsone and in the upper Maykha-Malikha river basin on the water levels in the lower Ayeyawady. He said the farmers and people of Ayeyawady Region rely on the river for agricultural, economic and social affairs and he wanted to know what kind of losses and damage the upstream projects might cause and what measures needed to be taken to prepare for this. Hydropower Minister Zaw Min said that matters concerning the environment and relocation were considered to be of special concern. At the site of the Myitsone project, the annual rainfall was 91 inches. The average flow of water in the river at this point was 128.52 million acre feet per year. The dam to be constructed would be of concrete face rock-fill type, 4300 feet in length, 458 feet in height and would be able to store up to 9.788 million acre feet of water. This would amount to 7.6pc of the flow into the river and was not expected to have any material impact on the agricultural, economic and social activities of the people in the lower Ayeyawady. During the hot season, when the inflow of sea water increases [in the delta], water levels in the lower course of the river would actually rise 1.5 to 2 feet higher as the generation of

electricity at Myitsone would release water stored at the dam and this would prevent the inflow of salt water [in the delta].

NLM, 22/03/11. Edited and condensed. <http://www.burmalibrary.org/docs11/NLM2011-03-22.pdf>

Replying to a question in Parliament from Kachin State representative Zakhun Ting Ring as to what arrangements are being made for the people who live in the area where the Myitsone hydropower project is under construction, EPM-1 Zaw Min said that five villages in the Myitsone area have been relocated. They include Tanphe, Kyeinkaram, Myitsone, Khappa/Aungjayan and Daungpan villages, with a total of 410 households and a population of 2146. The former three villages were moved to Aungmyintha new model village and the latter to Maliyan new model village. Each household has been provided with a new two-storey traditional Kachin-style wooden houses and a plot of land. Concrete roads have been built, a high school with two extensions, three primary schools, a police station, a post office, a general administration office with fire station, a 16-bed hospital and four religious buildings have been provided. A water system and electricity been installed. Aungmyintha model village is situated on the Myitkyina-Myitsone concrete road. Compensation for farmlands and perennial crops were given to locals after negotiations with local authorities and land reclamation was carried out. Currently there are opportunities for locals to work on stone and sand production, building and road construction, civil engineering works in the projects and supplying food for the tens of thousands of workers on the projects. Construction of a bridge across the Ayeyawady south of the Myitsone project is currently underway and will be finished in 2011. The first generator at Myitson will start up operations in 2018 and the others will come on-line in 2019.

NLM, 06/03/11. <http://www.burmalibrary.org/docs11/NLM2011-03-06.pdf>

Rice, cash other supplies and TVs were presented to the households who have moved to Aungmyintha model village on 01/03/11. Work is continuing on the construction of houses there.

KNG, 26/01/11. Edited and condensed. <http://www.kachinnews.com/news/1844-relocation-deadline-in-myitsone-tang-hpre-village-creates-quandary.html>

Residents of Tang Hpre village near the site of the Myitsone dam have been caught up in the search for gold [in lands that will be flooded when the dam is completed]. "It is akin to hell now. More and more people are addicted to drugs in the village, which is being destroyed due to digging for gold," said Bawk Naw, a villager from Tang Hpre. He told Thailand-based KNG that whole paddy fields are being destroyed because of gold mining and no one is even attempting to plant paddy, due to the uncertain conditions. On top of that there is mounting pressure to relocate. Police and the Asia World Company came to the village on January 23 and 24 to talk about compensation and told villagers that they will need to relocate by March of this year. Tang Hpre villagers are to be compensated but the authorities have told them that the amount of financial aid will depend on plant count and food stored in every house. There will be no payment for house and land. "We villagers have decided not to shift from our village whatever comes our way," said Bawk Naw. Most young men are keeping away from the village for fear of being arrested in connection with investigations related to the explosions that occurred near the dam construction site in April of 2010. There are more security check points and soldiers around the construction site since that time.

NLM, 24/12/10. <http://www.burmalibrary.org/docs09/NLM2010-12-24.pdf>

Inauguration of Aungmyintha model village and a 16-bed hospital in the village. Also the commissioning of a concrete road between Myitkyina and Myitson. A bridge is being built across the Ayeyawady river near the Myitson dam site. [A photo of the bridge site is included in the print edition of NLM.]

TAPEIN-1 HYDROPOWER PLANT IN KACHIN STATE OFFICIALLY OPENED

NLM, 24/01/11. Adapted. <http://www.burmalibrary.org/docs11/NLM2011-01-24.pdf>

A ceremony to inaugurate Tarpein-1 hydropower plant was held at the plant in Momauk tsp on 23/01/11. The dam and power station are located on the Tarpein River about thirty miles northeast of Bhamo near old Kalonskha village in Moemaik township. Construction work on the project started on 19/12/07 and the first generator began supplying power on 18/09/10.

The dam has a concrete embankment measuring 672 feet in length and 151 feet in height. Its water storage volume at full tank level is 18162 acre-feet. The other main hydropower structures include two 22-foot-diameter tunnels, each 9770 feet in length, a 23-foot-diameter, 806-foot-long water diversion tunnel, one 59-foot-diameter, 259-foot-high surge tank and a second surge tank, 228 feet high and 59 feet in diameter. There are four penstocks, each 16 feet in diameter and 1010 feet long, while the power plant where four turbine-generators are installed measures 289 feet by 89 feet by 151 feet. The total generating capacity of the plant is 240 MW and it is expected that it will produce approximately 1065 million kWh a year.

Present at the commissioning ceremony were Myanmar's prime minister, U Thein Sein and Chairman Wu Jing of China Datang Overseas Investment Co Ltd (CDOI). The plant will be operated by Datang (Yunnan) United Hydropower Developing Co Ltd (DUHD), a subsidiary of CDOI. Power is being supplied to Bhamo, Mansi, Momauk and Shwegu in southern Kachin state [and to the grid in Yunnan province just across the border in the PRC].

Speaking at the opening, EPM-1 Zaw Min said that his ministry currently has fourteen projects under construction that will have a total generating capacity of 3,337 megawatts, while national entrepreneurs are undertaking nine projects with a capacity of 586 megawatts. Forty-four other projects that will have a generating capacity of 41,545 megawatts are being carried out with the assistance of foreign investors.

[Photos showing the exterior of the power station and switch yard, the control room and the main gate of the dam are included in the print edition of NLM.]

Additional references

Data summary: [Tapein-1](#) [Tapein-2](#)

See below: [China Datang and Shwetaung](#) team up for six hydropower projects (NLM: 20/01/11)
 'Datang begins [operations at Tapein river](#) hydropower plant' (Interfax: 03/09/10)
 'Agreement on [four hydro projects signed with Datang](#) (Yunnan)' (PRC Comm: 15/01/10)
 'Ministers meet with [PRC suppliers](#) in Nanning and Wuhan' (NLM: 06/11/06)

NLM, 06/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-06.pdf>

An aerial view of Tarpein-1 hydropower plant and switch yard is included with an article on Kachin state.

Kyaw Hsu Mon, Myanmar Times, 31/01/11 (Issue 560). Condensed.

<http://www.mmimes.com/2011/business/560/biz56003.html>

Datang (Yunnan) United Hydropower Developing Co will operate the Tarpein-1 dam and power plant, about 45km northeast of Bhamo, for 30 years under the build, operate, transfer system. The first 60MW turbine came online in September, providing electricity to Bhamo, Mansi, Momauk and Shwegu townships in southern Kachin State. In a thinly veiled message to the Kachin Independence Organisation, both PM Thein Sein and Brig Gen Zayar Aung "urged local brethren" to ensure "stability for locals to enjoy the benefits" of the new hydropower projects. It is not clear what proportion of total production at Tarpein-1 will be reserved for domestic use, but residents in Bhamo confirmed they began receiving a significantly improved supply of electricity about three months ago, when the first turbine at Tarpein-1 came online. "We now have 24-hour electricity with full voltage. Up until three months ago we were getting only 12 hours a day, at night, and we had to use a [voltage] regulator because we were only receiving about 60 volts," said U Khin Maung Thin from Bhamo township. He said the Department of Electricity had provided 10 extra transformers to cope with the increased electricity supply. "We have never had enough electricity, particularly in the day time. There was a serious lack of electricity in this region before."

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

With a view to implementing projects to supply electricity, EPM-2 is undertaking national grids such as the installation of . . . the three-mile-long power line from the Kyaukpahto-Shwegu-Bhamo 66-KV power grid to the Naba sub-power station project . . . the 40 mile-long Naba-Mohnyin 66-KV power line project and the 55-mile-long Mohnyin- Mogaung 66-KV power line project.

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CHINA GUODIAN TO BUILD POWER STATION ON THE [NAM TABAT](#) IN KACHIN STATE

NLM: 22/01/11. Edited and condensed. <http://www.burmalibrary.org/docs11/NLM2011-01-22.pdf>

Vice-President Li Hon Gyuan and party of China Guodian [Huadian] Corporation of the PRC met with EPM-1 Zaw Min in Nay Pyi Taw for discussions related to the Nam Tabat hydropower project in Kachin state on 20/01/11.

Afterwards, an MoU on the Nam Tabat project was signed between the Dept Hydropower Planning of EPM-1, the China Guodian [Huadian] Corp and Tun Thwin Mining Co Ltd [of Myanmar]. Present at the signing ceremony were Myanmar government offices, V-P Li Hon Gyuan and party, Chairman Wang Junchang and party of Yunnan Yunneng Power Engineering Co, Ltd, and Chairman of Tun Thwin Mining Co, Ltd U Thein Tun and officials.

The project will be implemented on the Namtabat River, 45 miles southeast of Myitkyina, based on the JV/BOT system.

Compiler's note: As noted in the references below, the construction of a dam and power station on the Nam Tabak was originally assigned to the Buga Co, whose major shareholders are high-ranking members of the Kachin Independence Organization (KIO). The re-assignment of the project to China Guodian and Tun Thwin Mining should be seen in the light of the refusal of the KIO to accept integration of its armed wing, the KIA, into the Myanmar *Tatmadaw* during the period leading up to the elections of November 2010.

Map references

Burma 1:250,000: Series U542, NG 47-09: Myitkyina

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ng47-9.jpg>

China 1:250,000: Series L 500, NG 47-10: T'eng Ch'ung

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-10.jpg>

The Tabatkha [Dabak] is easily visible in the lower right hand corner of the Myitkyina map but the hydropower projects would be located in the mountainous country east of the village of Tabakyang (25° 08' N, 97° 33' E) shown on the T'eng Ch'ung map.

Additional references

See below: 'MoU signed on [Mawlaik and Kalewa](#) power projects' (NLM: 29/05/10)

'KIO promises better power supply for [Kachin state](#)' (IRROL: 25/08/06)

NLM, 24/01/11. <http://www.burmalibrary.org/docs11/NLM2011-01-24.pdf>

According to information published in NLM at the opening of the Tapein-1 hydropower station, two power plants are to be constructed on the Namtabet [=Namtabak]: the first with a generating capacity of 96 megawatts and the second with a capacity of 104 MW.

Global Witness, *A Choice for China: Ending the Destruction of Burma's Northern Frontier Forests*, p. 58, Oct 2005. www.globalwitness.org/media_library_detail.php/492/en/

In 1997, the KIO initiated the construction of two large hydro-electric power stations -- the Mali creek hydropower scheme and the Dabak river dam -- to improve the electricity supply situation in Kachin State. Eight years later, in Jan 2005, the KIO was in negotiations with MEPE regarding the purchase of electricity to be generated by these plants. The Jinxin Co with bases in both Tengchong and Pianma is the largest logging company operating in Kachin State. It is this company that has been the main contractor for the construction of both dams. Work is being carried out in return for logging rights to timber in the area, worth millions of dollars. The dams are being built with the permission of the SPDC, which also gave permission for logging the upper Dabak region to pay for the schemes. Neither dam has yet been completed, despite the fact that the value of the timber already exported to China exceeds the cost of the Mali project and half that of the Dabak project. Ara La, who manages the projects, formerly a leading member of KIO, left the organization in disgrace in the wake of a corruption scandal surrounding the dam construction. Following pressure from the Yunnan provincial gov't, Jinxin agreed in principle to complete Dabak. Whether or not

Jinxin is asked to finish the Mali dam depends on their performance at Dabak. It is feared that more timber will have to be felled in order to pay for further work.

NLM, 17/01/04. www.myanmar.gov.mm/NLM-2004/Jan04/enlm/Jan17_rg7.html

Mali hydel power project in Waingmaw township, with a capacity of over 10 MW, and Dabut creek hydel project, with a capacity of 24 MW, are being implemented in Kachin state. The projects will contribute to the industrial development of Kachin State.

Global Witness, *A Conflict of Interests: The uncertain future of Burma's forests*, October 2003, p. 93.

http://www.globalwitness.org/media_library_detail.php/113/en/

Electricity generation in Kachin state is totally inadequate. The Jinghkrang dam built by the SLORC in 1993 does not produce sufficient electricity to supply Myitkyina, let alone the rest of Kachin state, and that which is generated is prioritised to the Tatmadaw bases. Since 1997, the KIO has been involved in two hydroelectric power schemes, the Mali creek hydropower scheme and the Dabak river dam, to increase electricity generation in the state. This would increase the rate of development and provide for the needs of nascent industries in the area. In terms of the timber trade this could mean an increase in processing capacity and the manufacture of value added timber products. However, it is far from clear whether there would be a ready market for such value added products;

NLM, 11/04/01. <http://www.myanmar.gov.mm/NLM-2001/enlm/April11.htm>

SPDC Secretary No 1 Khin Nyunt and party were welcomed by KIO leaders, officials of the Bugar Co, members of the national races and local people. Officials reported on the targets and benefits of the Mali and Dabat hydro-electric power projects. Afterwards, Secretary No 1 and party met with KIO Chairman La Mon Tu Jai and national leaders, officials of Bugar Co and local people. They were introduced to officials of Mali hydro-electric power project. Secretary-1 said the Dabat and Mali power projects were the result of the KIO's endeavours for the local people's interests. Electric-powered home industries and commercial-scale industries would emerge not only in Myitkyina and Waingmaw but also in the villages in the area.

CHINA DATANG AND SHWETAUNG TEAM UP FOR SIX HYDROPOWER PROJECTS

NLM, 20/01/11. Edited. <http://www.burmalibrary.org/docs11/NLM2011-01-20.pdf>

A ceremony to sign MoAs on the implementation of six hydropower projects was held at Yeywa Hall of EPM-1 in Nay Pyi Taw on January 18. The projects include the Ywathit on the Thanlwin river, and the Nampawn Cascade and Namtamhpak in Kayah state and the Saingdin in the northern part of Arakan state as well as two on the Lemro river near the boundary between Arakan and Chin states in western Myanmar.

Signing the six MoAs were D-G Kyee Soe of the Dept of Hydropower Planning, President Kou Bingen of China Datang Overseas Investment Co Ltd and M-D [Eik Htun] of Shwe Taung Hydropower Co Ltd.

Afterwards V-P Zou Jiahua of China Datang Corporation and M-D [Eik Htun] of Shwe Taung Hydropower Co Ltd spoke words of thanks.

Company reference:

Shwetaung Hydropower Co Ltd appears to be the newest member of a large stable of companies involved with real estate development and construction activities associated with the name of U Eik Htun and his son U Aung Zaw Naing. Shwetaung Development Co Ltd is listed as the owner of the massive, double-towered, 18-storey-high Mawtin shopping and residential complex that was opened in Sept 2010 in downtown Yangon, as well as other large shopping centres at Junction 8 and Junction Zawana in Yangon and in Nay Pyi Taw and numerous housing estates throughout Yangon. Hi-Tech Concrete Co Ltd, also managed by U Eik Htun, has been heavily involved in the construction of roller-compacted concrete (RCC) dams, bridges, roads and other concrete structures in Myanmar for more than a dozen years. <http://www.high-techtechnology.com/n> The name of U Eik Htun, well known for his promotional skills, appears on websites connected with companies in Thailand, China, Vietnam and Bangladesh. It would

appear that he was largely responsible for brokering the deal between his own company, Datang and the governments of Myanmar and Bangladesh for the development of the hydropower projects on the Lemro and Saingdin rivers in Arakan. Other related companies include the Olympic Construction and Engineering Co Ltd, Hi-Star Co Ltd, Golden Tri Star Co Ltd, Asia Royal Hospital and the Ngwe Saung Beach Resort. U Eik Htun was also the managing director of the Asia Wealth Bank, a private institution, that was closed down by the military government in Myanmar in 2004 for reasons not stated but believed to be associated with money laundering operations.

Additional references

See above: 'Tapein-1 hydropower plant in Kachin state officially opened' (NLM: 24/01/11)
 See below: 'Datang begins operations at Tapein river hydropower plant' (Interfax: 03/09/10)
 'Agreement on four hydro projects signed with Datang (Yunnan)' (PRC Comm: 15/01/10)
 'Taping river hydropower projects under discussion in China' (Hubei Daily: 04/11/06)

DISPLAYS FEATURE LOCALLY MADE ELECTRICAL EQUIPMENT AND PARTS

NLM, 15/01/11. Edited and condensed. <http://www.burmalibrary.org/docs11/NLM2011-01-15.pdf>

PM Thein Sein and officials attended an exhibition of machine and spare parts used in the steam/gas turbines and power grids of the Ministry of Electric Power No 2 at Ahlon gas fired power plant of MEPE in Ahlon township on 12 January. Exhibits viewed by the PM and his party gave details of the Kyunchaung, Myanaung, Ywama, Mann (Minbu), Shwetaung, Thaton, Thakayta, Ahlon and Hlawga gas-fired power plants, including the location and age of the plants, their generating capacity, the types of machines in each along with their value and the costs of keeping them in repair.

The PM also observed a display of machine and spare parts made by local companies for the steam and gas plants of EPM-2 and the tools and materials used in construction of power grid by departments under the Ministry of Electric Power No. 2 as well as research-related documents.

The exhibition is being held with view to encouraging the development of businesses which will make more import-substitute materials for electrical industry thus reducing the use of foreign exchange in importing them from abroad.

MD Aung Than Oo of MEPE explained the display of 295 machine parts and spare parts, as well as facts about the nine gas -fired power plants across the nation, maintenance works, small, medium and large scale repair works, maintenance and repair costs and facts about the major machine parts of gas turbines.

The PM said the role of gas-fired power plants had become important for electricity generation. With the increasing population, improving living conditions and the changing lifestyle of the people, demand for electricity was growing by leaps and bounds. So, full use of all generated electricity was a special priority. As the gas turbines had been used for many years, it was necessary to be servicing and maintaining the machinery frequently and costs were high. Efforts were needed to manufacture machine parts locally rather than importing them.

Later, Deputy Chief Engineer Maung Maung Kyaw, explained about the construction of the 230-kV Ahlon Twin Bundle Double Circuit power grid line across the Hline river. Afterwards the PM and his party inspected the work being done on the double-circuit power grid project on the Ahlon bank. [Photos of the double circuit power grid under construction and of some of the electrical parts and equipment manufactured locally are included in the print edition of NLM.]

Additional references

NLM: 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held a co-ordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw of 05/03/10. . . . EPM-2 Khin Maung Myint submitted reports on the renovation of nine national grids, 10 main power station projects and planned major repair of power plants. . . . The power plants to undergo major repairs are No 3 turbine of the Ywama power plant, the No 1 turbine of the Ahlon power plant, the Hlawga recycle steam turbine, the Ahlon recycle steam turbine, the Thakayta recycle steam turbine, the Hlawga power plant, the Thakayta power plant, the No 3 turbine at the Kyunchaung power plant, the Shwedaung power plant, the Myanaung power plant, the steam turbine at the Mawlamyine power plant and the Thaton power plant.

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[Start 11](#)

MADAY DAM SERVING FARMERS OF KANMA TOWNSHIP

Byline and photos: Khin Maung Than (Sethmu), NLM, 14/01/11. Edited and rewritten.
<http://www.burmalibrary.org/docs11/NLM2011-01-14.pdf>

Maday dam is [near Gyobin Village (19° 02' N, 94° 54' E), 3.5 miles west of the Patheingyi highway] in Kanma township. The main embankment is 1920 feet long and 155 feet high, and the dyke, 1200 feet long. It gets an annual inflow of 91,100 acre feet of water from its catchment area of 0.76 [?] square miles. Its maximum water storage capacity is 54,000 acre feet, and its dead storage water surface is 960 acres. It was built between 2003 and 2006 and commissioned on 25 February 2007.

On our trip to Maday dam [in January 2011], we found the water in the facility was at the full tank level, and it was pleasant to view green areas around the dam. The main canal is ten miles long and has 298 irrigation structures and branch canals 47.8 miles long.

Kanma township has an average annual rainfall of 45.06 inches. This is enough for the paddy fields in the rainy season, so the dam water is mostly used for cultivating paddy in summer. During the period between the two paddy seasons, local farmers also grow chick pea, groundnut and sesame, especially pigeon pea. As a result of the triple-cropping pattern, they are getting ahead with their businesses.

Maday Dam is a reliable source of irrigation water. The facility benefited 157 acres of farmlands in 2007-2008; and 1436 acres, in 2009-2010. It is expected to benefit 4000 acres of summer paddy fields in 2010-2011. If so, the township will be able to put 8000 acres under paddy in a year.

Five and ten kV hydropower generators are installed along the main canal near Pyinhtaung and Ahtet Meepauk Village. [A photo accompanying the article in the print edition of NLM shows the exterior of one of the small-scale hydropower plants on the main canal of dam.]

Additional references

NLM, 20/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-20.pdf>

Maj-Gen Khin Zaw of the MoD visits Maday dam project near Gyopin Village, 3.5 miles west of the Patheingyi highway in Kanma township. The dam, which was opened on 25 February 2007, is 155 feet high and 1920 feet long. It has a storage capacity of 54,000 acre-feet and can irrigate 4,000 acres. He inspects the storage of water in the dam, construction of the spillways and the generating of hydropower to supply electricity to Ahtet Mipauk village. NLM (24/03/09) notes that "steps are being taken for the installation of turbines at the dam for small scale hydel power plants." <http://www.burmalibrary.org/docs6/NLM2009-03-24.pdf> See also the article in NLM (10/02/06) which mentions preparations for generating power at the dam. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060210.htm>

NEW HYDRO POWER PLANTS EASE DRY SEASON SHORTAGES IN YANGON

Kyaw Hsu Mon, Myanmar Times, 20/12/10 (Issue 554). <http://mmtimes.com/2010/news/554/index.html>

Yangon Electricity Supply Board (YESB) has no immediate plans to introduce a rotation system for the distribution of electricity to residential areas of Yangon, an official said last week. The system is normally introduced from December through to the start of the rainy season in May, as dwindling water supplies reduce the amount of electricity generated by the nation's hydro dams. In 2009, the rotation system was introduced on December 3 because a lack of rain over the monsoon season had reduced the generation capacity of the Lawpita dam in Kayah State, which is a major source of power for Yangon.

But board general secretary U Maung Maung Latt said last week new sources of electricity had reduced the city's reliance on Lawpita. "Although we are in the dry season we have enough power from the hydro projects because we are now using not only Lawpita but also Shweli and Yeywa. That's why we can still distribute power to residential areas in Yangon 24 hours a day," he said, adding that YESB also receives electricity from the Mone and Thaphansake hydro projects. "We can't say at the moment when the rotation system will be introduced."

Another factor in the improved electricity supply was the recent introduction of a fourth turbine at the US\$700 million Yeywa project, which is located in Mandalay Region and has a capacity of 790MW, or 3.55 billion kilowatt hours a year. "Until the second week of December there were three turbines running but now the last turbine has come online, so we can distribute more power," U Maung Maung Latt said.

Despite the improved supply, residents of some townships in Yangon Region said they are still without power for several hours a day. "Sometimes the power cuts out for two or three hours a day, sometimes it's out for the whole evening," North Dagon resident U Kyaw Myint said.

U Maung Maung Latt said such power outages were "temporary" and usually the result of a broken transformer. "These temporary shut downs happen because when a transformer breaks, the township branch station will stop the power supply [for safety reasons]," he said. Another major power outage occurred last month when a large group of migrating birds collided with high-voltage power lines near Shwedaung and Myaung Tagar in Bago Region, he said.

Supply to industrial zones in Yangon is also not constant, with electricity diverted from factories to residential zones from 4pm to 8pm each day. "Our first priority is residential areas," U Maung Maung Latt said.

Electricity consumption in Yangon Region averages 500MW a day and the nation's total consumption is about 1200MW, according to YESB.

Additional references

See below: '[Power boost for Yangon](#) as rain falls' (MT: 21/06/10)
 '[Coping with unreliable power](#) supply in Burma's cities' (IRROL: 22/05/10)
 'Rangoon reels under [severe power cuts](#)' (Mizzima: 02/04/10)

MONGTON HYDROPOWER PROJECT TO BE DEVELOPED ON UPPER THANLWIN

NLM, 12/11/10. Rewritten and condensed. <http://www.burmalibrary.org/docs09/NLM2010-11-12.pdf>

An MoU on the development of the Upper Thanlwin (Mongton) hydropower project was signed at Yeywa Hall of Ministry of Electric Power No 1 in Nay Pyi Taw on 10/11/10. Signing for the Hydropower Planning Dept of EPM-1 was Director-General U Kyee Soe, while Vice-President Bi Yaxiang signed for the China Three Gorges Corporation and Senior Executive Vice-President Prutichai Chonglertvanichkul signed for Egat International Co Ltd of and an [unnamed] official signed for the International Group of Entrepreneurs Co Ltd [of Myanmar]. Also present on the occasion was Group President Cao Guangjing of China Three Gorges Corp of the PRC and Chairman Nay Aung and officials of the International Group of Entrepreneurs. [A photo of the signing ceremony is included in the print edition of NLM.]

Compiler's note:

A release issued on 12/11/10 by the PRC's Ministry of Commerce with accompanying photo covers the same signing ceremony. It notes that Mongton project will have a generating capacity of 7.1 GW, the same as that previously announced for the Tasang project on the Thanlwin.

<http://www.mofcom.gov.cn/aarticle/i/jyjl/j/201011/20101107242451.html>

Additional references

Data summary: [Tasang](#)

See below: 'Chinese [firm takes 51% interest in Tasang](#) hydropower project' (MT: 19/11/07)

'EGAT [agreed only](#) to study feasibility of Salween project' (BKP: 10/06/07)

'Myanmar, Thailand begin work on [controversial Tasang](#) dam' (AFP: 05/04/07)

Bloomberg, 16/11/10. <http://www.bloomberg.com/news/2010-11-16/myanmar-china-thailand-agree-to-study-for-10-billion-hydropower-project.html>

China, Myanmar and Thailand have agreed to study a \$10 billion hydropower project that would be Southeast Asia's largest by generation capacity. The 7-gigawatt project would be built on the Salween River in Myanmar over 15 years, China's State-owned Assets Supervision and Administration Commission said in a statement on its website. Companies from the three countries signed an accord on the project on 10/11/10 according to the statement. China, the world's largest energy consumer, is planning to add hydropower capacity in its southern provinces such as Yunnan and help build hydro dams in neighboring countries including Myanmar, Laos and Cambodia to meet demand from the region. China Three Gorges Corp., Sinohydro Corp. and China Southern Power Grid Co. will work with the Electricity Generating Authority of Thailand and the International Group of Entrepreneur Co. in Myanmar on the study, according to the statement.

Jonathan Shieber and Wan Xu, Dow Jones, 24/03/10. Edited.

<http://www.foxbusiness.com/story/markets/industries/utilities/china-consortium-starts-work-myanmar-hydroelectric-project/>

Three Chinese companies, which set up a consortium to build a 7.1-gigawatt hydropower dam and station across the Salween river in Myanmar in November 2009 are proceeding with development plans, a Chinese government agency said on its web site. The State Asset Supervision and Administration Commission said the dam in Myanmar would be jointly developed by China, Myanmar and Thailand. The consortium includes China Three Gorges Corp., Sinohydro Corp., and China Southern Power Grid. The three companies have started work on the project, the commission said. Upon completion, the hydropower station will be the largest in Southeast Asia by installed capacity.

China Southern Power Grid. 15/07/08. http://www.sp.com.cn/dlyw/gndlyw/200807/t20080715_109473.htm

In order to implement the tasks under the "Framework Agreement on Myanmar's Salween River Basin Hydropower Development Strategic Cooperation", the China Southern Power Grid Co, Sinohydro Corp and China Three Gorges Project Corp held the first joint working meeting on Myanmar's Salween River Basin, and decided to form a tripartite joint working group. The meeting confirmed the membership, working place, working mechanism and the initial plan for the next phase work of the joint working group. This establishes the foundation for implementation of Myanmar's Salween river basin hydropower projects, particularly the Tasang hydropower project. The working group will develop the objectives, responsibilities and obligations, and start assessment of the initial project technology and business risks. They will also arrange joint market field research, and start pre-project work among the Chinese, Thai and Myanmar sides.

Kyaw Thu, Myanmar Times, 24/03/08. <http://mmtimes.com/no411/b002.htm>

According to an energy expert close to EPM-1, all hydropower joint ventures with Thailand are still suspended, despite Thailand's PM Samak Sundaravej recent visit which focused on increasing investment in the energy sector. Executive director Precha Sekhararidhi of the MDX Group had been quoted as saying on March 17 that the company intended to move ahead with its Tasang project in Myanmar after finishing two dams in Laos. However, the energy expert insisted the Tasang project has not moved forward since the end of last year and no formal instructions have been given to HPID to re-start their work. Construction of the project started at the end of March 2007 and was expected to finish in 2022. The Thai company initially had an 85pc share in the project before Myanmar's government reassigned control of the venture to a Chinese

company at the end of 2007. Under the new arrangement, MDX Group holds a 24pc stake, HPID has a 25pc stake, and the Chinese firm, Gezhouba Water and Power Group Co Ltd, holds a 51pc share.

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4000 MEGAWATT POWER PLANT PLANNED FOR DAWEI DEEP-SEA PORT

NLM, 03/11/10. Condensed and rewritten. <http://www.burmalibrary.org/docs09/NLM2010-11-03.pdf>

A framework agreement regarding the construction of Dawei Deep-sea Port, an industrial estate and a road and rail link to Thailand was signed in Nay Pyi Taw on 02/11/10 by Chairman Premchai Karasuta of Italian-Thai Development Public Co Ltd of Thailand and Managing Director Thein Htay of the Myanma Port Authority.

Plans for the seaport on the Andaman coast near Dawei call for the establishment of two harbours capable of simultaneously berthing 25 vessels ranging in capacity from 20000 to 50000 tons at 22 wharfs. An area of 250 sq kms will be set aside for the development which will include two heavy industrial zones, two medium heavy industrial zones, a light industrial zone, a residential community, parks and other infrastructure. Among the industries to be established in the area are a shipyard, petrochemical industries, an oil refinery and a steel plant. The seaport will be connected with Bangkok in Thailand by a motor road, a railroad, an oil pipeline and power transmission lines. A power station that can generate 4000 megawatts will be built for the whole project.

[The article is accompanied by several photos of scale models of the ports and industrial zones, a cross-section of the transportation corridor, and a map showing the corridor route between Nabule in Yebyu township and Kanchanaburi in Thailand.]

Additional references

Project summary: [Dawei seaport](#)

Htet Aung, Irrawaddy, 25/02/11. Edited and condensed. http://www.irrawaddy.org/article.php?art_id=20828
The latest anti-coal protest in southern Thailand's Nakhon si Thammarat Province has put further pressure on the country's coal-fueled energy industry, which will reportedly build a power plant in Burma where it hopes to find a more receptive environment. On Thursday, 10,000 residents of Tha Sala District in Nakhon Si Thammarat Province formed a "human chain" as a symbol of their determination to protect their district from a coal-fueled power plant slated to be built by EGAT," according to a press release by the protest organizer, Greenpeace Southeast Asia. As a result of the strong protests against the use of coal-fired power plants inside the country, Thailand is reportedly looking to build a power plant near Tavoy on the southern Tenasserim coastline. According to the conceptual plans of the Italian-Thai Development Co, Thailand will build a 4,000 megawatt (MW) coal-fired power plant—the largest in Southeast Asia—in an industrial estate on the Maungmagan beach near Tavoy. "Coal plants in Thailand are notorious polluters. Mae Moh in Lampang province is considered to be the worst of its kind in Asia, causing sickness and disease as well as lost livelihoods," said the Green Peace press release. In 2009, Thailand's Supreme Administrative Court suspended new construction of the 65 industrial factories in Map Ta Phut after the local residents filed a lawsuit against the Thai government.

Bloomberg, 03/11/10. <http://www.businessweek.com/news/2010-11-03/italian-thai-signs-8-6-billion-myanmar-port-contract.html>

Italian-Thai Development Pcl, Thailand's biggest construction company, signed an \$8.6 billion contract with Burma's government to build a deep-sea port and industrial estate, Vice President Anan Amarapala said. The project will be located in Dawei, less than 300 kilometers (186 miles) west of Bangkok, offering another route for exporters to ship goods to Europe and the Middle East. Financing for the agreement is still under discussion, Anan said. "Thailand's government has said they want to support the project, so Italian-Thai will discuss details with them," Anan said by phone. "There have been no official talks yet." The planned project would be 10 times bigger than Thailand's main port and industrial estate, according to Tanit Sorat, vice chairman of the Thai Chamber of Commerce, who has studied the proposal. Nippon Steel Corp., Japan's

largest steel maker, and PTT Plc, Thailand's largest energy company, are also considering an investment in the project, Tanit said last month. The project will include a coal-fired power plant, an industrial center, oil and gas pipelines and an eight-lane highway, according to Thailand's National Economic and Social Development Board. It may benefit automakers and petrochemical companies looking to expand in the region, it said. "Many private companies from Thailand and overseas would like to be involved in the Dawei project as developers or investors," Chompunuch Ramanvongse, an NESDB analyst, said last month. "There is a possibility that Ital-Thai will form a holding company for the purpose of co-financing with those developers."

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NEGATIVE IMPACT OF CHINA'S HYDROPOWER INVESTMENTS IN MYANMAR

International Crisis Group (ICG), *China's Myanmar Strategy: Elections, Ethnic Politics and Economics*, pp 8, 12, 14, 15, 16 (Beijing, 21/09/10). <http://www.crisisgroup.org/~media/Files/asia/north-east-asia/B112%20Chinas%20Myanmar%20Strategy%20%20Elections%20Ethnic%20Groups%20and%20Economics.ashx>

[**Compiler's note:** The selection below from ICG's report is limited to those parts which refer to China's hydropower investment in Myanmar. The report itself is richly footnoted and should be consulted for further reference purposes.]

Myanmar's hydropower resources are a target for investment because they offer an abundant source of inexpensive energy close to the border that can be used to satisfy growing Chinese demand. Beijing also hopes that Myanmar's hydropower resources can help improve the ratio of clean energy in its power companies' output. All five state-owned Chinese power companies are investing in Myanmar's hydropower sector.

Official data does not depict the full extent of China's economic engagement in Myanmar. Chinese build-operate-transfer (BOT) projects are classified as government loans/aid and therefore omitted from official investment figures. Major BOT projects such as the \$440 million Shweli-1 hydropower station constitute a significant influx of Chinese capital. The level of Chinese investment is also underreported because many private companies and individual investors invest under local partners' names to gain preferential treatment reserved for nationals. And while Chinese investment in the areas controlled by the ethnic groups is also rising, it is often not included as foreign investment in official reporting because government control in these areas is weak or non-existent.

Several factors contribute to China's deteriorating image in Myanmar. First, the distribution of benefits from large projects is regarded as unequal and unfair. The colossal Myitsone Dam in Kachin State is expected to send most of the power generated to China after its scheduled completion in 2017. This is widely resented by local residents, who continue to suffer serious electricity shortages. "We don't want dams. SPDC and China Power Investment (CPI) signed an agreement without giving notice to Kachin people to construct seven dams in Kachin State. All the power will support China. It is not for locals, it's not for our country". According to a Kachin leader, "The Chinese government and Chinese companies are a big vacuum; they suck all the resources out of Kachin State, making it a desert, which is fully resented by the Kachin people". The Kachin resent that they are often unable to compete against Chinese companies which dominate gem mining in small-to-medium scale operations. There is also considerable anger towards Chinese companies that import labour rather than hire locally. Local communities also suffer from damage to their traditional ways of life and to the environment by Chinese projects.

The Myitsone dam project will displace up to 15,000 farmers and fishermen, who will lose their original livelihoods. The dam will alter the environment, ecology and biodiversity of the region, including the river itself, yet no independent, international impact assessment has been conducted. Local residents have not received relocation compensation from CPI, which argues that the money has been paid to Naypyidaw. Many found that replacement housing was "uninhabitable". Local people further complain about disregard for sacred sites and cultural artefacts. A Burmese analyst noted that while ethnic Chinese have lived in

Kachin State for decades, if not centuries, the antipathy towards them was relatively new. Immigrant Chinese are often scapegoats for the unaccountable behaviour of Chinese companies and Naypyidaw.

As negative impressions of Chinese companies grow within Myanmar, China increasingly recognises the threat local opposition poses to its business and security interests. Chinese mining and hydropower projects are frequently targets of protest and condemnation by local and international organisations. In April 2010, a series of bombs exploded at the Myitsone dam construction site. The military government suspected the KIO, but Kachin leaders deny the organisation was behind the bombing. On the ground near the blast site, several sources have said that local resentment of the project was so widespread that anyone could have been responsible. Civil society groups warn the bombing signals that border ethnic groups' grievances may cause further violent backlash against Chinese investment.

But Beijing's pursuit of its interests in Myanmar is encountering significant hurdles. The location of largescale Chinese energy investments – including in Kachin, Shan and Rakhine States – links their security to the stability of ethnic group areas. Yet many projects are increasing resentment of China in Myanmar, due to unequal distribution of benefits, environmental damage and harmful impacts on local communities and traditional ways of life. If China does not act to limit the negative impact of its companies in Myanmar, it risks increasing tensions in ethnic group areas and possible violent backlash, all of which would undermine its economic and security interests. China's efforts at enhancing its relationship with Naypyidaw could also affect relations with the ethnic groups to the extent that it may no longer be able to act as a broker of talks and instead becomes a target of protest itself.

Additional references

See below: 'Hydropower projects generate [concern in South Asia](#)' (Asian Energy: 15/03/09)
 'China petitioned on Burma dam projects' (dpa: 02/12/07)
 'China - ASEAN Power Co-operation & Development Forum: Notes' (CEC: 29/10/07)
 'Chinese [hydropower investment in Mekong region](#): Perspectives' (LRS: 29/09/07)

DATANG BEGINS OPERATIONS AT TAPEIN RIVER HYDROPOWER PLANT

Interfax, 03/09/10. http://www.hydraworld.com/index/display/news_display.1256086555.html

China Datang Corp., one of China's five largest power generators, has put a 240-megawatt (MW) hydro-power plant into operation on the Tapein river in northeastern Myanmar, the company announced Sept. 2.

According to China Datang, four generators each with an installed capacity of 60 MW are now operational.

The company plans to boost the installed capacity of the RMB 1.7 billion (\$250 million) hydropower plant to 400 MW in the future, allowing the plant to generate a total of 1.07 billion kilowatt-hours (kWh) of electricity per year, Datang said.

Under a BOT (build-operate-transfer) contract between Datang and the Myanmar government, Datang will operate the plant for 40 years before transferring it to Myanmar.

Over 90 percent of the electricity produced at this plant will be transmitted back to China, Datang said. Construction of the plant was started in December 2007.

Topographic map references:

China 1:250,000: Series L500, U.S. Army Map: NG 47-13: Lung Ling
 Tapein-1 hydropower project is near Kalonkha [Hkalunghko: 24°25' N, 97°31' E], grid square : 38\3, 8\3.
<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-14.jpg>

Burma 1:250,000: Series U542, U.S. Army Map: NG 47-14: Bhamo

The site of Tapein-2 hydropower project is reported to be a few miles downstream from Tapein-1, probably near the village of Kalehkyet [24°21' N, 97°27' E] grid square 38\2, 8\2.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ng47-13.jpg>

Additional references

Data summary: [Tapein-1](#) [Tapein-2](#)

See above: '[Tapein-1 hydropower plant](#) in Kachin state officially opened ' (NLM: 24/01/11)

See below: '[China Datang and Shwetaung](#) team up for six hydropower projects' (NLM: 20/01/11)

'Agreement on [four hydro projects signed with Datang](#) (Yunnan)' (PRC Comm: 15/01/10)

'Ministers meet with [PRC suppliers](#) in Nanning and Wuhan' (NLM: 06/11/06)

'[Taping river](#) hydropower projects under discussion in China' (Hubei Daily: 04/11/06)

NLM, 25/09/10. Edited. <http://www.burmalibrary.org/docs09/NLM2010-09-25.pdf>

A ceremony was held at the hall of the Ministry of Electric Power-1 in Nay Pyi Taw on 23/09/10 to give work permits, company registration certificates, legal opinions and concession rights to the Upstream Ayeyawady Confluence Basin Hydropower Co Ltd for the Myithson hydropower project and to Dapein-1 Hydropower Co Ltd for the Tarpein-1 hydropower project. Vice-President Zhang Xiaolu of China Power Investment Corp received the documents on behalf of the Upstream Ayeyawady Confluence Basin Hydropower Co Ltd and President Kou Bing-en of China Datang Overseas Investment Co Ltd received the documents on behalf of the Dapein-1 Hydropower Co Ltd. Also present on the occasion were government ministers and officials and Managing Director Tun Myint Naing of Asia World Co Ltd, and Chairman U Myint Lwin of Tarmoenye Chantha Co Ltd.

NLM, 23/09/10. <http://www.burmalibrary.org/docs09/NLM2010-09-23.pdf>

EPM-1 Zaw Min received Chief Economist of China Datang Corp, Chairman Wu Jing and President Kou Bing-en party of China Datang Overseas Investment Co Ltd and Chairman of the Datang (Yunnan) United Hydropower Developing Co Ltd (DUHD), all of the PRC on 22/09/10. They discussed cooperation in hydropower projects.

International Crisis Group, *China's Myanmar Strategy: Elections, Ethnic Politics and Economics*, p. 12 (Beijing, 21/09/10). <http://www.crisisgroup.org/~media/Files/asia/north-east-asia/B112%20Chinas%20Myanmar%20Strategy%20%20Elections%20Ethnic%20Groups%20and%20Economics.ashx>

Footnote 129: Datang Group's B.O.T agreement with the EPM-1 on the Taiping-1 hydropower project was omitted from Myanmar Ministry of National Planning and Development's investment figures for 2009, citing 《大唐与缅甸第一电力部签署太平江一期水电项目合资协议》 ["Datang signs joint venture agreement on Taiping River I hydropower project with Myanmar's First Electricity Ministry"], Datang Group, 30 December 2009.

NLM, 26/09/09. <http://www.burmalibrary.org/docs07/NLM2009-09-26.pdf>

EPM-1 Zaw Min received President Wujing of China Datang Overseas Investment Co Ltd and party from the PRC at the ministry in Nay Pyi Taw on 25/09/09.

KNG, 26/09/09. (edited and condensed)

<http://www.kachinnews.com/index.php/news/1120-chinese-citizens-from-eastern-burma-asked-to-return.html>

Chinese border authorities have been collecting names and making a list of hundreds of PRC citizens working in the two hydropower project sites on the Dapein river in the Bhamo district since last week. The sites are situated near the China border. Observers in the border area in northern and northeastern Burma believe the registration may be related to a possible outbreak of violence between ethnic armies along the border and the Burmese army.

NLM, 08/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-08.pdf>

PM Thein Sein and his entourage visit Tarpein-1 hydropower site near Kanlonkha village in Moemauk township. He is briefed by EPM-1 Zaw Min on the Tapein-1 and Chiphwaynge projects and presents a basket of fruits to the technicians of the Datang (Yunnan) United Hydropower Developing Co Ltd (DUHD) of

the PRC. The main dam is being paved with concrete and construction work is proceeding on the intake structures. The concrete dam is 672 feet long and 151 feet high and has a catchment area of 2400 square miles. The 240-MW power plant is expected to produce 1065 million kWh hours annually. [A frontal aerial view of the dam site is included in the print edition of NLM.]

KNG, 25/03/09. http://www.kachinnews.com/index.php?option=com_content&view=article&id=763:kio-junta-lock-horns-over-taping-hydropower-projects&catid=1:latest-news&Itemid=50

A KIA outpost in the border area where the Datang company from China is building two hydropower dams on the Taping river was destroyed by the Burmese army on 27 February, but it has since been restored. However Burmese army soldiers continue to man their own outpost along the Myitkyina-Bhamo road and no one is allowed entry to the project sites except the company's workers, said local eyewitnesses.

NLM, 27/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-27.pdf>

Deputy EPM-1 Myo Myint inspects the Tapaing-1 hydel power plant project, 30 miles NE of Bhamo. He visits the dam site and checks on construction of the dam. The project is being implemented by Construction Group 5 of the ministry. Work is proceeding on the diversion tunnel and two intake channels. Earth work is continuing. The power plant will be equipped with four 60-megawatt generators.

NLM, 01/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-01.pdf>

President Wu Jing of Datang (Yunnan) United Hydropower Developing Co Ltd visits Nay Pyi Taw for discussions related to Tarpein-1 hydropower project.

IRROL, 01/10/08. http://www.irrawaddymedia.com/article.php?art_id=14360

Tensions soared in Moemauk township where Chinese construction workers are building a dam across the Tarpein river. Chinese authorities [company officials?] refused to pay a tax to the Kachin Independence Organization which claims control over the area. The KIO responded by deploying soldiers around the two [?] dams in mid September, causing Chinese workers on the project to flee and construction was suspended. Sources close to the KIO said that the workers returned and the project resumed about a week ago after the Chinese paid 1.5 million yuan (US \$220,916) to the KIO. The negotiation was reportedly mediated by newly appointed Northern Commander Soe Win. The Tarpein-1 hydroelectric dam is designed to generate a capacity of 240 MW and is located about 3.5? (6 km) miles from Momauk town, while Tarpein-2, which should generate 168 MW, is located about 6 miles (10 km) downstream of Tarpein-1. According to a Kachin environmentalist, Naw La, who is coordinator of the Chiang Mai-based Kachin Environmental Organization, about 30pc of the construction work at Tapein-1 project has been completed. (Compiler's note: The distance from Momauk town appears to be about 18 (29 km) miles, judging from the map)

NLM, 27/09/08. <http://203.81.72.132/newpaper/279newsn.pdf>

Director-General [Aung Ko Shwe] of the Hydropower Implementation Dept of EPM-1 and President Wu Jing of the Datang Yunnan United Hydropower Developing Co Ltd of the PRC signed an MoU on the implementation of Tapaing-2 hydropower project in a ceremony at the Ministry in Nay Pyi Taw on 25/09/08. It is learnt that Tapaing -2 hydropower project is of 160-MW capacity.

KNG, 30/07/08.

http://www.kachinnews.com/index.php?option=com_content&view=article&id=327:1000-acres-of-paddy-fields-flooded-in-heavy-rain-in-bhamo&catid=1:latest-news&Itemid=50

Construction of two hydroelectric power projects is underway side by side in China and Burma on the Taping River, also called Ta Hkaw Hka in Kachin.

Dow Jones, 04/03/08.

http://news.morningstar.com/newsnet/ViewNews.aspx?article=DJ/200803040541DOWJONESDJONLINE000209_univ.xml

Chinese power producer Datang Group will take a controlling stake in a hydropower project in Burma. Datang's total investment in the [Taping river] project will be up to CNY 1.6 billion [US\$ 225 million], GM Zhai Ruoyu said in Beijing. The installed capacity of the hydropower plant will be 180 MW, Zhai said.

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ADVANCED INSULATOR FACTORY OPENED IN CHAUK TOWNSHIP

NLM, 04/09/10. Edited and condensed.

The opening of the Advanced Insulator Factory of Myanma Ceramic Industries took place near Chauk on 03/09/10. Among those taking part in the ceremony was Director Yin Htwe of Unicom Trade & Travel Co Ltd. Afterwards, Managing Director Soe Yi of MCI reported on production, maintenance of the machines, availability of raw materials and supply of quality insulators needed. Gifts were presented to the foreign experts who had taken part in building the plant.

The quality insulators produced at the factory, which is located about four miles southwest of the city of Chauk, will help to reduce imports from abroad. It will also make effective use local workers to manufacture quality products.

It is expected to make about 800 tons of insulators a year up to the standards of 383/ BS-137 of the International Electro-technical Commission. The disc type, post type and pin type high voltage-resistant insulators will be installed on 500-kV, 230-kV, 66-kV, 33-kV and 11kV power grids throughout the country.

[A photo of the insulators produced at the factory can be found in the print edition of NLM.]

Additional references

See above: 'Factories urged to speed up production of [lampposts and wiring](#)' (NLM: 30/05/07)

NLM, 15/06/10. <http://www.burmalibrary.org/docs09/NLM2010-06-15.pdf>

On a visit to Chauk PM Thein Sein inspects the insulator factory and is briefed on test production of resistors by MD U Soe Yi of Myanma Ceramics Industries. EPM-2 Khin Maung Myint reports on orders to be placed for the resistors which will be used in the construction of pylons. [Photos of the interior of the factory and of the resistors produced there are included in the print edition of NLM.]

NLM, 05/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070505.htm>

Industry Minister No 1 checks on advanced porcelain insulator factory project of MCI in Chauk.

NLM, 24/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070324.htm>

From a report to the Special Projects Implementation Committee. The Ministry of Industry No 1 will implement the Advanced Insulator Factory Project (Chauk) that will manufacture 800 tons of advanced insulators a year. The factory will be built beside Chauk-Sale road, four miles from Chauk. The insulators are used in power lines. The Ministry of Industry No 2 will establish a factory in Pahtosan Village of Magway township to produce aluminum conductor steel reinforced cables to be used for the grid.

NLM, 30/11/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051130.htm>

Unicom Trade and Travel Co Ltd of Thailand won a contract to export machinery and provide technical assistance to the porcelain insulator factory project of Myanmar Ceramics Industries (MCI) to be built in Chauk.

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RICE HUSKS USED TO POWER URBAN WARDS

Thae Thae Htwe, Myanmar Times, 23/08/10. <http://mmtimes.com/2010/timeout/537/med.html>

Rice husk-powered power plants will be used to provide 24-hour electricity to some wards in the Rakhine State capital Sittwe, The Yangon Times reported on 19/08/10.

The report said the project was about 60 percent finished but did not give an expected completion date. The generators will be used to provide electricity to police stations, Peace and Development Council offices, the telegraph office, Sittwe General Hospital and residential areas in some wards.

The report did not say how many megawatts the new plants will be able to generate.

The Sittwe Department of Electricity is not able to provide electricity to all areas of the city and many wards rely on small generators, the report said. Rice husk plants are used not only villages but also in urban areas of Mrauk U, Minbya, Taungup and Kyauktaw townships, the report said.

Additional references

See below: ['Interest growing](#) in rice-husk generation' (MT: 10/07/06)
Sittway power company plagued by [diesel deficit](#) (Narinjara News, 25/03/03)

NLM, 26/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-26.pdf>

A mixed husk-fired gas and diesel power station was opened near milepost 146/4 along the Yangon - Sittwe highway by the chairman of the Myanmar Inventors Co-op and a representative of the Kyauktaw Township Electric Power Supply Board. Two 250-KVA turbines are installed at the station.

NLM, 23/10/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n081023.htm>

A 300-ton cold storage plant and a 50-ton ice factory owned by the Minzarni Company in Sittwe are operated on power supplied by a generator fuelled by rice-husk gas and diesel.

NLM, 30/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071230.htm>

Western Commander Maung Shein and EPM-2 Khin Maung Myint attended the launch of a 500 KVA paddy husk-fired generator and a diesel-fired generator at the Electrical Engineer's Office of Taungup township in Thandwe district on 22 December. The minister said the 500 KVA paddy husk-fired generator was the largest of its kind in the nation, and that the diesel-fired generator had been put into commission to help supply sufficient electricity. Chairman of the township committee for supply of electricity Kyauk Taung gave an account of the steps followed in obtaining the generators. Managing Director of the EPSE Htin Aung and Chairman of the Myanmar Innovators Cooperative Ltd Soe Tin Aung conducted a tour of the power plant and explained the operation of the paddy husk-fired boilers and the engines to generate electricity.

ELECTRICITY SUPPLY KEY TO [INDUSTRY SHIFT](#) TO MYANMAR

Ye Lwin, Myanmar Times, 16/08/10. Edited. <http://mmtimes.com/2010/business/536/biz003.html>

Rising wages in China have removed some of the lustre from the Pearl River delta of the PRC for foreign manufacturers. But if Myanmar wants to pick up the slack, it has to improve its infrastructure, industry sources said last week. Hideki Arai of Asahi Kasei Trading Company, said China was the main manufacturing base for Japanese textile and clothing makers. But the business environment there has changed for the worse, and many companies are looking to move elsewhere, seeing major potential in ASEAN countries.

Mr Eitaro Kojima, managing director of Japan External Trade Organization's (JETRO) Yangon office, said Japan has an umbrella free trade deal with ASEAN – the ASEAN-Japan Comprehensive Economic Partnership – and several bilateral deals already in place, which leaves the region in a good position to benefit from China's loss. U Myint Soe, president of the Myanmar Garment Manufacturers Association (MGMA), pointed to Myanmar's large and relatively inexpensive labour pool as one of the country's potential attractions to lure Japanese investment. "But we need to enhance our workers' capacity-building as the Japanese market is sensitive in terms of quality control," U Myint Soe said.

Mr Kojima said Myanmar stood to gain new investment if it improved its operating environment, but warned that regional competitors like Bangladesh, Cambodia and Laos had similar advantages and more attractive operating climates. "For the time being, clothing exports from Myanmar to Japan are larger than those from Bangladesh to Japan," Mr Kojima said.

U Myint Soe said statistics from the Myanmar Garment Manufacturers' Association show clothing exports to Japan have been rising for the past five years, from US\$53 million worth in 2005, to \$71 million in 2006, \$96 million in 2007, \$133 million in 2008 and \$149 million in 2009. But Mr Kojima said Bangladesh would soon overtake Myanmar because new factories are already being built there. Bangladesh also produces its own fabric, while Myanmar has to import virtually all the raw materials. "I expect that exports from Bangladesh to Japan will overtake those from Myanmar because there are more Japanese factories on the ground there," he said.

"At the moment, I am not sure how many new Japanese-financed factories are on their way in Bangladesh. But I can say there are no new factories planned for Myanmar, only orders. But new suppliers and buyers are looking for suitable factories here," Mr Kojima said. "If private factories here can set up new lines and provide clothing of a certain quality then I think more opportunities will arrive."

There are only four wholly Japanese-owned factories in Myanmar, with another 20 or so working to supply the Japanese market, U Myint Soe said. He added that while labour costs are relatively low in Myanmar compared with other Asian countries, potential investors are wary of the challenges posed by unreliable electricity supply, substandard infrastructure and other logistical hurdles. "Regular electricity supply is the most important consideration for Japanese companies contemplating investing here," Mr Kojima said.

Additional references

See below: 'Reliable electricity supply gives advantage to [Thai shrimp](#) farmers' (MT: 13/08/07)
'Impact of [unreliable power supply](#) on industrialization in Myanmar' (IDE: 10/05)

NLM, 15/03/11. <http://www.burmalibrary.org/docs11/NLM2011-03-15.pdf>

At the regular session of the Amoth Hluttaw on 14/03/11, Industry Minister-1 Minister Aung Thaung replied to a question from U Maung Aye Tun of Rakhine Constituency-9 as to whether or not there was a plan to build a pulp factory in Buthidaung township where there is an abundance of bamboo growing naturally. U Aung Thaung said that Saidin bamboo forest in Buthidaung and Ponnagyun regions can be used to produce raw materials for a factory with a production capacity from 200 to 500 tons of pulp a day. But the establishment of a pulp factory requires chemical and chlorine dioxide plants, a generator and boiler plant, a cooking and digesting plant, a pulp sheet making plant and a recovery plant. Inputs to the plants are from about 0.3 to 0.75 million tons of bamboo per year, from 20 to 50 megawatts of electricity, from 30,000 to 75,000 tons of limestone, from 90,000 to 300,000 tons of salt and from 10 to 25 million gallons of water a day. Only if these inputs are fulfilled can the pulp factory be built. Lack of sufficient electricity supply at the present time, capital and technical problems hindered to build the factory. Although five field trips were made with the participation of foreign companies, progress could not be made due to electricity supply, energy and other problems. Nevertheless, there were future prospects for the energy sector in Rakhine State and good prospects for the establishment of a pulp factory by local organizations and foreign investors.

Myo Maung, Irrawaddy, 10/09/10. Excerpt. Edited. http://www.irrawaddy.org/article.php?art_id=19436
Burmese entrepreneurs have raised concerns that they will be unable to compete with tax-exempt imports from other countries in the region when the Asean Free Trade Agreement (AFTA) goes into effective in 2015. The goal of AFTA is to increase Asean countries' competitive edge as a production base in world markets through the elimination, within Asean member-states, of tariff and non-tariff barriers, in order to attract more foreign direct investment to Asean. Burma became a signatory of the AFTA agreement in 1997. Business owners in an industrial zone in Rangoon said unnecessary production costs under the military regime and a poor economic infrastructure have made it difficult for businessmen even to keep their enterprises. "The AFTA will come later but don't talk about foreign products now. At the moment, we can hardly compete with each other in the country," said a businessman. Another businessman said, "Just give us electricity and techniques."

Financial Express (Bangladesh), 02/09/10. Edited and condensed.
http://www.thefinancialexpress-bd.com/more.php?news_id=110954&date=2010-09-02

A high-powered Bangladesh delegation received Burma's consent over cross-border electricity trade during its recent visit to the country, according to a senior power ministry official. The agreement is aimed at exporting around 575 megawatts of electricity. A Burmese delegation is expected to visit Dhaka shortly to sign an MoU on the electricity trade between the two countries. Before finalizing the deal, Burma has sought a power purchase guarantee from Bangladesh, said the official who was a member of the delegation that visited Burma last week. The delegation included top officials from the power ministry and Power Development Board (PDB). The power plants with an electricity generating capacity of 500MW and 75MW will be installed on the Lemro and Michaung rivers. Burma's Shwe Taung Development company has already tied up with a Chinese firm to build these power plants with a view to exporting the output to Bangladesh. It has already secured a land lease in Rakhine state to set up the power plants.

Bangladesh is currently reeling under an acute electricity and gas crisis with electricity generation hovering around 4200MW against demand of over 6000MW and gas output at around 1980 million cubic feet per day (mmcf) against the demand of over 2300 mmcf. Operations at four major gas guzzling fertiliser factories have been closed down to make room for generating more electricity at gas-based power plants as more than 80pc of the country's power plants are based on gas. Compressed natural gas (CNG) filling stations have been ordered to close down for six hours daily to ensure smooth gas supplies to power plants. Holiday staggering in industries is continuing and there is a halt to new connections both for natural gas and electricity. The country's hectic economic activities have sky-rocketed energy demands over the past two years. The government has targeted to produce additional 10,000MW electricity by 2014.

Alfred Oehlers, IRROL, 22/08/07. [excerpt] http://www.irrawaddy.org/article.php?art_id=8318
 Burma is essentially a diesel-powered economy. We see this in the buses, trains and trucks that rumble around the country. We also see this in the dilapidated power plants that sometimes generate electricity. Most of all, we see this in the ubiquitous portable generators that exist in nearly every home, factory and shop that can afford one. For a long time now, diesel prices have been kept artificially low through subsidies. But as demand for diesel has continued to grow in tandem with an expanding economy, the amount spent on these subsidies has similarly expanded, posing an ever increasing strain on the regime's finances. The only solution has been to import diesel, since Burma's ageing refineries simply cannot refine crude volumes sufficient to meet demand. And as this is usually done at spot market prices, it is an extremely costly solution.

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AGREEMENT SIGNED ON [NGAWCHANHKA](#) HYDROPOWER PROJECT

NLM, 25/07/10. Edited and revised. <http://www.burmalibrary.org/docs09/NLM2010-07-25.pdf>

The Hydropower Planning Department has signed a Memorandum of Agreement on implementing a hydropower project on the Ngawchanhka river in Kachin state. The project will be undertaken by Yunnan's International Energy Cooperation & Development Co Ltd (YEDC) and Mynamar's International Group of Entrepreneurs Co Ltd (IGE). YEDC is a subsidiary of the Yunnan Power Investment Company (YPIC).

The agreement, which was inked in the Ministry's Yeywa Hall in Nay Pyi Taw on 23/07/10, was signed by D-G Kyee Soe of the Hydropower Planning Dept, by Duan Wenquan, president of YEDC, and by Chairman U Nay Aung of IGE.

Also present for the signing ceremony were Myanmar government ministers and officials as well as Chairman Bao Minghu of the Yunnan Provincial Investment Holding Group Co (YIHG). Earlier in the day EPM-1 Zaw Min held discussions with Chairman Bao on the Ngawchanhka project.

The Ngawchanhka Hydropower Project, which is estimated to generate 1055 MW, will be implemented in five phases on Ngawchanhka River in Kachin State.

Website references

The Yunnan [Provincial] Investment Group (YIHG) is described as a state-owned company engaged in investments in power generation and resource-based industries, typically through issuing project-related bonds. For instance, among the ventures funded by YPIC in 2009 was an international mining industry trade center in Kunming, reportedly aimed at promoting co-operation with the mining sectors of Laos, Vietnam and Myanmar. Speaking at the opening of the centre Bao Minghu, board chairman of YPIC, said it was imperative to build an international institution focusing on consulting, information release and trading services for mineral products in the region. The lack of such a centre for mineral product trading and a related fund-raising platform was a real bottleneck for the further development of the Yunnan mining industry. See, for example, the following references:

http://www.chinaknowledge.com/Newsires/News_Detail.aspx?type=1&NewsID=18314

http://www.chinadaily.com.cn/bizchina/2009-09/07/content_8663394.htm

<http://jiakr.com/article?u=asia-39-s-biggest-solar-power-station-settled-in-yunnan-map&v=3>

Stretching to the north of the Hpimaw [Pianma] area where the Ngawchankha rises, the Gaoligongshan mountains on both sides of the Yunnan – Kachin border are reported to “exceptionally rich in a wide variety of minerals”. “In Pianma discoveries of molybdenum have attracted the interest of mining companies that built processing facilities in the town. The 2% quality of the ore is reportedly higher than anywhere else in China and it is expected that Pianma will become a major source of the mineral for China.” On 05/05/10, the Kachin News Group, citing local sources, reported that 16 Chinese miners had been killed and 20 injured as a result of a landslide triggered by explosives at one of the moly mines on the Kachin side of the border. The news agency said there were hundred of miners from the Chinese side working at mines in the area. Lead, graphite, gold and zinc are also found there. See the following references:

http://www.globalwitness.org/media_library_detail.php/113/en/a_conflict_of_interest_english, p 104.

<http://www.kachinnews.com/news/1550-sixteen-chinese-miners-killed-in-molybdenum-mine-collapse-in-northern-burma.html>

Topographical map references

China 1:250,000: Series L 500, NG 47-10: T'eng Ch'ung

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-10.jpg>

China 1:250,000: Series L 500, NG 47-06: Fu Kung

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-6.jpg>

The Ngaw Chang Hka is a major tributary of the N'maihkha. It rises in the height of land (3800 m) along the Yunnan – Kachin border near Hpimaw (26°01' N, 98°37' E) and flows down rapidly ESE, then circles around and flows in a northerly direction entering the N'maihkha near Hpyikrang (26°18' N, 98° 18' E). Existing east – west and north – south logging roads along the valley of Ngaw Chang Hka should make it accessible for hydropower development.

Additional references

Data summary: [Ngaw Chang](#)

NLM, 24/09/10. <http://www.burmalibrary.org/docs09/NLM2010-09-24.pdf>

EPM-1 Zaw Min meets with V-P Zhang Xiaolu and Chief Engineer Xia Zhong of China Power Investment Corp (CPI) and GM Li Guanghua and party of CPI Yunnan International Power Investment Co Ltd (YPIC) of the PRC. They focus on joint implementation of hydropower projects.

NLM, 21/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-21.pdf>

The five projects along the Ngawchankha were named in a list of hydropower projects in Myanmar. They are as follows: Kulant (100 MW), Wukyonkye (60 MW), Kankan (140 MW), Htonshin Creek (320 MW) and Laungdin (435 MW). [The easiest to identify from this list are Htonshin Creek (Htawmshing: 26° 02' N, 98° 27' E), Laungdin (Lawngte: 26° 06' N, 98° 20' E) and Kankan (Hkamkawn: 26° 02' N, 98° 25' E). Wukyonkye could be either Wakyang: (25° 56' N, 98° 22' E) or Wachutaing: (25° 59' N, 98° 24' E). Kulant is not listed among the villages of either Tsawlaw or Chipwi townships and is not visible on the U.S Army topo maps.]

Economic and Commercial Counsellor's Office of the Chinese Embassy in Myanmar, 27/02/09.

<http://mm.mofcom.gov.cn/aarticle/todayheader/200903/20090306072591.html>

On February 26, 2009, Yunnan Power Investment Corporation's (YPIC) International Energy Cooperation and Development Co and Myanmar's EPM-1's Dept of Hydropower Implementation (DHIP) signed an MoU for the joint development of Ngaw Chang Hka hydropower project. President Xia Yuan-Ming of YPIC and Director Win Kyi of DHIP signed on behalf of either side. Among those attending the signing were the Tang Hai, Economic and Commercial Counsellor of the PRC in Myanmar and colleagues, representatives of the Yunnan Provincial Dept of Commerce, the Yunnan Provincial Investment Holding Group Co Ltd, the Yunnan Power Investment Corp and officials of Myanmar's EPM-1 and EPM-2 and the Ministry of Justice. A four-cascade hydropower development is planned, with a total installed capacity of 1,050 MW

BORDER TOWNS UNHAPPY WITH POWER SUPPLY FROM SHWELI-1

Sai Zom Hseng, IRROL, 22/07/10. Edited and revised. http://www.irrawaddy.org/article.php?art_id=19032

Since the border towns of Muse, Nam Kham and Pang Sang in Shan State north were switched to receiving electricity from the Shweli hydro-power project, service has become increasingly unreliable. Previously electric power for the three towns was provided from across the border in China. Service from China had been available for twenty years up until April of this year. "Electrical power is essential for our work," said a Muse businessman, who asked for anonymity. "If we can't depend on the electricity, it's really frustrating for both employers and workers. We can't work in a productive way."

The electricity supplied from China, was also much cheaper. The owner of a manufacturing plant said: "We didn't have to pay a power meter box maintenance fee when we used electricity from China, but now have to pay many different fees for the Shweli electricity, and we receive irregular service. We use it because we are forced to." In the beginning, locals had to pay electricity fees in Chinese currency, but they will begin paying in kyat this month. Residents in Muse, Nam Kham and Pang Sang have been charged two yuan (US \$0.29) for a unit [per kWh] of electricity from the Shweli project. The fee for a unit of electricity from China was 1.2 yuan.

Locals in Lashio said electricity transmission lines are under construction between Lashio and Mandalay. They said people in many parts of Lashio use Shweli electricity, but they do so by choice. According to one Lashio resident, people there can pay electricity fees with Burmese currency. "The regime's Myanma Electric Power Enterprise (MEPE) controls electricity from both China and Shweli. Edible oil factories here continue using the Chinese electricity because the Shweli electricity is more expensive."

Additional references

See below: '[Shweli-1 hydropower plant](#) officially inaugurated' (NLM: 17/05/09)
 '[Shweli transmission](#) line contract Signed' (People's Daily Online: 10/10/03)

High and Dry: The cross-boundary impacts of China's Longjiang dam (Shan Women's Action Network, Shan Sapawa Environmental Organisation, December 2010, 24pp)

http://www.shanwomen.org/pdf/high&dry_Eng.pdf

This report prepared by two grass roots community organizations analyzes the impact of the sudden surges in the level of the Mao (Shweli) river which resulted from the construction of the Longjiang dam on the upper reaches of the river in Yunnan. Many villagers along the Mao valley between Muse and Namkham depend on the local longboat trade between the countries for their livelihood and this was severely affected as the reservoir behind the Longjiang dam was filled in 2009 and the first half of 2010. The report briefly mentions the Shweli-1 dam and power station, also located on the Mao (Shweli) river about 30 km below the Mao valley but there is no mention of how surges in the Mao may have affected the level of the reservoir at Shweli-1 and the generation of electricity at the power plant there. Also omitted from consideration in High and Dry is any mention of the drought in southern Yunnan in the latter part of 2009 and the early months of 2010. The best of part of this report is the picture it paints of rural life in the valley of the Mao and the fine set of photographs that illustrate the text.

Shan Herald, 14/07/10. Edited and condensed.

http://www.shanland.org/index.php?option=com_content&view=article&id=3101:border-people-paying-high-for-homegrown-electricity&catid=90:environment&Itemid=287

People in Muse and Namkham townships complain that they are still being asked to pay the same charges as when they were using electricity from across the border in China even though they are now receiving it from the Shweli hydropower plant inside Burma. The changeover to the Shweli plant took place in April. They are being charged between Yuan 1.4 - 1.6 per unit (\$ 0.21 - 0.23 per kWh). Moreover, they say the power supply is quite irregular and some days they don't get any electricity at all. The problem may be in the meter boxes which are unable to read the unit measurement, said a source. "The people are unaware of how much the charges really are. So, they have to pay what the authorities say," he added.

Ta'ang Students and Youth Organization, 25/05/10. Edited. See note below.

<http://www.palaungland.org/2010/05/25/authorities-putting-security-in-place-around-ruili-electric-power-a-cause-of-community-discontent/>

When the people of Namkham township used to get electricity from China the power connection was good. But since the power has been supplied from Myanmar Ruili, there have been frequent power shortages. Nevertheless, the people still have to pay for the electricity and they are not definitely not happy about the situation. "Since we changed the electric meter box, we do not get the electricity regularly. Even if we don't get power, we have to pay one thousand [kyat?] for meter box maintenance, so people in the community people are really unhappy about the change in the supply of electricity. During the Myanmar water festival, we did not have any electricity and the Kaung Tak villagers went and argued with electrical office. So, they put everybody at the Ruili dam on security alert because they were afraid that local people would cause damage at the Ruili dam," said a woman who lives in Namkham township. "Some villages told the township power office they wanted a refund of their meter box fee and some did get one third of their money back, but others didn't, so they are discontented," she said. A guard at the Ruili power station said that there had been a lot of explosions during the water festival in the third week of April and that authorities at the power station were worried that people who were unhappy might take advantage of the situation to detonate something at the Ruili dam. [**Compiler's note:** This story has been drastically edited and revised. The original is available at the website cited above. The references to 'Ruili' have been retained but they are almost certainly wrong. Ruili is a city across the border from Muse in China. The journalist who reported this story probably misheard what the source was saying. The 'Ruili dam' should be read as referring to the 'Shweli dam' that is now supplying electric power, however irregularly, to Namkham and Muse.]

POWER BOOST FOR YANGON AS RAIN FALLS

Kyaw Hsu Mon, Myanmar Times, 21/06/10 (Issue 528). <http://mmtimes.com/2010/news/528/news007.html>

Yangon City Electricity Power Supply Board (YESB) last week began supplying more electricity to residential and industrial zones in the city, a senior official said on June 15. Supply has improved because recent rains have begun filling the Lawpita dam and the Yadana-Yangon natural gas pipeline has come online, the YESB official said. "The water supply at Lawpita has improved and with the natural gas that we are now also receiving we can improve both the voltage and the supply of electricity," he said. If the situation continues to improve, the board could even start supplying 24-hour electricity, he added. "Under the rotation system currently in place, we are able to provide six hours of electricity a day to each area," he said. "But now we can give almost double that – about 12 hours a day. We hope we can provide 24-hour electricity by about the second week of July."

The natural gas pipeline project linking the Yadana field with Yangon was officially opened on June 9 by Energy Minister U Lun Thi, state media reported. The 24-inch pipeline is to increase the amount of gas allocated from the Yadana project for domestic consumption to 200 million cubic feet a day (mmcf), up from 110mmcf. The US\$270 million project was commissioned by the Ministry of Energy and construction began in December. Singapore-based Swiber Holdings won the contract for the 150-kilometre (93-mile) offshore section, while local company IGE was responsible for the 135km onshore section linking Daw Nyein village in Ayeyarwady Division with the Ywama Gas Distribution Station in Yangon. When electricity supplies began

dwindling in December, YESB introduced a rotation system where residential areas in Yangon were to receive a minimum of six hours a day and industrial zones five hours.

An official from the Dagon Seikkan Industrial Zone Committee said the zone electricity supply improved on June 16. The committee has divided the zone into two groups, with one group receiving power from 7am to midday and the other from midday to 5pm. "This is just a temporary schedule for the electricity that we are receiving now ... but we are pleased because for about one month before this we had no electricity at all," he said.

U Thein Tun, owner of Unicolor, an exercise book manufacturer in the Dagon Seikkan Industrial Zone, said the improved supply had significantly reduced operating costs. "We run our factory 10 hours a day regardless of the electricity supply. Over the past month we've been using 15 gallons (68 litres) of fuel a day to keep a generator going but now we're using about half of that amount ... we still don't have as much electricity as we would like," he said on June 16. A spokesperson for the Hlaing Tharyar Industrial Zone Committee said the committee had also split factories into two groups to take advantage of the improved electricity.

Ko Kyaw Kyaw, 30, from North Okkalapa township, said he had noticed the electricity supply became more regular last week. "I think the power supply got better starting on about June 13, but sometimes it still goes off when there is a lot of rain," he said. Ko Thiha, a resident of Tarmwe township, said he was pleased at the timing of the improved power as it allowed him to watch the football World Cup at his home rather than in the teashop.

The YESB official said Yangon used about half of the electricity generated in Myanmar. "Demand from Yangon is about 600MW a day. But we are producing only about 750-800MW a day for the whole country and it's difficult to say exactly how much of that goes to Yangon," he said.

Additional references

See above: 'New hydro power plants [ease dry season shortages](#) in Yangon' (MTBR: 20/12/10)
 See below: 'Coping with unreliable power supply in Burma's cities' (IRROL: 22/05/10)
 'Rangoon reels under [severe power cuts](#)' (Mizzima: 02/04/10)
 'Small businesses, [factories struggle](#) to keep up with rising fuel prices' (IRROL: 06/03/08)
 'Fuel [price increase](#) impacts industrial use of electricity' (IRROL: 15/08/07)

MOU SIGNED ON MAWLAIK AND KALEWA POWER PROJECTS

NLM, 29/05/10. Edited. <http://www.burmalibrary.org/docs09/NLM2010-05-29.pdf>

The Department of Hydropower Planning of EPM-1, China Guodian [Huadian] Corp of the PRC and and Tun Thwin Mining Co Ltd signed an MoU to develop a hydropower project in Mawlaik township and a coal-fired thermal power plant in Kalewa township in Nay Pyi Taw on 27/05/10. Signing for the HPD was Director-General U Kyee Soe, for China Guodian, Executive Vice-President Mi Shuhuan, and for Tun Thwin Mining was Chairman Thein Tun. Among those attending the ceremony was EPM-1 Zaw Min, National Planning and Economic Development Minister Soe Tha, Attorney-General U Aye Maung and responsible persons of China Guodian and Tun Thwin Mining. The Executive Vice-President of the Chinese company expressed thanks for the signing ceremony.

Website references:

http://www.cgdc.com.cn/en_no_use/en_index.html

China Guodian [Huadian] Corporation is one of the five largest nationwide power generation groups approved by the State Council of China. It mainly engages in the development, investment, construction, operation and management of power generation, and the sales of power (and heat). It is involved in the investment, construction, operation and management of the business relevant to its core business, such as

coal, power generation equipment, new energy, transportation, high-tech, environment protection, technological services and consultancy. Besides that it is also involved in both domestic and international financing, and international trade, economic cooperation, international project contracting and international laboring service. China Guodian [Huadian] Corporation owns 16 regional and provincial branch companies, 13 extra large subsidiary companies, 2 R&D institutes, nearly 200 power enterprises, covering 31 provinces (autonomous regions and municipalities) with over 110,000 employees. By the end of 2009, the total controllable installed capacity of China Guodian [Huadian] reached 82,030 MW, including 70,250 MW by thermal and taking 88.64% of total installed capacity, 6,376 MW by hydro (including 3.9MW tidal power) and taking 7.77%, and 5,345.2 MW by wind power and taking 6.52%, and 54MW by biomass generation and taking 0.07%. China Guodian [Huadian] is the largest wind power operator in Asia and No. 5 in the world.

<http://www.tunthwinmining.com/index.htm>

Tun Thwin Mining Co Ltd is a privately owned company, incorporated on 3rd January, 2000. It mainly engages in exploring for and mining coal. It has operated the Nantahin-Paluzawa coal mines in Kalewa township since early 2004. From 2001 to 2003 the company was engaged in exploration activities, along with regional mapping, a survey of the massive coal seam at Paluzawa and detailed mapping of the mining area. Currently the mining operations are open cut, but the design is also drawn for underground coal mining. Analysis of coal samples from the Nantahin-Paluzawa mines show that it has excess of carbon and less sulphur and ash. The coal is of sub-bituminous to bituminous quality.

Additional references:

Data summary: [Nantahin](#)
[Mawlaik](#)

See above: 'China Guodian to build power station on [Nam Tabat](#) in Kachin state' (NLM: 22/01/11)

NLM, 18/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-18.pdf>

EPM-1 Zaw Min reports to the Special Projects Implementation Committee of the SPDC that the Mawlaik hydropower project on the Chindwin river about 20 miles northeast of Mawlaik will be launched soon. The dam will be of a rock-filled/concrete type. It will have generating capacity of 520 megawatts and is expected to produce about 3310 million kilowatts hours a year. In addition, a coal-fired power plant will be built about 11 km northwest of Kalewa which will be able to produce from 3000 to 4200 million kilowatt hours a year with two 300-megawatt generators. It is intended to help meet the power demands of Sagaing Division. Over 1.3 million to 1.9 million tons of coal for the plant will be provided from Paluzziwa coal mine near Kalewa.

NLM, 01/05/10. <http://www.burmalibrary.org/docs08/NLM2010-05-01.pdf>

EPM-1 Zaw Min received Mr Gao Song, Vice-president of China Guodian Corporation of the People's Republic of China, and party at the ministry in Nay Pyi Taw on 29/04/10. The meeting focused on co-operation. Also present at the call were ministry officials, General Manager Li Hongyuan of Guodian Yunnan Power Co Ltd from China and Chairman Thein Tun of Tun Thwin Mining Co Ltd.

Myanmar Information Sheet, 09/06/05. Edited.

<http://www.myanmar-information.net/infosheet/2005/050609.htm>

Prime Minister Soe Win and party flew to Pantha village in Mawlaik township where Deputy A&I Minister Ohn Myint reported on arrangements for Mawlaik dam multipurpose project to be implemented at the confluence of the Chindwin and Uru rivers. Next, U Maung Maung Tin, Director of Construction Group-4 of the Irrigation Dept, reported on the condition of the site chosen to build Mawlaik multi- purpose dam. A feasibility study is under way to implement the dam project. The estimated power generation of the project is about 500 megawatts. **[Compiler's note:** The 'Uru river' mentioned in this news item is almost certainly not the Uru river that empties into Chindwin near Homalin but the Yu river which flows into the Chindwin near Mong Yu about 15 km upstream from Pantha.]

NLM, 28.04/04. <http://burmalibrary.org/docs/NLM2004-04-28.pdf>

From a report of a meeting of the National Electric Power Development Co-ordinating Group held at the Office of the Commander-in-Chief (Army) in Yangon on 27/04/04. "Other major electric power projects are

the 1,200-MW Htamanthi project in Homelin township, the 400-MW Mawleik project in Mawleik township, the 660-MW Shwesarye project in Budalin township,

COPING WITH UNRELIABLE POWER SUPPLY IN BURMA'S CITIES

Aye Chan Myate, IRROL, 22/05/10. Edited and condensed.

http://www.irrawaddy.org/article.php?art_id=18530

Burmese people are getting more and more ingenious at finding ways to cope without a reliable power supply. Recently, I spoke with a friend in Burma who told me about the latest “must-have” item on the market: a battery charger with a rotating lever that you can use to power your cell phone for up to an hour. Costing between 5,000 and 8,000 kyat (US \$5-8), this hand-cranked dynamo charger is fast becoming an indispensable addition to the long list of tools used for dealing with the daily blackouts that afflict most of the country outside of Naypyidaw, where the ruling generals bask in 24-hour-a-day access to electricity.

Already, a typical Burmese household relies on an array of equipment to meet its energy needs, including car batteries, chargers, inverters, generators and transformers. Needless to say, the device my friend described was made in China. Few Burmese can afford better-made products from Japan or elsewhere, so we have to make do with cheap contraptions produced in Chinese factories or Burmese-made knock-offs.

When I was younger, it was common to see people using car batteries to power foot-long fluorescent lamps. When the batteries died, they had to be taken to a shop for recharging. But these days, most people have their own chargers and use batteries to run many different types of appliance.

To run most appliances on a car battery, you need an inverter, which converts direct current (DC) to alternating current (AC). Inverters started coming onto the Burmese market about 10 years ago. At first, they were imported from China, but these days, Burmese-made inverters with brand names like Matrawnit, Duwon and U Pe Thein are widely available for around 70,000 kyat (US \$70). Unlike the original inverters from China, the Burmese versions typically include a charger, so that the battery is always ready for use whenever the main power supply dies. But this means that you have to be careful not to let the water level—which falls as the battery is being charged—go too low. To prevent damage to the battery, everyone—even the children—must regularly check to see if the water needs to be topped up.

The ideal in most Burmese homes is to have at least two batteries—as the actress May Tha Nu used to say in commercials: “One for the lights, the other for the cassette player.” But not everyone can afford such luxury. A 120-volt battery costs around 100,000 kyat (\$100), while a 150-volt battery is about 120,000 kyat (\$120). The problem with using car batteries is that the main power supply is so irregular—cutting off every five or 10 minutes—that the battery doesn't know how to store the electricity, often making the inverter useless.

Some people then turn to generators to ensure that they have a steady power supply. Generators vary considerably in size. Some are small enough to be carried by a handle, while others are as big as huts. The smaller ones are used mainly for charging batteries or making sure the TV doesn't go black at an inopportune moment (when I was working for a magazine inside Burma in 2006, I edited a story about a fire caused by a child who spilled petrol while trying to fill a generator so his mother could watch her favorite Korean soap opera).

These home-use generators range considerably in price, from around 80,000 kyat (\$80) for a Chinese model to about double that for a Honda. But the real expense is fuel. A liter of gasoline costs 900 kyat (\$0.90) and will keep a Honda generator running for just one hour. For commercial and industrial purposes, however, nothing beats a made-in-Burma diesel-powered generator. These big, noisy machines are ubiquitous in Rangoon's downtown business district and in suburban industrial estates. They aren't cheap, but unlike Chinese generators, they are built to last.

Apart from the general lack of electricity in Burma, another problem is voltage fluctuations. Usually, the voltage is too low, especially for businesses, so there is a great demand for step-up transformers. But power surges are also common, so many people buy regulators—transformers that automatically increase or decrease voltage to maintain a steady output. Transformers can cost as little as 50,000 kyat (\$50) or as much as 500,000 kyat (\$500). In effect, they are used to steal electricity from the local power grid. If one house has a transformer, it will get more electricity, while its neighbors will get less. So as more and more people get transformers, they are becoming less useful.

These days, some homes even have computers. But in Burma, computer users must always have a UPS (uninterruptible power supply) to cope with abrupt power cuts. A UPS will give you enough time to shut down your computer properly if the main power supply dies; without it, your machine could suffer irreparable damage.

At the other end of the technological spectrum, even simple lighting presents difficulties in Burma. People put candles and lighters in several places around their homes so they always know where to find them when they're needed. But for reading at night, especially under a mosquito net, candles can be dangerous, so these days small rechargeable LED lamps are a popular option. A Chinese-made lamp with 20 LED bulbs costs just 1,500 kyat (\$1.50) and emits enough light for reading, but not much else. It's very convenient, but as with most products imported from China, it typically lasts only a few weeks before it breaks down.

For most Burmese, life is almost unthinkable without all the extra gadgets that help them to make the most of their limited access to electricity. Some may even feel a grudging gratitude toward China for supplying many of the things that make life bearable in one of the world's most power-starved countries. But they would probably be much happier if they could do without all of these devices and enjoy the kind of reliable power supplies that are available even in remote corners of China—courtesy, in large part, of Burma.

[Compiler's note: The original version of this article is accompanied by an AP photo showing fish sellers using a battery-powered lamp at their pavement shops as they wait for customers in Rangoon.]

Additional references

See above: 'New hydro power plants [ease dry season shortages](#) in Yangon' (MTBR: 20/12/10)

'[Power boost for Yangon](#) as rain falls' (MT: 21/06/10)

See below: 'Rangoon reels under [severe power cuts](#)' (Mizzima: 02/04/10)

'[Inverters](#) keep lights and TV sets running' (MT: 04/07/05)

Ko Htwe, IRROL, 14/06/10. Condensed. http://www.irrawaddy.org/article.php?art_id=18713

Burma's state-run electricity firm has so far managed to provide adequate power to Rangoon each evening since the World Cup football tournament kicked off in South Africa on Friday. The measure has kept thousands of football fans happy as they can now enjoy the month-long sports competition live on TV. It comes after a severe drought caused water shortages in Burma last month resulting in frequent power cuts around the country, even in the capital, Naypyidaw. Speaking to The Irrawaddy on Monday, an official from state-run MEPE said, "A certain businessman close to regime secured the rights to broadcast the World Cup in Burma nationwide. However, without a guarantee of electricity every evening, he cannot transmit it regularly on TV. So, he had to get some guarantees from MEPE." Yangon Entertainment, run by Zaw Min Aye, a son of one of the top military generals, Lt-Gen Tin Aye, was granted exclusive rights to broadcast the World Cup on TV. It screens the games through the country's only two TV stations, MRTV and Myawaddy. Hundreds of bars, restaurants and tea shops, such as the dozens that occupy the area surrounding Rangoon's popular Kandawgyi Lake, are currently showing every match on large screens until late at night, attracting hundreds of customers. Speaking to The Irrawaddy, a retired professor from Rangoon said, "Thanks to the World Cup, we are now getting a regular supply of electricity every night. I heard that MEPE had to provide electricity for the matches because they were afraid of riots breaking out." A reporter for a Rangoon-based weekly journal said, "When the World Cup began, the electric current became instantly more regular. However, it still goes off in the daytime."

Aung Thet Wine, IRROL, 03/06/10. Edited and condensed.

http://www.irrawaddy.org/article.php?art_id=18615

Naypyidaw, the capital of Burma, which has received electricity service almost without interruption since it became Burma's capital in late 2005, is facing a shortage of electricity, according to a government official. Most government ministries there have been on short supply since mid-May, said a MEPE official who is based in Nay Pyi Taw. Meanwhile, in Mandalay electricity often functions for only an hour a day. Zaygyo, the city's well-known market, has had no electricity for several days, said a resident. In Rangoon, officials blamed a gas pipeline leak in Mudon for electric power outages in the city. "Another problem is that Chinese-made hydro-electric generators are always breaking [down] and sometimes there's not sufficient water [in the dam reservoirs] to run the generators," said an official at EPM-2. In Pegu [Bago] diivision, electricity has been completely cut off for days, and local people in almost all townships have turned to rented diesel generators in order to pump water for daily use, said one source.

IRROL, 03/06/10. http://www.irrawaddy.org/article.php?art_id=18614

A fire destroyed 472 shops and stalls at the Chindwin Yadana Market in Monywa on 03/06/10, but no one was killed or injured, according to the local fire department. The fire was started by an electrical fault at 3 a.m, the fire department said, and quickly spread to both stories of the complex before being extinguished by the firefighters at 8 a.m. Chindwin Yadana Market is the main wholesale market in Monywa and was composed of 200 shops on the ground floor and 272 shops on the first floor selling everything from textiles, plastics and steel products to clothes and foodstuffs. "We are still investigating the cause of the fire and its losses," said an official from the Monywa Fire Department. A textile shop owner in the market whose business was destroyed told The Irrawaddy: "My shop was valued at between 20 and 30 million kyat (US \$20,000 - \$30,000) and if I add the value of the textiles, I lost more than 50 million kyat (\$50,000)." Chindwin Yadana Market was rebuilt as a two-story building 10 years ago. (IRROL, 03/06/10);

NLM, 27/05/10. Condensed. <http://www.burmalibrary.org/docs08/NLM2010-05-27.pdf>

A fire broke out on the fourth floor of Mingala Market in Mingala Taungnyunt township, Yangon, at about 8.30 am on 24 May and was put out at about 5.05 am yesterday. The investigation made by a team led by Director U Aung Kyaw Myint of the Fire Services Department revealed that the market committee cut off electric power supply when the market hours were over at 5 pm on 23 May; that at that time owners of shop No. Sa (80/81) were boiling water with the use of an electric pot; that they forgot to pull off the plug as well as to switch it off; that the electric power supply resumed at the market hours at 7.30 am the following day, and the electric pot set fire to nearby cosmetics at about 8.30 am after all the water was dried up and the electric pot got excessively hot. Then, the whole floor caught fire, burning down 399 cosmetics shops, 398 pharmaceuticals shops on the fourth floor and 48 food stalls on the top floor. The total loss of goods is estimated at about 20,926.3 million kyats, and the loss caused by to the damage to the building is under estimation. The disaster injured a public member and three firefighters, and there were no deaths. Mingala Taungnyunt Township Police Station has filed a lawsuit against owners of Shop Sa (80/ 81): U Tin Aung, Ma Thida Shwe (a) Ma Thida, and Ma Khin Mar Aye for their negligence. Authorities concerned today urged the people to use electric power with care, and warned that punitive punishment will be given to negligent electric power users next times.

Na Yee Lin Latt, IRROL, 26/05/10. Condensed. http://www.irrawaddy.org/article.php?art_id=18559

The power cuts that plague Rangoon are also causing interruptions or overloading of land line communications. An engineer working at a township's communications unit told The Irrawaddy that the telephone relay system has been replaced in every township in Rangoon by an Auto Digital Exchange System (ADES), which needs sufficient electrical power to operate. "ADES is a computerized system, so we don't need someone to sit in the control chamber to relay the communications. But, it does need electricity 24 hours of every day," the engineer said. Up to 700 land lines in Rangoon are reportedly cut off or busy every day. "The control chamber also must be air-conditioned. If there is no electricity the room will be overheated and the system will shut automatically. As a result, telecommunications are interrupted," the engineer said. He said township communications offices needed inverters and generators to maintain a regular communications system in the dry season, when power cuts were more frequent. The Myanma Posts and Telecommunications (MPT) has said Burma has nearly 750,000 phone lines, including registered mobile hands sets, excluding disposable pre-paid card lines.

Aung Hla Tun, Reuters, 25/05/10. <http://uk.reuters.com/article/idUKTRE64N15B20100524>

A huge fire broke out in a commercial centre housing 4,000 shops and stalls in Myanmar's biggest city Monday but no casualties were reported, firefighters and traders said. Mingalar Zay, a five-storey market complex in Yangon, burst into flames around 9am and dozens of fire trucks were still battling to put out the blaze several hours later. "Fortunately, there were not many people inside the building when the first broke out, since the market had just opened," said the owner of pharmacy at the market. "Otherwise, there would definitely be a very high death toll." Local traders said they believed the fire was started by the overheating of a battery charger on the fourth floor. Myanmar is plagued almost daily by acute power shortages and factories, shops, hospitals are often badly affected by blackouts. Many people rely on batteries during power cuts and fires are common as a result of chargers overheating.

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GENERAL THAN SHWE VISITS THE UPPER YEYWA HYDROPOWER PROJECT

NLM, 22/04/10. Edited. <http://www.burmalibrary.org/docs08/NLM2010-04-22.pdf>

Accompanied by several SPDC members, senior military officers of the MoD, regional commanders, cabinet ministers and officials, Gen Than arrived at the Upper Yeywa Hydropower Project being implemented by EPM-1 near Taungchay village of Kyaukme township.

Gen Than Shwe and party viewed the operation of heavy machinery carrying out ground work at the main embankment. They also looked into the excavation of boulders at the site.

At the briefing hall, EPM-1 Zaw Min reported on the aims of the project, progress to date, the location of the Upper Yeywa project in relation to the Yeywa project farther down the Myitnge river, construction of approach roads, conditions of the main embankment, the diversion tunnel, the spillway, the power intake structure and tunnel, the penstock tunnel and the proposed generating capacity of the project, as well as the yearly implementation schedule. In his guidance, General Than Shwe stressed the need for timely completion of the Upper Yeywa project, given the experience the workforce had gained in the Yeywa hydropower project.

The Upper Yeywa Hydropower Project is about 20 miles south of Kyaukme in Shan State North and 80 miles upstream of the already completed Yeywa dam. It will store water from the Myitnge and Namlam rivers that will be released to the Yeywa dam [in the dry season], as well as generating electricity. The project is being implemented by No 2 Construction Group of the Hydropower Planning Department. [Two photos of the dam site accompany the article in the print edition of NLM.]

N.B. The decision to construct the Upper Yeywa hydropower project on the Myitnge near Taungchay village in Kyaukme township appears to have superseded earlier plans to construct dams and power stations at Pyaungsho on the Myitnge near Yaydwingyi village and on the Namlan river in Nawngkhio township (see below). The Myitnge river is also known as the Dokhtawady and the Namtu in Shan State North.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-05: Maymyo Upper Yeywa dam near Tawngkye village (22° 16' N, 97° 07' E) grid square reference: 13\9, 26\7 <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-5.jpg>

Additional references

Data summary: [Upper Yeywa](#)

See below: 'Dam design at [Yeywa](#) hydropower project saves time, costs' (MT: 04/04/05)

Hseng Khio Fah, Shan Herald Agency for News, 19/05/10. Edited and condensed.

http://www.shanland.org/index.php?option=com_content&view=article&id=3035:junta-runs-underground-mine-in-shan-state-north&catid=89:drugs&Itemid=286

An unknown mining project is being secretly operated in Kyaukme township, according to local sources. The project site is located in Nawngping village tract, south of the Lashio-Mandalay highway. Outsiders are banned from visiting the site where security is very tight. The number of workers in the site is over 500 and more are expected soon. Other villagers have come to open shops and restaurants in the vicinity. The

Burmese military has ordered workers not to release any information about the project, said another source. "They have informed people that it is only for a hydro power project." "Everything dug out is put in boxes and carried to Naypyitaw directly," she said, "Workers don't know what they are." An informed source said General Than Shwe was reported to have visited the site in the second week of April. Some local residents, believe that it will turn out to be a coal mine as a coal and metal company had been reported to be prospecting in the area two years ago.

NLM, 01/05/10. <http://www.burmalibrary.org/docs08/NLM2010-05-01.pdf>

A signing ceremony between the Hydropower Implementation Department of EPM-1 and NEWJEC Inc of Japan took place at the ministry in Nay Pyi Taw on 30/04/10. Present at the ceremony were EPM-1 Zaw Min, Deputy Minister Myo Myint and President and Director Masaki Matsumoto and members of NEWJEC Inc. On the occasion, D-G Myint Zaw of the Hydropower Implementation Dept (DHI) and General Manager Yukao Tanaka of NEWJEC Inc signed the contracts on Agreement of Consulting Services for In-House Engineering Services. [On the same occasion] a Memorandum of Understanding on tasks [related to the supply] of concrete for the Upper Yeywa Hydropower Project was signed by the DHI and High Tech Concrete Technology Co Ltd [of Myanmar].

NLM, 19/12/09. <http://www.burmalibrary.org/docs07/NLM2009-12-19.pdf>

EPM-1 Zaw Min and D-G Myint Zaw of the Hydropower Dept visit the Upper Yeywa hydropower project near Taunggyay village in Kyaukme township. They are briefed on the construction of roads to the project, the dam site, the location of the intake and diversion tunnels, the site for construction of the power station, the condition of the rock layers according to geological survey, and future programs. Stones from the Sein Lun quarry are being used in construction work. The project dam will be built across the Dokhtawady river, 65 miles upstream of the Yeywa Hydropower Project. The Upper Yeywa Hydropower Project will have a capacity of 140 megawatts.

NLM, 17/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-17.pdf>

On a visit to the Yeywa project, Gen Than Shwe is informed that the Upper Yeywa dam will be built of concrete and will be 200 feet high and 1640 feet long. It will be able to generate 140 megawatts and will contribute to the production of electricity at the Yeywa plant.

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

At the co-ordination meeting (1/2008) of the Special Projects Implementation Committee, EPM-1 Zaw Min gives a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the committee. [Among the the fifteen are] the Upper Yeywa hydropower project (140 megawatts) in Shan State North.

"Myanmar Country Report on Progress of Power Development Plans and Transmission Interconnection Projects" (17/06/08), p 15.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/PWG5-Appendix4.4.pdf>

The Pyaungsho hydropower project with a capacity of 300 MW will be implemented in the near future.

NLM, 23/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080223.htm>

Lt-Gen Kyaw Win of the MoD is briefed on the implementation of Myaungcho hydropower station project by Nay Myo Win of HPID. The station will generate 230 MW and contribute to the implementation of Yeywa hydropower station.

NLM, 13/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071213.htm>

While visiting the Yeywa dam site, Gen Than Shwe is briefed on the survey, findings and preparations for the Pyaungsho hydropower project that is to be implemented on the Namtu (Myitnge) river near Yaydwingyi Village, 32 miles south of Nawngkhio town in accordance with his guidance.

NLM, 12/07/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070712.htm>

PD Myint Zaw and Dep Dir (Geology) Kyaw Nyein brief EPM No 1 Zaw Min on feasibility study for the Nawngkhio hydropower project, including geographical conditions and flow of water in the Dokhtawady river, 25 mi upstream from the Yeywa hydropower project.

NLM, 04/07/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nln/n070704.htm>

Lt-Gen Kyaw Win of the Ministry of Defence and Maj-Gen Aung Than Htut of the North East Command met with officials of the Pyaungthlyo hydropower project being undertaken by the HPID and Colenco Power Engineering Co near Nawngkhio township on 2 July, 2007. At the briefing hall, Director U Myint Zaw of HPID reported on salient points of the project including the site chosen. In response, Gen Kyaw Win stressed the need for speedy implementation of the project to satisfy the power demand. The project is situated 29/2 mi south of Nawngkhio on the Dokhtawady (Myitnge) river. It will be able to generate electricity ranging from 60 to 300 MW. After that, Lt-Gen Kyaw Win and party inspected the construction of Nawngkhio-Taungkhin-Kyaukgu-Intaw road and the Dokhtawady Bridge.

Myanmar Times, 28/08/06. <http://www.myanmar.com/myanmartimes/MyanmarTimes17-331/n010.htm>

The design for Htamanthi Dam is expected to be finalised in early 2007. The Agriculture and Irrigation Ministry has already drafted the design and hopes to finalise it under supervision of Colenco, an international consulting and engineering company.

NLM, 28/04/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nln/n040428.htm>

The 60-MW Pyaungsho and 160-MW Namlan hydel projects in Nawngkhio tsp are mentioned at a meeting of the National Electric Power Development Co-ordination Cte.

RANGOON REELS UNDER SEVERE POWER CUTS

Myo Thein, Phanida, Mizzima News, 02/04/10. Edited and adapted.

<http://www.mizzima.com/news/election-2010/3783-nld-to-plunge-itself-headlong-into-social-work.html>

Rangoon has been reeling from severe bouts of power cuts with consumers getting a daily supply of a meagre two hours a day last week. The power cuts in Rangoon follow repair work on the natural gas pipeline of the Myanmar Oil and Gas Enterprise.

"We receive electricity for only about two hours a day. At times power is restored for just three minutes and goes again. Sometimes it is restored for just 10 minutes. Sometimes power is supplied at midnight for about 10-15 minutes," a local resident said.

Electricity is supplied to Rangoon from gas turbines in Thaketa, Ywama, Hlawga, Ahlone power plants and from the Lawpita hydro power station. But these power stations are not operating at full capacity leading to the severe shortage of power in Rangoon.

The Tanintharyi-Rangoon gas pipeline leaks frequently, affecting electricity production from the gas turbines. So, a new gas pipeline from the offshore Yadana natural gas wells in the Gulf of Martaban is under construction. The Ministry of Energy has announced that the new gas pipeline will be completed next month.

The power failures in Rangoon are causing severe problems in the water supply system. "We wait for electricity to be restored to operate our pumps even at night. Every flat operates pumps simultaneously so the higher flats do not get water," a local resident said.

Water is not available even for cooking so residents have to use bottled drinking water for preparing their meals with the result that the high demand for bottles has pushed up prices, a housewife from Lanmadaw township said. The normal price of a 20-litre bottle of drinking water is K 500 to 600 home delivered to higher floors but now it is K 800 to 900.

For downtown residents in Rangoon, the water comes from reservoirs in Nga Moe Yeik, Hlawga and Phu Gyi but most residents in suburban areas rely on tube wells.

According to the 2008 April census, Rangoon's population is over six million and the demand for power was 400 MW but now it has risen to over 500 MW given the increase in the number of industries and rising consumption due to use of home electrical appliances.

Additional references

- See above: 'New hydro power plants [ease dry season shortages](#) in Yangon' (MTBR: 20/12/10)
 'Power boost for Yangon as rain falls' (MT: 21/06/10)
 'Coping with unreliable power supply in Burma's cities' (IRROL: 22/05/10)
- See below: 'Power [supply improves](#) in Rangoon' (Mizzima: 28/07/09)
 'Gas turbine failure restricts electricity supply in Yangon' (Xiinhua: 01/02/09)
 'More [gas to be diverted](#) from Yadana for national use' (MT: 14/01/08)
 'Gas in [short supply](#) to meet demand for electricity' (MT: 17/09/07)
 'Pipeline to solve electricity shortages' (MT: 16/09/02)

IRROL, 01/06/10. Edited and revised. http://www.irrawaddy.org/article.php?art_id=18596

Electricity shortages in Rangoon have worsened due to insufficient gas supplies caused by a leak in a pipeline that brings natural gas to power the city. An official at EPM-2 said the electricity shortage in Rangoon worsened following a leak in the gas pipeline located near Mudon Township in Mon State. The leak will take days to repair, he said. "The old pipeline was leaking while new ones were still under construction. That's why the shortages have increased," he said.

Rangoon residents said the city had been divided into three groups that were to be provided with electricity for six hours a day in rotation. But since the gas supply worsened, electricity is available for only three hours a day on an intermittent basis. According to one resident, it often stops and starts every 15 to 30 minutes or an hour.

Rangoon needs about 600 megawatts of electrical power but only 120 megawatts can be produced under present circumstances, according to an official at the city's electricity supply board. Businessmen and residents normally enjoy electricity for 24 hours a day at this time of the year, after the start of the rainy season. But an official of EPM-1 that usually provides the additional power from its hydropower plants at Lawpita said it might not be possible to provide electricity 24/7 this monsoon season because of technical problems and low levels in the reservoirs that supply water to the hydro stations. "We have encountered technical problems in some hydro-power projects that have already been completed, but we are taking care of it. Some power plants can't produce enough electricity as well because the amount of water hasn't reached the usual levels," said an official at the Naypyidaw electricity supply board. The Yeywa hydro-power project is said to have experienced technical problems as well.

A source at the Rangoon electricity supply board said it still can not provide electricity to industrial zones and will be unable to do so for at least another two months. "We were told that we would be provided with electricity in mid-August," said a businessmen from the Hlaing Tharyar Industrial Zone Management Committee. "Some factories have already stopped operation while some wealthier ones have acquired electricity by paying bribes. Those who can afford it, they use diesel generators to run their factories." On May 14, small industrial enterprises and businesses that use power meters in Rangoon were cut off from electricity, but electrical service resumed on a rotation basis after May 20.

Myanmar Times, 24/05/10 (Vol 27: 524); Edited and condensed.

<http://www.mmmtimes.com/2010/business/524/busi001.html>

Yangon Electricity Supply Board (YESB) has now stopped supplying electricity to industrial zones, small and medium enterprises (SME), private clinics, shopping malls and supermarkets to try to conserve the energy supply to private homes. YESB operates two supply systems, one for domestic users and the other for commercial use, which is known as the power meter. Businesses are charged K50 per unit of electricity, twice the domestic rate. Small businesses that operate out of private homes have had their power supply cut off, while the supply to the [living quarters], through a separate meter, is unaffected. "In my home, I have

two meters – one for household use and the other for business. YESB cut off our power meter box on May 14 and we are not allowed to use electricity for business purposes from the household meter,” said U Tin Aung, who runs a printing company in Botahtaung township.

YESB says it will collect or lock power meter boxes in every SME. “The program aims to supply more electricity to the public than before,” said a statement from YESB secretary U Maung Maung Latt. It said electricity would be supplied six hours a day alternatively in Yangon from that day onwards. “Before this new program, we got power three times a day, but only for two hours at most,” said U Nyan Lin, a resident in Dagon Myothit East district.

U Myat Thin Aung, president of Hlaing Tharyar Industrial Zone Management Committee, said that the industrial zones were used to power shortages. “Before the induction of this new program, the industrial zones did not receive electricity for 10 days,” he said.

“Until April, our industrial zone received electricity for four hours during the day. Since the beginning of May, we did not receive electricity at all and relied on our generator,” said U Thein Tun, of Unicolour Group. “My generator uses 1.5 gallons of diesel an hour and we normally run it for at least eight hours a day,” U Thein Tun said. YESB is also maintaining power to government offices, Yangon City Development Committee (YCDC), private artesian wells, and the highway terminals. Yangon’s daily electricity demand is estimated by the Ministry of Electric Power (2) to be 666.78 megawatts (MW) but Yangon is only receiving about 250MW a day, one industrial zone committee member said.

Ba Kaung, IRROL, 21/05/10 Edited and condensed. http://www.irrawaddy.org/article.php?art_id=18523
Small business owners in Rangoon are complaining they may have to shut down because of the decision by the state power authority to halt supplies to industrial users owing to the lack of water to drive hydro dam turbines. The power authority says it needs to cut industrial supply in order to provide private households with electricity on a 6-hour quota system.

But Nay Myo, owner of an air-conditioner and refrigerator workshop in downtown Rangoon, has had to halt repair work because he is solely reliant on state-supplied electricity. He says he can't afford to run a generator to provide the power he needs to keep his workshop going. “Since there is no electricity, my shop is now full of air-cons and refrigerators which I haven't fixed yet.”

Generators are keeping an ice-cream factory in Rangoon in business, but at a high cost to its owner. “I cannot increase my ice-cream price since this will affect my customers,” he said.

Khin Maung Nyo, a Rangoon-based economist, said: “I hear that some small businesses have to shut down or run only half a day. Some store owners are thinking of operating their businesses for only a few days in a week.” An official of MEPE said he had received a wire message on Friday that businesses can now submit applications for industrial power use, but he was unsure when supplies for industrial use would resume. “Only when the dams are filled with water again will the electricity come again, I think,” said Myint Soe, the chairman of Myanmar Garment Manufacturers Association (MGMA), in Rangoon. “But for big industries like ours, the one or two hours a day during which we get power doesn't make much difference.”

Bernama, 20/05/10. Edited and condensed. <http://www.bernama.com/bernama/v5/newsworld.php?id=499671>

Myanmar authorities have temporarily stopped power supply for industrial use in Yangon, to divert electricity for residential use as a provisional measure to ease power shortage in the former capital. The step which was initiated at the beginning of this week, has restored 150 megawatts (mw) for home use, up from the previous 80 mw, China's Xinhua news agency reported citing a local daily. Authorities attributed the lack of power to falling water levels in the reservoirs that supply the country's hydropower plants during the red-hot summer months. On an encouraging note, authorities did say that a 24-inch gas pipeline that will carry

natural gas from the Mottama offshore gas field to gas-run power plants has been completed and that after the installation of related machinery, power supply would be back to normal soon.

Ko Htwe, IRROL, 17/05/10. Edited and condensed. http://www.irrawaddy.org/article.php?art_id=18484

Electricity for businesses in Rangoon was cut off on Friday as a result of low-water levels at hydropower generating plants. The cut off affects private hospitals, shopping centers, small businesses and industry zones. Many businesses and residents are experienced in using private generators to provide their own electricity, but the cost of fuel is prohibitive. Unusually high temperatures in recent weeks have exacerbated what is normally a seasonal shortage of electricity. A businessman on 32nd Street in Rangoon said, "MEPE has sealed the meter box. Now we cannot use electricity." An employee at Asia Taw Win private clinic in Rangoon said, "For emergency operations and patients who need air conditioning we are facing many problems. Speaking to The Irrawaddy on Monday a MEPE official said, "The conditions for distributing electricity are very difficult now. We have no choice." In Rangoon, the power supply is usually restricted from March to June, because of a lack of rain water to power the Lawpita hydroelectric plant at full capacity. Lawpita, located 210 miles (350 kilometers) north of Rangoon, is one of the main sources of electricity for the former capital. The water supply of the Lawpita hydroelectric plant depends on Innlay Lake in Shan State, but high temperatures this year have severely lowered the lake's water level, said a resident of Khaungdine village, located near the lake. "At the center of the lake, there is only a little water. We have to carry drinking water from other places. Authorities are ignoring the situation." The lake's water level is near a 50-year low and the famous floating market in Ywama village has nearly disappeared, according to Weekly Eleven.

Wai Moe, IRROL, 15/05/10. http://www.irrawaddy.org/article.php?art_id=18475

The completion of a gas pipeline from the Gulf of Martaban to Rangoon has stalled due to quality-control issues. The pipeline project, which is estimated to be worth about US \$500 million, is being carried out by IGE Co Ltd, run by Nay Aung and Pyi Aung, sons of U Aung Thaung, Minister of Industry-1. IGE is a major supplier of substation and transmission line materials, oil and gas, and CNG filling stations for government projects. With an election coming later this year, the regime had promised to boost Rangoon's power supply by the end of April and Energy Minister Lun Thi has been pushing IGE to conclude the pipeline project a month ahead of the original deadline. Now accused of shoddy quality control in its work on the project, IGE is blaming Lun Thi for the problems it is facing. The delays could not have come at a worse time. Burma is experiencing its most severe heat wave in years, straining the city's limited resources, including its access to water, which requires electric pumps to ensure an adequate supply. "It's like living in hell," said one NGO worker. "The heat is intense, and we can't run our air conditioners or water pumps because of a lack of electricity. Officials involved with the pipeline project have recently vowed to complete the 288-km (179-mile) soon, according to *Weekly Eleven*, a private journal published in Rangoon.

SPECIAL PROJECTS COMMITTEE BRIEFED ON ELECTRIC POWER PLANS

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held a co-ordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw on 05/03/10. . . .

At the meeting, EPM-1 Zaw Min reported on matters related to five joint projects to be implemented with the investment of local entrepreneurs and seven joint projects with foreign companies. The Ministry of Electric Power No. 1 will jointly implement the five projects with the investment of local national entrepreneurs. They are: the Upper Biluchaung hydropower project in Shan State South to generate 29 megawatts, the Htakha hydropower project in Kachin State to generate 6 megawatts, the Anyaphya hydropower project in Taninthayi division to generate 9 megawatts, the Yangon coal-fired power plant project in Yangon division to generate 270 megawatts and the Kawthoung coal-fired power plant project in Taninthayi division to generate 6 megawatts.

Seven projects to be implemented jointly with the investment of foreign companies include: the Naungpha/ Mantawng hydropower project in Shan State North to generate 1200 megawatts, the Ywathit hydropower project in Kayah State to generate 600 megawatts, the Namtabat hydropower project in Kayah State to

generate 110 megawatts, the Nampun hydropower project in Kayah State to generate 130 megawatts, the Nawchankha hydropower project in Kachin State to generate 1055 megawatts, the Namloi hydropower project in Shan State East to generate 452 megawatts and the Namkha hydropower project in Shan State East to generate 200 megawatts. On completion of the 12 projects, electricity will be supplied to the national grid and to local [grids connected to the national] grid.

The Electric Power Ministry No 1 currently has [19 other] hydro electric generation projects that involve investment by foreign companies under planning and development. One of them, the Shweli-1 project that generates 600 megawatts, has already been completed. The remaining projects are as follows: (1) Shweli-2 - 640 megawatts; (2) Ayeyawady Myitson - 4100 megawatts; (3) Yinan - 1200 megawatts; (4) Khaunglanphu - 2700 megawatts; (5) Phizaw 2000 – megawatts; (6) Wuhsauk -1800 megawatts; (7) Chipwe - 2800 megawatts; (8) Chipwenge - 99 megawatts; (9) Laikzar - 1900 megawatts; (10) Tarpein-1 - 240 megawatts (11) Tarpein-2 - 168 megawatts; (12) Laymyo - 500 megawatts; (13) Htamanthi - 1200 megawatts; (14) Shwesayay - 660 megawatts (15) Upper Thanlwin (Kunglong) - 1400 megawatts; (16) Tarhsan - 7110 megawatts; (17) Hatgyi - 1360 megawatts; (18) Taninthayi 600 megawatts

Moreover, plans are under coordination to build two 540-megawatt coal-fired power plants in Yangon. It is estimated that a total of 27 projects to be implemented with US\$ 38,584 million foreign investment will have 35,364 megawatts generating capacity. After the Special Projects Implementation Committee has given permissions, nine hydropower projects have been completed and 36 projects are under implementation.

Afterwards, EPM-2 Khin Maung Myint submitted reports on the renovation of nine national grids, 10 main power station projects and the planned major repair of power plants. Among the lines connected to the national grid the Ministry of Electric Power No 2 is undertaking are the installation of the 18-mile-long Panlon -Namhsam 66-KV power grid, the 3-mile-long power line from the Kyaukpahto-Shwegu- Bhamo 66-KV power grid to the Naba sub-power station, the 9.5-mile-long 66-KV power line from the Kyunchaung-Pakokku 66- KV power line (near Myitchay) to Kanma, the 34-mile-long Lashio-Hsenwi 66-KV power grid, the 15-mile-long Hlinethaya- Ahlon 230-KV twin-bundle, single-circuit power grid, the 0.9-mile-long Hline river crossing (Ahlon) 230-KV twin-bundle, single-circuit power grid, the 60-mile long Thaton-Mawlamyine twin-bundle, single-circuit power grid, the 40-mile-long Naba-Mohnyin 66-KV power line and the 55-mile-long Mohnyin-Mogaung 66-KV power line. f them, Panlon- Namhsam Power Line Project has been completed, three [others] are under implementation and plans are under way to implement the other five.

Among the projects to build or upgrade main power stations are: the Namhsam 66/11-KV, 5-MVA power station; the Naba 66/33/11-KV, 10-MVA power station; the Kanma 66/11-KV, 5-MVA power station; the Hsenwi 66/33-KV, 10-MVA power station; the extension of the substation bay at the Hlinethaya power station, the Ahlon 230/33-KV, 2x100-MVA main power station; the extension of the 230-KV switch bay at the Thaton power plant, the Mawlamyine 230/66/11-KV, 2x50-MVA power station; the Mohnyin 66/11-KV, 5-MVA power station and the Mogaung 66/11-KV, 5-MVA power station. The Namhsam power station project has been completed, and the power stations in Naba, Kanma and Hsenwi are currently under construction.

The power plants to undergo major repairs are No 3 turbine of the Ywama power plant, the No 1 turbine of the Ahlon power plant, the Hlawga recycle steam turbine, the Ahlon recycle steam turbine, the Thakayta recycle steam turbine, the Hlawga power plant, the Thakayta power plant, the No 3 turbine at the Kyunchaung power plant, the Shwedaung power plant, the Myanaung power plant, the steam turbine at the Mawlamyine power plant and the Thaton power plant.

Additional references

See below: [‘Plentiful water](#) resources to generate electricity’ (NLM: 31/12/09)
[‘Inventory](#) of generating plants, transmission grids, projects’ (NLM: 30/07/06)
[‘National update](#) on electric power plants’ (NLM: 18-22/01/06)
[‘State’s electric power projects](#)’ (NLM: 25-27/04/05)
[‘Than Shwe on key role of electricity](#) in national development’ (NLM: 28/04/04)
[‘Formation of work committee](#) for electric power development’ (NLM: 01/04/04)
[‘Annex 1: National high-voltage grid system and maps’](#)

ELECTRIC-POWERED VEHICLES TO BE PRODUCED IN YANGON

NLM, 06/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-06.pdf>

Minister for Industry No 2 Soe Thein reports to the Special Projects Implementation Committee that the ministry will launch an electric vehicle project that will produce one-ton, 1.5-ton and two-ton electric vehicles in Yangon. It will target production of 200 units a year. The vehicles will be designed for use in factories, workshops, airports and hospitals.

Additional references

Perspectives, NLM, 25/02/11. Excerpt. <http://www.burmalibrary.org/docs11/NLM2011-02-25.pdf>
Mandalay Industrial Zone-1 is manufacturing many light trucks, jeeps and zone jeeps. An electric car for family use manufactured by the industrial zone has a maximum speed of 60 miles per hour, and more tests have to be conducted to extend mileage.

NLM, 25/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-25.pdf>

Automobile makers under Myanma Automobile and Diesel Engine Industries have just started to produce . . . [the] Myanmar Electric Vehicle (MEV) . . . [Compiler's Note: The MEV is not mentioned among vehicles on display at an exhibition in Yangon in June that occurs later in this article.]

Maung Maung Myint Swe, NLM, 18/03/10. Edited and condensed.

<http://www.burmalibrary.org/docs08/NLM2010-03-18.pdf>

At its meeting on 05/03/10, the Special Projects Implementation Committee received guidance on a project to produce electric automobiles to be implemented by the Ministry of Industry-2. I was eager to write about this new project so I visited [the offices of the ministry in Yangon]. I was warmly welcomed by officials and got facts about the project which is designed to produce one-ton, 1.5-ton and two-ton electric automobiles. The Ministry of Industry- 2 has gained a lot of experience in the auto industry. The vehicles it already makes are fine, strong, and user-friendly and have won customer satisfaction. The electric automobiles it will produce will help the country to catch up with global changes in the auto industry. The documentary photos and statistics on electric vehicles [to be] produced with international auto technology are very interesting and eco-friendly. They help curb air pollution because they consume less fuel. The electric vehicles the ministry will produce are common sizes in workplaces. Thorough research has been carried out so as to avert potential weaknesses. They will be suitable for factories, mills, airports and hospitals. In particular, they can be used with convenience in transporting goods of light weight, and passengers. Under the programme, the ministry plans to produce 200 units a year at the automobile factory in Yangon. I am confident that this project will bring a lot of benefits to the nation since the products are ecofriendly and will help reduce air pollution. (The article in the print edition of NLM is accompanied by a photo of a mockup of a sample electric automobile to be produced by the ministry.)

CONTROVERSIAL HATGYI DAM TO GO AHEAD

Watcharapong Thongrung, Chularat Saengpassa, Nation, Bangkok, 16/02/10

http://www.nationmultimedia.com/2010/02/16/business/business_30122674.php

The Energy Ministry of Thailand will proceed with the construction of the Hatgyi dam and hydropower plant in Burma, despite a local requirement to enhance the environmental impact assessment and information disclosure for greater transparency. "There will be more studies. Although this may lead to a delay, the project is not scrapped," Energy Permanent Secretary Pornchai Rujiprapa said yesterday. Most of the electricity from the 1.36 gigawatt plant will be supplied to Thailand.

Pornchai, as chairman of the subcommittee on power cooperation with neighbouring countries, said the Energy Ministry is ready to heed the advice of the committee led by PM's Office Minister Sathit

Wongnongtoey. Sathit's committee said the environmental impact assessment be extended while information disclosure must be improved. The Electricity Generating Authority of Thailand, as the representative of Thailand and the dam operator, will take care of the two issues.

The committee last month submitted the list of recommendations to Prime Minister Abhisit Vejjajiva, in a bid to make the investment project more transparent. The committee was set up following the National Human Rights Commission's complaints that the project would directly impact dozens of Karen villages and the villages may have to be relocated from the dam's floodplain. Thousands more will suffer abuses from the Burmese army's attempts to secure the site, which have resulted in several military offensives and a large build-up of troops in the area. All of the dams planned on the Salween River will greatly disrupt the riverine ecosystem and destroy the livelihoods of those peoples living along the river.

Sathit said in a telephone interview that the hold-up of the project should not cause diplomatic displeasure with Burma. He also referred to the cool response from Egat towards the proposals. "The committee's concern was the repercussions on Burma, not the impacts on Egat's investment," he said. Next week, the committee will convene to monitor Egat's reactions to the suggestions. It will also work on the structure of the information disclosure unit, as well as its scope of responsibility.

Montree Chantawong, coordinator of Towards Ecological Recovery and Regional Alliance (Terra), was pleased with the Sathit committee's resolutions, which should create a more transparent disclosure channel. Egat has so far refrained from releasing the full EIA, claiming that it needed Burma's consent to submit the full report, he said. The civic groups received only a brief summary in English.

The civic groups actually want the government to terminate the investment outright, Montree said. While people in Karen State would be saved, Egat does not need power from Burma. However, the construction will fuel fighting and suppression of the minority tribe. Montree also urged the government to ask for parliamentary approval for the project's EIA, if it continues to support the project. Since the dam will lead to alterations in river flows, which could change Thai territory in Tak's Sob Moei district, the contract needs parliamentary approval under Article 190 of the Constitution, he said. "The Human Rights Commission earlier even urged Egat to conduct a separate EIA on the Thai border, for a clearer impact," he said.

The Burma Rivers Network, comprising organisations representing various dam-affected communities in Burma, says on its website that "large development projects in Burma bring an expanded Burma army presence and the increased use of forced labour. Villagers living downstream from the dams will also face difficulties."

Energy Minister Wannarat Charnnukul insisted that Abhisit has not yet ordered a delay of Hatgyi Dam. The Energy Ministry has worked closely with the Foreign Ministry on the project. Once the negotiations are completed, the issue would be submitted to Parliament under the Constitution, he said.

Pornchai who is also chairman of Egat, stressed that Thailand has followed international human rights and environmental accords. Egat's board of directors recently approved the investment with Sinohydro from China. A joint venture is being set up. Sinohydro will hold a bigger stake than Egat, as it is in charge of securing the loan, while the Burmese government will be a minority partner, Pornchai said.

The hydropower plant was expected to start commercial operations and export power to Thailand in 2015 or 2016. However, due to controversies, the project has been stalled and has not yet been included in the Power Development Plan.

Topographic map reference: Thailand: 1:250,000: Series L509, U.S. Army Map: NE 47-10: Li Hutgyi dam, 33 km downriver from confluence of Salween and Moei, grid square reference: 19/4, 3/6 http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-ne47-10.jpg

Additional references

Data summary: [Hatkyi](#)

See below: 'Hydropower Dept and EGAT ink agreement on [Hutgyi](#) project' (NLM: 10/12/05)

Karen Information Centre, 01/03/11. Edited and condensed.

<http://www.bnionline.net/feature/kic/10171-hatgyi-dam-genrates-problems-for-karen-farmers.html>

Karen farmers along the Salween River are worried about the flooding that will result from the construction of the Hatgyi dam. "We don't want any dams in our area," said Saw Kyaw Phoe from Mae Par village in the upper part of the construction site. "If the dam is built, our village -- the whole area -- including our paddy farms and our gardens will be flooded. I, myself, will have no place to live," he said. "We depend on the Salween to irrigate our farms, but the dam will destroy our livelihood," he told the Karen Information Center in a recent interview. Saw Kyaw Phoe and his family used to grow fruit, tobacco, peas, beans, chili and other vegetables on the banks of the Salween, when the river was low in the summer. Since the elections in Burma in Nov-2010, the Burmese Army and Border Guard battalions have been patrolling the area where the dam will be built. In Dec-2010 Kyaw Phoe and his family moved to Mae Par which lies outside the patrol area. "We are human beings. The foreign investors should sympathize with the problems this dam construction is bringing to our lives. I am asking them to stop the dam construction," he said. [A photo showing a section of the Salween and the longboats used by the Karen people who travel on the river is included with the article.]

NLM, 23/10/10. <http://www.burmalibrary.org/docs09/NLM2010-10-23.pdf>

EPM-1 Zaw Min meets with President Fan Jixiang of Sino Hydro Corp in Nay Pyi Taw. They discuss cooperation in implementing hydropower projects.

Thomas Kean, Myanmar Times, 03/05/10 (Vol 26: 521). Edited and condensed.

<http://mmtimes.com/2010/business/521/b02.html>

A hydropower project in eastern Myanmar appears to be back on track after a new Memorandum of Agreement – four and a half years after the original – was signed on April 24 in Nay Pyi Taw. The MoA for the Hutgyi project was signed by the Dept of Hydropower Planning under EPM-1, China's SinoHydro Corp, the Electricity Generating Authority of Thailand (EGAT) International and a local firm, the International Group of Entrepreneurs (IGE) at the ministry building, state media reported last week. The 1360-megawatt (MW) Hutgyi dam will be built in Kayin State along the Thanl win River; the cost is tipped at more than US\$1 billion. The dam will comprise eight 170MW turbines, according to SinoHydro, which is providing most of the financing for the project. A feasibility study and detailed design report were completed in August and September 2007 respectively but construction work is yet to get underway. Last week's report did not give an expected completion date for the project. The dam was originally expected to begin generating electricity in 2015 or 2016.

NLM, 25/04/10. <http://www.burmalibrary.org/docs08/NLM2010-04-25.pdf>

A Memorandum of Agreement on the Hutgyi hydropower project was signed at the Ministry of Electric Power No 1 in Nay Pyi Taw on 24/04/10. The agreement will be implemented by the Dept of Hydro-power Planning under EPM-1, the SinoHydro Corporation Ltd of the PRC, EGAT International Co Ltd of Thailand and the International Group of Entrepreneurs Co Ltd (IGE). After EPM-1 Zaw Min delivered an opening address, Deputy Governor Wirash Kanchanapibul of EGAT International Co Ltd of Thailand spoke words of thanks. Director-General Kyee Soe of DHP, Vice President Shen Decai of SinoHydro Corp, Deputy Governor Sahust Pratuknukul of EGAT International, of Thailand and a representative of the International Group of Entrepreneurs Co Ltd signed the contract. Also present on the occasion were government officials and Chairman Nay Aung of the International Group of Entrepreneurs.

Hydrochina Zhongnan Engineering Corporation, 15/03/10. <http://en.msdi.cn/showArticle.aspx?id=6>

From March 3 to 13, [2010] HydroChina ZhongNan Hutgyi PMO, SinoHydro International Engineering Co., Ltd., SinoHydro Foundation Engineering Co., Ltd., Electricity Generating Authority of Thailand (EGAT), and Myanmar IGE Co., Ltd. jointly carried out a field survey for Hutgyi hydropower project in Myanmar. The main purposes of this survey are to investigate the topographic and geologic conditions of the dam site, quarry and access road [and] find out the site conditions for supplementary engineering survey to preliminarily determine the route, measures and logistic guarantee necessary for the survey, further understand the natural conditions and social customs of Myanmar and Thailand, [to] discuss with the various parties on the physical quantities of supplementary survey and field testing, schedule and work division, [to]

investigate the cement production level, yield and quality in Myanmar, and [to] select the sites for new hydrometric stations.

William Boot, IRROL, 20/02/10. http://www.irrawaddy.org/article.php?art_id=17855

The large-scale hydroelectric dam proposed for the River Salween at Hatgyi might never be built—at least not by Thailand. That's the view of some energy industry analysts following the Bangkok government's announcement that further environmental studies of the estimated US \$1 billion project. "This new stall indicates that the government of Prime Minister Abhisit Vejjajiva is having second thoughts," Bangkok analyst Collin Reynolds told The Irrawaddy. "It's not so much concern about the environment as it is about need. Since the dam plans were first drawn up, the Thai Energy Ministry and EGAT have been revising down their forecasts of future power need. And for a guy like Abhisit with his Western background, there is just too much dirty backwash politics in the Hatgyi project." Abhisit, under pressure from environmental and human rights groups, has ordered closer scrutiny of Hatgyi, which would lead to the forced displacement of many Karen people.

Yuthana Praiwan, Bangkok Post, 08/10/09. <http://www.individual.com/story.php?story=108188964>

With power demand falling, Egat International Co, an overseas investment arm of the Electricity Generating Authority of Thailand, is shifting its focus to operating and maintenance services for power plant operators. The international business subsidiary, established in 2007, oversees all of Egat's investments outside Thailand. But plummeting power demand has made Egat International postpone two overseas projects -- the 440-megawatt Nam Ngiep hydropower plant in Laos and the Hutgyi hydropower plant in Burma -- neither of which have started construction. Egat holds both plants' operating licences from their governments. To develop its new business focus, Egat International is in talks with the US-based GE Group on conducting a feasibility study into providing operating and maintenance services to privately run power plants.

NLM, 01/10/09. <http://www.burmalibrary.org/docs07/NLM2009-10-01.pdf>

EPM-1 Zaw Min receives V-P Bi Ya'xiong of China Three Gorges Project Corporation (CTGPC) of the PRC and MD Pronte Chai and party of Egat International Co Ltd of Thailand for discussions on co-operation between the two countries.

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AGREEMENT SIGNED ON [COAL-FIRED THERMAL POWER PLANT FOR YANGON](#)

NLM, 14/02/10. <http://www.burmalibrary.org/docs08/NLM2010-02-14.pdf>

An MoU on the implementation of a coal-fired thermal power plant in Yangon was signed by the Dept of Hydro Power Planning of EPM No 1, the Htoo Group and the Huaneng Lancang River Hydropower Co Ltd of the PRC at the meeting hall of the Ministry in Nay Pyi Taw on 11/02/10. EPM No 1 Zaw Min, Chairman Teza of the Htoo Group and President Yuan Xianghua of Huaneng Lancang River Hydropower Co spoke on the occasion. Afterwards, director-general U Gyi Soe of the Hydro Power Planning Dept, U Teza and the president of Huaneng Lancang River Hydropower Co signed the MoUs and exchanged documents.

Additional references

Data summary: [Yangon Industrial](#).

For other electric power projects under planning by Htoo Trading Co see: 'Official visit gives impetus to [Upper Sedawgyi dam](#) project' and 'Htoo Trading to build [Htakha](#) hydropower project on B.O.T. basis'.

NLM, 06/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-06.pdf>

Mining Enterprise No-3 and Htoo International Industries Co Ltd signed a PSC contract for mass production of coal in the Theitchauk and Labinchauk areas of Kalewa township. The contract was signed by MD Win Htein ME-3 and V-P U Thiha of Htoo Co in the presence of the mines minister and personnel of the Myanmar Investment Commission.

[Compiler's note: Thitchauk is located about four miles (7 km) west of Kalewa on the north bank of the Myittha river. Coal has been mined commercially in underground pits there since the middle fifties but never in large quantities. Currently, production is about 15,000 tonnes per year. Reserves have been estimated at approximately 87 million tonnes, but proven reserves are only about 5 million tonnes with another 18 million classed as 'probable' and the rest as 'possible'. Shafts at the mine go down as deep as 1,800 feet. Japan's Chiyoda company carried out explorations to test the reserves about ten years ago and an Australian company, McElroy Bryan Geological Services, also explored the resource in the past. Analysis of the Kalewa coal shows that it has an average calorific value of about 11,720 Btu/lb, not exceptional but good enough for use in thermal power plants. According to a World Bank study carried out in the mid-eighties, coal mined at Kalewa was barged 280km down the Chindwin to Monywa from where it was shipped by rail another 750km to Yangon by the government's ME-3, the present operator of the mine. But Kalewa coal is highly friable, crumbling easily, and not conducive to shipment over long distances and to being shifted from one means of transport to another. Labin creek (Labinchaung) rises in mountainous terrain immediately to the south of Thitchauk.

Myanmar Times, 28/03/10 (Vol 26: 515). <http://mmtimes.com/2010/news/515/n51501.html>

Htoo Trading and a Chinese partner will start work on a coal-fired power plant next July that will supply electricity to Yangon's industrial zones, U Sein Oo, a director of the Htoo Group of Companies, told The Myanmar Times on March 17. The US\$300 million project will be implemented by the Ministry of Electric Power-1, Htoo Trading and Huaneng Lancang River Hydropower under the build, operate, transfer system, whereby the private companies will finance the construction and then operate the plant for a minimum of 20 years before transferring it back to the government. Htoo Trading will provide the majority of the investment, U Sein Oo said, while the Chinese company will supply the technology and most of the machinery. They will also be responsible for training local technicians to operate the plant.

The plant, to be located on a 250-acre site in Htantabin township, Yangon Division, will initially provide 135 megawatts (MW) but that is expected to rise to 270MW after six months, he said. The project – Myanmar's first coal-fired power plant – should be completed by the start of 2013. "The construction work will be complete within two and a half years. We will start providing electricity to industrial zones after two years as the first step," said U Sein Oo. The plant will use coal from Kalewa mine in Sagaing Division and the electricity generated will supply factories in three industrial zones of Yangon: Hlaing Tharyar, Shwe Pyi Thar and Shwe Lin Pan. Any surplus electricity generated will be diverted to meet domestic demand. To generate the maximum amount of power, the plant will require 3000 tonnes of coal a day, or more than 1 million tonnes a year.

Myanmar produces about 250,000 tonnes of coal a year, according to government figures but there is potential for expansion. If Kalewa cannot provide enough, more will be imported from ASEAN countries, U Sein Oo said. "We will transport the coal along the Chindwin [River] and store at least six months' supply near the plant," said U Sein Oo. "The site of the plant has been selected bearing in mind the need to transport and unload coal." He added that, as an environmental protection measure, the plant would be fitted with a smoke control system to reduce emissions of carbon dioxide and other gases. No price has yet been set for the power to be generated. The Ministry of Electric Power-2 charges domestic users K25 (about 2.5 US cents) per kilowatt hour and industry K50. Yangon's electricity consumption is more than 300MW, but the actual demand is about double.

U Myat Thin Aung, chairman of Hlaing Tharyar industrial zone, said there were about 1100 businesses in the three zones. While electricity consumption figures for Shwe Pyi Thar were not available, U Myat Thin Aung said total electricity consumption at Hlaing Tharyar and Shwe Lin Pan is 88MW but demand is actually much higher. U Sein Oo said he expected the three zones to consume at least 200MW when the plant comes online.

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held coordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw of 05/03/10. . . . At the

meeting, EPM-1 Zaw Min reported on matters related to five joint projects to be implemented jointly by EPM No 1 with the investment of local entrepreneurs . . . [including] a coal-fired power plant project in Yangon division to generate 270 megawatts. . . . Moreover, plans are under coordination to build two 540-megawatt coal-fired power plants in Yangon.

Myanmar Times, 28/02/10 (Vol 26: 511). <http://mmtimes.com/2010/business/511/b51105.html>
Huaneng Lancang River Hydropower Co, Ltd of China, will assist Htoo Trading and EPM No 1 in setting up a coal power plant to meet Yangon's electricity needs. Construction work, which is expected to last two years, will begin in 2010, a Htoo Trading official was quoted as saying by The Yangon Times on February 18. No details were provided on the power generating capacity of the plant. Yangon's electricity consumption is more than 300MW but actual demand is approximately double that figure, the report said.

Xinhua, 05/01/10. http://news.xinhuanet.com/english/2010-01/05/content_12757356.htm
Myanmar is encouraging private companies to invest in hydropower projects to share the government's efforts in fulfilling the country's growing electric power demand. Recently, the Myanmar authorities granted one more company to implement hydropower projects under a build, operate and transfer (BOT) system, according to EPM-1. Under an MoU reached on 29/12/09 between the ministry and Htoo Trading Co, the private company will implement two hydropower projects of Upper Hsedawgyi and Thaka, for the first time. In November last year [2009 or 2008?], two other local private companies -- the Future Power Co and the Min Anawyahtar Co Group -- had also been granted to implement the Upper Beluchaung and Saidin hydropower projects under the same system.

Dore, John and Yu Xiaogang, *Yunnan Hydropower Expansion*, March, 2004. See especially pp 20-21.

http://www.mpower.net.org/download_pubdoc.php?doc=2586

Yunnan Huaneng Lancang River Hydropower Company Ltd (YHLHC) was one of five major generating companies formed when the PRC's State Power Corp was broken up at the end of 2002 and the SPC's assets were transferred to five independent electricity generating, two transmission and four consultant/construction companies. YHLHC became the dominant actor in the operation and development of the hydropower resources of the Lancang (Mekhong) and upper Jinsha (Yangtse) rivers in Yunnan, having acquired the already constructed Manwan and Dachosasan dams and power plants on the Lancang and the rights to develop six others including the 4200-MW Xiaowan dam. By February 2003, the shareholders in YHLHC were Huaneng Power International (HPI) (56%), Yunnan Development Investment Company (31.4%) and Yunnan Hongta Investment (12.4%). HPI, originally the largest independent power producer in the PRC, was listed on the New York exchange shortly after incorporation in 1994 and on the Hong Kong exchange in 1998. According to an article in the China Daily (24/09/03), Li Xiaopeng, chairman of the Huaneng Group, wants Huaneng to become the world's leading electricity producer, aiming to double its generating capacity by 2010 to 60,000 megawatts, and make it into the Fortune 500 list of the world's largest companies. To fund the Xiaowan dam alone, YHLHC has been able to borrow over US\$ 3 billion from three Chinese banks. For more on YHLHC operations in Myanmar, see '[China's first BOT](#) hydropower project in Myanmar revs up'

SOUTH CHINA POWER COMPANIES TARGET RIVERS IN EASTERN SHAN STATE

Xiao Lingzhi, People's Net, 08/02/10. Edited and revised. Based on a translation by Kevin Li.

<http://news.sohu.com/20100208/n270128118.shtml>

The Yunnan Power Grid Company and SDIC Huajing Power Holdings have agreed to work together on two hydropower projects in Myanmar. The agreement which covers projects on the Namhka and Namlwi rivers in north-eastern Shan State was signed on 04/02/10 by Wang Wen, the Deputy General Manager of Yunnan Power Grid, and Hu Gang, Director of SDIC Huajing Power Holdings.

Commenting on the agreement Wang pointed out that both companies have a long history of co-operation which is now reaching a new stage through the hydropower development in Myanmar. He said that Yunnan Power Grid will establish mechanisms to co-ordinate its work on the project with the SDIC Group in order to

maximize the outcome of the co-operative venture. Hu Gang said that SDIC welcomes the opportunity to manage the project jointly.

The Nam Lwi river originates in the village of Laba in Lancang Lahu Autonomous County in China's Yunnan Province, from which flows south through the Manxin mountains and enters Shan State in Myanmar. Eventually it empties into the Mekong River along the eastern border of Myanmar. The hydropower project includes a six-dam cascade development, with a total installed capacity of about 396MW.

The Namhka river is a tributary of the Nu [Salween] River. It rises [in the Wa region] of north-eastern Myanmar and flows south-west. The river's multi-year average flow is 224 cubic meters per second. The dam project on the Namhka will have an installed capacity of about 200-240MW.

At the end of 2008, Liao Ze-Long, General Manager of Yunnan Power Grid Corporation and Mr Hu signed a letter of intent with regard to their interest in co-operating in the two projects and submitted a development plan to Myanmar's Ministry of Electric Power No 1. In May and December of 2009, the Ministry confirmed the development plan. Up to now, the project pre-feasibility study has been completed, and the investigation work outside the Nam Hka River hydropower stations will be launched.

Website references:

http://www.alacrastore.com/company-snapshot/SDIC_Huajing_Power_Holdings_Co_Ltd-2508928

SDIC Huajing Power Holdings Co Ltd, No. 63 Baimiao Street, Jingmen, Hubei 448002 China

URL: <http://www.sdicpower.com/>

Thomson Reuters Business Description:

SDIC Huajing Power Holdings Company Ltd is a China-based company engaged in investment, generation, operation and sale of electric power. The Company operates power generation plants in Gansu, Yunnan, Jiangsu, Fujian, Anhui and Guangxi provinces, China. During the year ended December 31, 2008, the Company generated approximately 34.4 billion kilowatt-hours of electric power, its total installed capacity reached approximately 6.79 million kilowatts. As of December 31, 2008, the Company had six major subsidiaries and two affiliates, which involved in generation, development, construction and operation of electric power. [Shares of Huajing Power Holdings Co Ltd trade on the Shanghai exchange.]

<http://eng.csg.cn/topic.php?channelID=13&topicID=17>

Yunnan Power Grid Company is a wholly-owned subsidiary of the state-owned China Southern Power Grid Co., Ltd. Yunnan Power Grid Co is in charge of planning, construction, management and dispatching of the power grid in Yunnan Province. Yunnan power grid extends to cover a service area of 394,100 square kilometers and supplies electricity to 1.4 million customers. By the end of 2008, the company's total assets amounted to 49.24 billion RMB, and the total number of employee was 56,715.

Map references

Topographic map references for the Nam Lwi (Nam Loi): Burma 1:250,000: Series U542, U.S. Army Map: NF 47-11: Kengtung. <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-11.jpg> The Nam Lwi (Nam Loi) can be traced through much of its course on the Kengtung map. Not enough is yet known about the six cascades on the Nam Lwi (Nam Loi) to be able to provide map co-ordinates. For the area where the Nam Lwi (Nam Loi) rises, see China 1:250,000 Series L500, U.S. Army Map NF 47-07: Lan Ts'ang <http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-nf47-7.jpg> For the area where it empties into the Mekhong, see Indochina and Thailand 1:250,000, Series L509, U.S. Army Map NF 47-12: Muong Sing. http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-nf47-12-2nd-ed.jpg

For the area where the Nam Kha rises see China 1:250,000 Series L500, U.S. Army Map NF 47-07: Lan Ts'ang. Note that the river forms the boundary between Burma/Myanmar and China in the northern part of its course. <http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-nf47-7.jpg> The mid-river area of the Nam Kha can be found on Burma 1:250,000: Series U542, U.S. Army Map: NF 47-11: Kengtung. <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-11.jpg> The lower part of the river can be found on Burma 1:250,000: Series U542, U.S. Army Map: NF 47-10: Lai Hka.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-10.jpg> It seems probable that the dam on the Nam Kha will be located in the middle section of the river.

http://www.burmariversnetwork.org/images/stories/publications/english/salween_watch_vol2.pdf

A map showing the location of the Nam Lwi and the Nam Kha in eastern Shan state can be found in Vol 2, No 1, of Salween Watch Newsletter, p. 2, along with a brief analysis of the political and military implications of dam construction in this region.

Additional references

Data summary: [Nam Lwi](#)
[Nam Kha](#)

NLM, 15/01/11. <http://www.burmalibrary.org/docs11/NLM2011-01-15.pdf>

EPM-1 Zaw Min receives Pres Liao Zelong of the Yunnan Power Grid Corp and Pres Hu Gang of the State Development & Investment Corp of the PRC for discussions concerning the implementation of the Namtway and Namkha hydropower projects.

NLM, 28/10/10. <http://www.burmalibrary.org/docs09/NLM2010-10-28.pdf>

Hydropower projects on the Namtwe river include the Kengtung (96 megawatts), Wantapin (25 megawatts), Solu (165 megawatts), Mongpa (50 megawatts), Kengyan (28 megawatts) and the Hiku (88 megawatts). The project on the Namkha will be a 200-megawatts plant.

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held a co-ordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw on 05/03/10. . . . At the meeting, EPM-1 Zaw Min reported . . . on seven projects to be implemented jointly with the investment of foreign companies [including] . . . the Namloi [Namlwi] hydropower project in Shan State East to generate 452 megawatts and the Namkha hydropower project in Shan State East to generate 200 megawatts

CHINESE ENGINEERS PLANNING GRID CONNECTION WITH BURMA PROJECTS

William Boot, IRROL Business, 23/01/10. Edited.

http://www.irrawaddy.org/article.php?art_id=17643

Chinese companies have begun drawing up plans for a power grid along [rivers of] the Irrawaddy [basin] in Burma—to transmit electricity into southwest China. An outline of the 15-year project was disclosed in a report published by China's chief energy planning authority, the National Development and Reform Commission (NDRC). The NDRC and several state enterprises, including China Power Investment Group and China International Engineering Consulting Corporation (CIECC), are involved in the planning.

An assessment report should be completed by the end of this year, Zhou Jiachong, a director of CIECC, states in the magazine China Investment.

Agreements signed in 2009 between these companies and the Burmese military government for hydroelectric development along [rivers] of the Irrawaddy basin would have a combined electricity generating capacity of 21,000 megawatts, said Zhou. "Myanmar is a smaller country with less population relative to China. Most of the electricity generated [by projects developed by PRC companies] will not be able to be consumed domestically. So for Chinese companies, they have to consider power transmission back to China when developing Myanmar's hydro-power resources," said Zhou. Zhou said Chinese developers were moving into Burma because of the "difficulties of hydro-power development on China's international rivers."

Additional references

See below: [Chipwi creek plant](#) to power huge hydel project in Kachin state (MT: 24/03/08)

'Agreement signed for Upper Kachin hydropower projects ([Myitson](#))' (NLM: 02/01/07).
 'South Korea's [KEPCO](#) to study improving power transmission system' (MT: 31/07/06)
 'Power trading in the Greater Mekong Sub-region (GMS)' (Appendix 14)
 'Annex 1: National high-voltage [grid system and maps](#)'

From an article in the January 2010 issue of China Investment, a publication of the National Development and Reform Commission of the PRC. Translation thanks to Kevin Li. Text as posted 16/01/10 on

nu-salween@googlegroups.com

Quoting Zhou Jiachong, Director of Electricity Office (II) of the Energy Business Department of China International Engineering Consulting Corporation (CIECC): There are hydropower resources that are more difficult to develop, which involve the problems like resettlement and ecological impacts, and the mismatch between the sites of resources and its local market demand, i.e. the hydropower resources in Tibet, the border rivers shared between Russia and China, and the international rivers that originates in China. The development of hydropower resources in such rivers faces a higher degree of difficulty and needs further study and coordination. In the second half of 2009, the National Energy Bureau took up a major task. The bureau organized a study in the consumption of electricity from the dams in Southwestern China and outside the China border. In March 2009, China signed an agreement with Myanmar on the hydropower development in upstream Irrawaddy River. In June, China Power Investment Group (CPI) signed a Memorandum of Understanding (MOU) in developing seven hydropower stations in upstream Irrawaddy River, whose total installed capacity reaches 21,000 MW. A major problem facing the Chinese power companies that are "going abroad" to develop hydropower in Myanmar is the power transmission. Myanmar is a smaller country with less population (relative to China). Most of the electricity generated cannot be consumed domestically. So Chinese companies have to consider power transmission back to China when developing Myanmar's hydropower resources. According to the agreement, the hydropower stations in the Irrawaddy River have to be built within 15 years, which implies an intensive hydropower development in the river basin. China needs to accommodate and coordinate the electricity generation from those dams and the dams in southwestern China. With the limit in market capacity, we have to study how China can accommodate and consume this electricity. The Bureau has already organized meetings to start the study. My company is also part of the task force, and hopefully will submit the research result by the end of 2010.

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AGREEMENT ON [FOUR HYDRO PROJECTS SIGNED WITH DATANG \(YUNNAN\)](#)

Electrical Division of the Ministry of Commerce of the PRC, 15/01/10. Edited.

<http://www.sourcejuice.com/1295827/2010/01/15/Datang-Yunnan-Myanmar-Hydropower-Development-Company-signed-joint/>

On January 7, 2010, Datang (Yunnan) and the Hydropower Planning Dept of the Union Myanmar signed an MoU on the joint development of four hydroelectric power projects. The agreement relates to the "Ywathit, Lampang River, Nandan Pa Lay absurd River and River 4 hydropower projects". The signing ceremony was held in Myanmar's capital of Naypyidaw. Group Chief Economist Wu Jing, chairman of Datang Overseas Investment, and the Myanmar Minister of Electric Power No 1 Suketoshi [sic] were present at the ceremony.

The vice president of Datang Overseas Investment Co of Datang (Yunnan), Chairman Jiang Jian-ping, signed the MoU for Datang (Yunnan) and Wu Chi Chisu of the Planning Division signed for Myanmar

In his remarks at the ceremony, Minister Suketoshi spoke highly of the outstanding achievements that Datang (Yunnan) has made in the Taiping river project it has undertaken in Myanmar. He said the Hydropower Ministry firmly believed that Datang (Yunnan) would enjoy similar success in co-operating in the joint development of the four new hydropower projects.

For his part, Wu Jing expressed the hope that the two parties to the agreement, China Datang Corporation and Myanmar's Electric Power [Ministry] No 1 would see it as an opportunity to continue to deepen their co-operation and that the four projects would serve to accelerate Myanmar's economic development and to enhance the traditional friendship between China and Myanmar.

Compiler's note:

The edited news story above should be compared with the somewhat garbled news item circulated by the Domestic Electrical Service of the PRC's Commerce Ministry as translated and circulated by SourceJuice, a website that relays items relating to commerce from 'trusted sources' in the PRC. The Commerce Ministry's version of the event adds some details that are not in the news item about the MoU that appeared in NLM on 08/01/10. See Item 1) below. Three of the projects are named in a report made by Hydropower Minister Zaw Min at a SPIC meeting in March. See Item 2) below. The fourth project may be Tapein-2 which Datang (Yunnan) is slated to begin when it finishes with its Tapein-1 project near the Yunnan border in Kachin state. ([tp-2](#))

Topographical map references

Topographic map references for the Nampun project on the Nam Pawn river and Namtabat project on the Nam Tamhpak [?] river: 1:250,000: Series U542, U.S. Army Map: NF 47-01: Pyinmana.
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-1.jpg> Not enough information is available to provide more precise locations for either of these projects.

Topographic map references for the Ywathit project on the Thanlwin (Salween) river near Ywathit (19°10' N, 97°30' E), See: 1:250,000: Series S250, U.S. Army Map: NE 47-02: Chiang Dao. Grid square 3\4, 21\1.
http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-ne47-2.jpg The dam might be located downstream of the junction of the Nam Pai with the Thanlwin.

Additional references

Data summary [Ywathit](#) [Nampun](#) [Namtabat](#)

See above: 'Tapein-1 hydropower plant in Kachin state officially opened' (NLM: 24/01/11)
 'China Datang and Shwetaung team up for six hydropower projects' (NLM: 20/01/11)
 'Datang begins operations at Tapein river hydropower plant' (Interfax: 03/09/10)
 See below: 'Taping river hydropower projects under discussion in China' (Hubei Daily: 04/11/06)
 'Tribe's home to be a valley of the dammed' (London Times: 22/03/06)
 'Lawpita power plants and associated dams' (Appendix 1)

1) NLM, 08/01/10. <http://www.burmalibrary.org/docs08/NLM2010-01-09.pdf>

EPM-1 Zaw Min received President Jiang Jianping of Datang (Yunnan) United Hydropower Developing Co Ltd (DUHD) of the PRC at the Ministry in Nay Pyi Taw on 07/01/10. Also present on the occasion were Deputy Minister U Myo Myint, directors-general, managing-directors and officials of departments and corporations under the Ministry, Chief Economist Wu Jing and personnel of DUHD. At the meeting, the two sides discussed matters related to hydropower projects in Myanmar. Afterwards, Director-general [U Kyee Soe] of the Hydropower Planning Dept and Chief Economist Wu Jing of Datang (Yunnan) signed an MoU with regard to hydropower projects [in Myanmar]. Also present at the signing ceremony were Minister for National Planning and Economic Development Soe Tha, Minister for Finance and Revenue Hla Tun, Attorney-General Aye Maung, deputy ministers, directors-general, managing directors of the departments under the ministry and President Jiang Jianping of DUHD and officials concerned.

2) NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

Among seven projects to be implemented jointly with the investment of foreign companies are . . . the Ywathit hydropower project in Kayah State to generate 600 megawatts, the Namtabat hydropower project in Kayah State to generate 110 megawatts, the Nampun hydropower project in Kayah State to generate 130 megawatts.

3) The Ywathit dam project has been mentioned from time to time in documents posted on the Internet. A study carried out for MEPE in 1990 estimated a potential power output of 1500 MW.

<http://www.angelfire.com/rock3/shanyouth/body/status-of-salween-dam-plans.html>

In 2004, a working committee appointed to study Thailand-Myanmar power co-operation recommended that a joint feasibility study for the development of hydro power plants in the Thanlwin and Tanintharyi basins

consider a plan that would include an 800-MW dam and power station at Ywathit. An MoU on the study was signed in May 2005.

http://neroc.kku.ac.th/mekong/gms/documents/Modules/Module2/M2b/Power_Trade_Policy%20in%20GMS_3_Jul_07.pdf

Kantarawady Times, 11/08/10. Edited and condensed. <http://www.bnionline.net/news/kantarawaddy/9144-junta-chinese-investors-forge-ahead-with-salween-dam.html>

According to the Karenni Development Research Group (KDRG), there has been no transparency or consultation with the local Karenni people about the proposed Ywathit dam project. They say it will submerge large tracts of land along the Salween, the original homelands of thousands of Karenni refugees currently sheltered in Thailand. Meanwhile, the military regime and Chinese investors have sent hundreds of workers from central Burma to Kyauk Kyin near Ywathit to construct roads. Construction materials have begun to be transported to the dam site.

IRROL, 27/12/10. http://www.irrawaddy.org/article.php?art_id=20418

Karenni National Progressive Party (KNPP) troops ambushed a Burmese military convoy transporting technicians to a dam construction project on 24/12/10, according to Khu Oo Reh, the joint secretary of the KNPP. The KNPP troops attacked 20 government military trucks near the town of Pruhsu, killing at least three persons including the foreign technicians, according to the KNPP. No information was provided about the number of people injured in the attack. Speaking to The Irrawaddy on Monday, Khu Oo Reh said, "We attacked the convoy because it brought persons who can harm local people by building a dam. The convoy came from Loikaw and was headed to the dam project in the Ywathit area of Bawlakhe township. We are investigating the building of this dam, including what company is investing in the project. We received some information that the regime began conducting secret surveys four years ago. At the beginning, we thought that they were working on the Weigyi dam and didn't expect that they planned to build a new dam in Ywathit."

NLM, 20/01/11. Excerpt. <http://www.burmalibrary.org/docs11/NLM2011-01-20.pdf>

EPM-1 Zaw Min met with V-P Zou Jiahua of China Datang Corp and Pres Kou Bingen and party of China Datang Overseas Investment Co Ltd in Nay Pyi Taw for discussions on joint implementation of hydropower projects. Afterwards a ceremony to sign MoAs on the implementation of the Ywathit, Nampawn, Namtamhpak, Lemro, Lemro-II and Saingdin hydropower projects was signed between the HPD of EPM-1, China Datang Overseas Investment Co Ltd and Shwe Taung Hydropower Co Ltd [of Myanmar] took place in Yeywa Hall of the Ministry.

Burma Rivers Network, 09/03/11. Edited and condensed.

http://www.burmariversnetwork.org/images/stories/petition_press_release/March%2010%202011%282%29.pdf

The Karenni Development Research Group (KDRG) has launched a campaign publication exposing how three planned dams proceeding in secret will block waterways across the state, tightening the junta's control and causing further widespread disruption to the war-torn population. A giant 600-MW dam on the Salween at Ywathit, nearly 60km from Mae Hong Son, will flood upstream to Shan State across large areas forcibly depopulated during ongoing offensives by Burmese army troops. Another 130-MW dam on the Pawn river in the heart of Karenni state will impact the Yintale people who now number just a thousand. A 110-MW dam on the Thabet River to the north of Loikaw is also planned. "We're not allowed anywhere near the dam site" said one local villager from Ywathit. "Some Chinese with strange equipment travel there with soldiers, but we don't know what's going on." The Ywathit is one of seven dams planned on the mainstream Salween in Burma by Chinese and Thai companies. All of the dams are located in conflict zones and have already exacerbated local resentment and instability. "How can investors think this is business as usual while armies are battling around them and people are fleeing for their lives?" said Thaw Reh of the KDRG. "They should wake up to the risks of these dams and immediately stop their operations."

Burma Rivers Watch, Salween Watch & Karenni Development Research Group. *Stop the Dam Offensive Against the Karenni*. March 2011. 4pp.

http://www.salweenwatch.org/index.php?option=com_content&view=article&id=279:stop-the-dam-offensive-against-the-karenni&catid=37:publications&Itemid=66

The report was issued to accompany the launch of a campaign calling for a moratorium on the construction by the Datang Corp of three hydropower dams in Karenni (Kayah) state: the Ywathit on the Salween, and one each on the Pawn and Thabet tributaries of the Salween. Six reasons are presented for opposing construction of the dams: 1) they will fuel further conflict in a region already impacted by violence and instability; 2) no environmental, social, or health impact assessments have been carried out; 3) the negative impact of the dams on the forest and fish resources in the Salween and Pawn river valleys; 4) construction of the dams will prevent vital nutrients in the sediment-rich Salween from reaching gardens and farms along the banks for hundreds of kilometres downstream; 5) the Pawn river dam located just to the north of the town of Bawlakeh is a threat to the livelihood of the Yintale people who plant millet and sesame in the river lowlands; 6) water surges and shortages for reasons related hydropower generation will negatively impact agriculture in the lower Salween. The report is richly illustrated with photos showing the traditional life style of the people of the Karenni. Maps pinpoint the location of the proposed dams.

RENEWABLE ENERGY FORUM HELD IN YANGON

Htar Htar Khin, Myanmar Times, 04/01/10. (Volume 26: No.504)
<http://www.mmtimes.com/2010/news/504/50408.html>

The first annual Renewable Energy Business Forum was held on 14/12/10 in Yangon. The forum marked the first step in promoting awareness about renewable energy and energy efficiency in Myanmar, according to its organisers. Objectives included: forming focal points for renewable energy, facilitating dialogue on the challenges and opportunities in private sector renewable energy businesses, sharing knowledge and experience between the government and private organisations and participating with international corporations for new technology development.

The inaugural forum was hosted by two-time ASEAN Energy Award-winning Kaung Kyaw Say Engineering Company. The award-winning reports written by chairman and CEO U Htun Naing Aung dealt with a mini-hydropower project in Ayeyarwaddy Division, and rice husk gasifiers as electricity sources in rural areas near Ngapali Beach. Nine further papers related to renewable energy were read out at the forum.

The next Renewable Energy Business Forum is scheduled for May 2010, according to organisers.

Project submission

Rural Electrification with Mini Hydro Power (Ma Mya Dam) Project, Application Form, ASEAN Renewable Energy Project Competition, 06/05/09. 20 pp.

http://www.aseanenergy.org/download/aea/renewable_energy/2009/awardees/mm_Rural%20Electrification%20with%20Mini%20Hydro%20Power%20%28Ma%20Mya%20Dam%29%20Project.pdf

The project was submitted to the 2009 ASEAN renewable energy competition with the aim of showing how to take advantage of drop structures along the canal irrigation system of a rural dam to produce electricity and the ease with which a micro hydropower plant could be installed without disturbing the irrigation system. An analysis of the savings in carbon emissions compared with that required to generate a similar amount of energy using an engine using a fossil fuel is included. The presentation focuses on the installation of micro hydropower turbine-generators along one of the main canals of the government's Ma Mya dam in Myanaung township in the Irrawaddy delta area of Myanmar. It includes details about the design of the project, technical, financial and market considerations, manufacture of the turbines used, the operational and maintenance program and the sustainability and replicability of the project. Information about the changes brought about in the village of Myinwartung which received electricity for the first time as a result of the project is also featured. Numerous photos, charts, tables, diagrams and two maps accompany the text. A map showing the project layout and a sectional profile of the installations at one of the drop sites are especially useful. The project submission appears to have been prepared by U Htun Naing Aung of Kaung Kyaw Say Engineering, consultant to the project.

Additional references

Clean Technology Investment seminar in Kowloon, Hong Kong, Sep-2010

<http://www.gii.co.jp/conference/clean-tech10/catalog.pdf>

Participating in a panel discussion on direct investment in cleantech companies will be Htun Naing Aung, chairman and CEO of Kuang Kyaw Say Co Ltd of Myanmar. Among other things, the panel will consider key investment trends of global investors in direct cleantech investment, partnership options & models and effective due diligence and risk management strategies when evaluating cleantech companies and what Asian cleantech companies have to offer to investors.

NLM, 03/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-03.pdf>

Kuang Kyaw Say Co secured the 1st Runner-up Award in the Renewable Energy Competition (Off-grid) by submitting a paper on Multipurpose Biomass Gasifier. On 22/07/10, Chairman Tun Naing Aung accepted the ASEAN Energy Award 2010 presented by ASEAN Center of Energy (ACE) in Da-Lat of Vietnam. The company held the 2nd Renewable Energy, Energy Efficiency Business Forum (REBF- 2010) at the Traders Hotel on Sule Pagoda Road, here, on 17 and 18 June and displayed the energy exhibition.

ENERGY EXPORTS TO FUEL GDP GROWTH

Thomas Kean, Myanmar Times, 04/01/10 (Vol 26: 504 – 503)

<http://mmtimes.com/2010/news/504/50403.html>

Energy exports, mining and construction will fuel annual Gross Domestic Product (GDP) growth of 8.6 percent to 2030, an Asian Development Bank (ADB) report says. Electrification, or the percentage of households connected to the electricity grid, is projected to rise to 80pc over the same period, while primary energy demand will increase by 2.6pc annually, slightly above projections for the region and almost double the global average.

Mr Edito Barcelona, a consultant with the ADB who worked on the report, Energy Outlook for Asia and the Pacific, said the GDP growth projection was based on government policies and other information reported by Myanmar government officials during ASEAN meetings and workshops. "In modelling, we assumed that this GDP growth could come from energy exports such as oil, natural gas and hydroelectricity which would also spur growth in other sectors of the economy," Mr Barcelona said.

Dr Sean Turnell, a professor of economics at Australia's Macquarie University and editor of Burma Economic Watch, said natural gas sales would not provide any new impetus to GDP growth until new projects came online in 2013. "It's true that Myanmar's energy sector will be the source of rising export surpluses into the future – and hence a net positive contributions to GDP growth – but there's no reason to see this sector being a growing contributor to this end in the coming year," Dr Turnell. "I think there will be growth in Myanmar and the report is right to note the stimulus of the pipeline construction and various other energy investments – but these are not large and have small multipliers into the broader economy, as Chinese construction often involves imported Chinese workers, for instance," Dr Turnell said.

Natural gas exports are expected to almost double over the next decade as the Shwe and Zawtika projects come online and Mr Barcelona said these profits, augmented with foreign investment, could then be used to fund the electrification. "To reach 80pc [electrification] in 2030, Myanmar needs to invest in increasing its electricity generating facilities, extension of its transmission and distribution lines as well as substation capacities to currently un-electrified areas in the country," he said.

While Mr Barcelona would not be drawn on how much would be required to fund electrification in Myanmar, the ADB estimates countries in the Asia and Pacific region must invest between \$7 trillion and \$9.7 trillion in the energy sector from 2005 to 2030 to meet the rapidly growing demand for energy in the region.

Despite the threat of global warming, up to 80pc of the region's energy demand will be met by fossil fuels, such as coal, oil and gas by 2030. While Myanmar is also expected to tap these energy sources, it will rely almost exclusively on hydropower for electricity generation by 2030, Mr Barcelona said. "Myanmar has huge potential for hydroelectric generation and is even capable of exporting electricity beyond 2030," he said.

One possible downside is the availability of water during dry season but this could be averted if Myanmar is able to interconnect its power system with Mekong-region neighbours. "It is ideal for the government to consider a more balanced electricity generation – to ensure supply security – as the country also possesses other energy resources, such as coal and natural gas," he said.

The growing demand for energy is expected to provide a boost for previously untapped coal resources in Myanmar, he said. "The projected GDP growth of Myanmar would entail a corresponding growth in infrastructure and will bring about growth in industrial and trade activities. As infrastructure is developed, there would be growing demand for cement which could be produced locally. As cement production needs coal, this would encourage coal production." Myanmar has about 4 million tonnes of recoverable coal reserves and 90 million tonnes of potential reserves, according to the Ministry of Energy. "For these resources to be developed, exploration activities to determine the recoverable reserves should be carried out."

Additional references

See below: 'Myanmar's tremendous [potential for energy export](#) (MT: 12/06/00)
See also listings under 'Hydro and thermal power export projects' ([EP](#))

Capitalvue: 29/12/10. <http://www.capitalvue.com/home/CE-news/inset/@10063/post/1271941>
China Southern Power Grid imported three TWh of electricity from Myanmar in the first 11 months through its subsidiary, Yunnan Power Grid, reports yicai.com, citing a release by Southern Grid. Based on an average coal consumption of 334 grams per kWh in the first 10 months, imports of electricity from Myanmar saved 1.02 million tons of coal and cut 2.66 million tons of carbon dioxide emissions. [Compiler's comment: It would appear that most of the 3000 GWh of electricity imported from Myanmar by Yunnan Power Grid was sourced from the Shweli-1 power station, as the Tapein-1 power station near the Yunnan border in southern Kachin state did not come online until Sept 2010.]

[S10](#)

[PLENTIFUL WATER RESOURCES TO GENERATE ELECTRICITY](#)

Maung Saw Win, NLM, 31/12/09. Excerpted and discussed.
http://www.burmalibrary.org/docs08/Electricity_article-NLM2009-12-31.pdf

This article is part of a series in NLM featuring the accomplishments of Myanmar's military government leading up to the celebration of Independence Day in the country on the 4th of January, 2010. It claims that the power plants in operation throughout the country have a generating capacity of 2,255.9 megawatts. This differs substantially from the 1717MW of installed capacity listed in reports of the Central Statistical Organization. The difference could be due to the inclusion of the 600MW generated at the Shweli-1 power station ([sw1](#)) which came online in 2009. Most of the power generated at Shweli-1, while produced in Myanmar, is being exported to Yunnan province in the PRC.

A chart accompanying the article indicates the name-plate capacity and expected time of completion for the following hydropower projects in various stages of construction: Yeywa - 790MW in 2010 ([yy](#)); Shwegyin - 75MW in 2010 ([sg](#)); Chephwenge [Upper Kachin state] - 99MW in 2011 ([cw](#)); Kunchaung - 60MW in 2011 ([kn](#)); Pyuchaung - 40MW in 2011 ([py](#)); Nancho - 40MW in 2011 ([nc](#)); Tarpein-1 [in Lower Kachin state] - 240MW in 2011 ([tp1](#)); Upper Paunglaung - 140MW in 2012 ([up](#)); Thaukyekhet-2 - 120MW in 2012 ([tk](#)); Biluchaung-3 - 52MW in 2012 ([b3](#)). Detailed information on each of these projects is available using the links provided.

Another chart provides a list of projects which have yet to be implemented on a full-scale basis. No time of completion is provided but the name-plate megawatt capacity and estimated annual generating production is provided. Shweli-3 [Shan state north] - 800MW, est at 3995 million kWh ([sw3](#)); Bawgata [Bago div] - 168MW, est at 500 million kWh ([bg](#)); Bilin [Mon state] - 280MW, est at 1512 million kWh ([bl](#)); Dayaingchaung [Karen

state] - 250MW, est at 87 million kWh ([dg](#)); Thakyet [Taninthayi div] - 20MW, est at 95 million kWh ([tg](#)); Tarpein-2 - 140MW, est at 633 million kWh ([tp2](#)); Shweli-2 [Shan state north] - 640 MW, est at 3310 million kWh ([sw2](#)); Shwesayay [Sagaing div] - 660MW, est at 2908 million kWh ([ss](#)); Taninthayi - 600MW, est at 3476 million kWh ([tn](#)); Laymyo [in Rakhine state] - 500MW, est at 2500 million kWh ([lm](#)).

The lists in both of these charts include some projects being developed directly under the aegis of the EPM-1, others being undertaken by foreign companies, mainly from the PRC, and some by independent Myanmar producers. The lists are by no means exhaustive. No mention is made of dams under construction by the Irrigation Dept of the A&I Ministry that have hydropower components attached to them.

According to the studies up to May 2009, the country has 302 water resources where hydropower projects exist, are planned, being implemented or could be undertaken. These are estimated to have a total generating capacity of 46,330.55 megawatts. The Ministry of Electric Power No 1 has adopted a 30-year long-term electricity development strategic plan and is said to be implementing the hydropower projects in line with five-year short-term plans.

Another chart lists the number of possible major hydropower projects and the potential hydropower capacity in each of thirteen states and divisions. Kachin state: 19 projects with 18745MW cap; Kayah state: 5 projects with 954MW cap; Karen state: 9 projects with 7064MW cap; Sagaing Div: 6 projects with 2830MW cap; Taninthayi Div: 6 projects with 711MW cap; Bago Div: 8 projects with 538MW cap; Magway Div: 5 projects with 359MW cap; Mandalay Div: 9 projects with 1555MW cap; Mon State: 2 projects with 290 MW cap; Rakhine state: 6 projects with 765MW cap; Shan State East: 4 projects with 720MW cap; Shan State South: 8 projects with 7570MW cap; Shan State North: 5 projects with 4000MW cap.

Photos accompanying the article show the Kengtawng hydropower plant, the main canal and spillway of the Kunchaung hydropower project, the Shwegyin hydropower project site and Saidin falls,

Additional references

See above: 'Special [projects committee briefed](#) on electric power plans' (NLM: 07/03/10)
 See below: 'Government will [prioritize hydropower](#) projects over gas' (MT: 10/07/06)
 'More inputs needed to power a [hydro future](#)' (MT: 04/06/01)

NLM, 16/12/10. Excerpt. <http://www.burmalibrary.org/docs09/NLM2010-12-16.pdf>

[At the official commissioning of the Yeywa hydropower dam and plant, PM Thein Sein said that as the] "generating of electricity has been speeded up after 1988, a total of 15 hydropower plants including Yeywa hydropower plant, one coal-fired power plant and 15 gas power plants, totaling 31 across the nation are now generating 3045 megawatts. In addition, he said that out of 13 ongoing hydropower projects, Shwegyin Hydropower Project that can generate 75 megawatts and Kunchaung Hydropower Project that can generate 60 megawatts will be launched soon."

Compiler's note: The fifteen hydropower plants would include Yeywa (780), Kengtawng (54), Shweli-1 (600), Khabaung (30), Yenwe (25), Paunglaung (280), Mone (75), Thapaseik (30), Zaungtu (20), Zawgyi-1 (18), Zawgy-2 (12), Balu-1 (28), Balu-2 (168), Sedawgyi (25) and Kinda (56) for a total generating capacity of 2201 MW. The coal-fired plant at Tigyit has a generating capacity of 120 MW. The thermal plants fueled by natural gas are as follows: Ywama (70.3 MW), Ahlone (154.2 MW), Thaketa (92 MW), Hlawga (154.2 MW), Kyunchaung (54.3 MW), Mann (36.9 MW), Shwedaung (55.35 MW), Myanaung (34.7 MW), Thaton (51 MW), Mawlamyine (12 MW) and Kanma (8.72 MW) with a total generating capacity of 723.67 MW. It is not clear why the number of gas-fueled plants was listed as fifteen, unless the combined-cycle plants at Ywama, Ahlone, Thaketa and Hlawga are considered as separate power stations. It is noted that the Shweli-1 power station with a name-plate generating capacity of 600 MW is included in the list, although 85pc of the power produced at Shweli-1 is designated for export to the PRC. Not included among the operating hydropower plants is the Tapein-1 station with a name-plate capacity of 240 MW. According to China Datang Corp, the owner, [Tapein-1](#) went into operation on a commercial basis at the beginning of September 2010. Notice of the start-up of the Tapein-1 generating plant was not published in state-owned media in Myanmar.

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MOU SIGNED ON [NAO PHA AND MAN TUNG HYDROPOWER PROJECTS](http://www.hydropower.org.cn/info/shownews.asp?newsid=2082)

China Hydropower Engineering Consulting Group (HydroChina), 28/12/09.

<http://www.hydropower.org.cn/info/shownews.asp?newsid=2082>

During the 19 and 20 December 2009 period, Chinese Vice President Xi Jinping headed a government delegation to the Union of Myanmar and signed a series of agreements with Myanmar government. After a thorough negotiation between China Hydropower Engineering Consulting Group (HydroChina) and the Union of Myanmar's EPM-1, an MoU for the development of the Nao Pha hydropower station on the mainstream Thanlwin (Salween) River and the Man Tung hydropower station on its tributary, Nan Ma River, was drafted. On December 20, witnessed by the Chinese Vice President Xi Jinping and Vice-Chairman Maung Aye of Union of Myanmar's SPDC, General Manager An Zhi-Yong and a representative of Myanmar's EPM-1 signed the MoU. The Thanlwin River, also known as the Salween (Nu River in China), is Myanmar's second largest river. Nao Pha Hydropower Station is located in the mainstream Thanlwin River. The Man Tung Hydropower Station is located in the left bank of the Thanlwin River's tributary, Nan Ma River. Both power stations, with good conditions for development, are close to the Sino-Burmese border.

Topographical map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-06: Mong Yai The Mantawng (Man Tung) station on the Nam Ma would appear to be close to the village of Manton (22° 57' N, 98°37' E) grid square reference: 39\6, 6\6. The location of the Nawngpha (Nao Pha) dam and power plant is probably located just east of the old Shan monastery town of Nawngghpa (22°36' N 98°34' E) about 20 km NE of Tangyan, grid square reference 39\6, 6\1. <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-5.jpg>

Additional references

Data summary: [Naungpha](#)
[Mantawng](#)

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held a co-ordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw on 05/03/10. . . . At the meeting, EPM-1 Zaw Min reported . . . on seven projects to be implemented jointly with the investment of foreign companies [including] . . . the Naungpha/Mantawng hydropower project in Shan State (North) to generate 1200 megawatts,

NLM, 21/12/09. <http://www.burmalibrary.org/docs08/NLM2009-12-21.pdf>

SPDC Vice-Chairman Maung Aye met a visiting Chinese goodwill delegation led by PRC V-P Xi Jinping at Zeyathiri Beikman in Nay Pyi Taw on 20 December. . . . After the meeting, a ceremony to sign bilateral agreements followed. Officials of the two countries signed 16 MoUs and agreements such as five agreements on development of trade, economy, transport infrastructures, technological cooperation and purchase of machinery; seven financial agreements, three agreements on hydro-electric power and one agreement on energy sector and oil and natural gas pipeline.

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REGULAR POWER SERVICE RESTORED IN MON AND KAREN STATE (edited)

Rai Maraoh, IMNA, 22/10/09 <http://www.bnionline.net/news/imna/7278-electricity-mysteriously-returns-to-villages-in-mon-and-karen-states.html>

After months without regular electricity, the residents of many villages in Mon and Karen states report that they have enjoyed a constant supply of power for the past month. "Now the electricity comes regularly, but we don't know why? Service had been restored before but only for a few minutes at a time. Now it comes on for much longer times, sometimes for the whole day," said a villager who lives in Hneepadaw village in Mudon township. "Regular power service was restored in Hpa-an in September, but before that electricity

just didn't come on. Regular service was restored not just in Hpa-an but also in the villages. It's never been like this before," said a Karen resident from Hpa-an.

An IMNA news story on May 11th of this year described the severity the power outages in southern Burma. Near the close of 2008, villages in Mudon township area only had electricity for 3 days a month, and even then for only two-hour at a time. When university students in Moulmein protested in March over a lack of electricity during spring exams, power supply resumed on a fairly steady basis for about two months but by the middle of May, the city was again plunged into darkness, along with the rest of Mon state.

IMNA's May 11th report documented how faulty electricity in Southern Burma presents a particular problem to professionals who run VCDs, computers, other electronics businesses; such individuals must purchase personal generators to get the electricity needed to run their businesses and sell their wares.

Some residents in Mudon township suspect the sudden "power surge" is a political strategy ahead of elections scheduled for 2010. They see it as kind of bribe by the military government to get villagers to organize in favour of the government before the elections.

Additional references

See above: 'Chaungzon supplied with [electricity at a big loss](#)' (NLM: 29/03/11)

See below: '[Premium rates](#) for electricity in Mon villages' (IMNA: 03/08/07)

'[Electricity metering](#) program taking root' (IMNA, 11/05/07)

'[Acute shortage](#) of electricity disappoints Mon residents' (IMNA: 21/02/07)

KIC, 31/03/11. Edited and condensed. <http://www.bnionline.net/news/kic/10442-electricity-authorities-accuse-karen-armed-group-of-bombing-beelin-electric-tower.html>

The Township Electricity Engineer's Office in Moulmein has accused the Karen National Liberation Army (KNLA) of setting off a bomb which knocked out the main electricity tower in Bilin in the northern part of Mon State very early in the morning of March 25th. As a result of the explosion electrical service from the national power grid in Bago to Bilin, Thaton, Paung and Mawlamyine was cut until the evening of March 30th. However, Saw Phaw Doh, commander of the KNLA's Battalion 101 denied responsibility for the blast. "It is not an area where we would bomb. And also, our people are not there," he told a reporter of the IMNA news agency. However, local observers said the KNLA's Brigade No. 1 is active in the Bilin township area.

Kun Chan, Mizzima, 09/03/11. Edited and condensed.

<http://www.burmanet.org/news/2011/03/09/mizzima-news-university-students-protest-against-power-cuts-in-mon-state-%E2%80%93-kun-chan/>

University students in Moulmein demonstrated at electrical services offices on 08/03/11 in protest against cuts in electricity during their graduation exams period. More than 50 university students gathered at the Electric Power Corporation office in Ngantay Ward and the township electrical engineering office in Mandalay Ward, sources said. Some students threw stones at the office, breaking glass. 'The power cuts began two days before the first exam. The graduating students had to study without electricity for two days, and they're unhappy about that. That's why we lodged the protests', a student leader told Mizzima. Graduation exams started on March 7 across Burma and will end on March 17. Power cuts during four consecutive days before graduation exams led to similar protests until the authorities intervened to restore electricity during the exam period.

Mi Lyi Htaw, IMNA, 17/03/10. Edited and condensed. <http://monnews.org/?p=607>

In Mudon, just when students need to study for the annual '10-standard' university entrance examinations, there is no regular electric power service. "Students whose homes have generators can get light, but those who have no generator have to study by candle light," said the mother of a Mudon high school student currently taking the exams. She informed IMNA that five months ago, in mid-November, Mudon enjoyed regular, 24-hour power supply. However, since the start of 2010, the hours of service have been slowly dwindling, and currently electrical access in Mudon is as poor as it has been for the past 20 years. Power comes on late in the evening or in the early hours of the morning, and then only for brief intervals. Mawlamyine gets electricity for only five or six hours a day. The irregular hours are especially difficult for

high school and college students to deal with. At other times, it doesn't matter so much, but they should give regular, full electricity during student exam times. 'Everyone is angry about it, but people feel it's no use protesting,' explained a resident of Myinetharyar quarter in Mawlamyine.

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DEALERS REPORT STRONG INCREASE IN THE [SALE OF SOLAR POWER SETS](#)

Nem Davies, Mizzima News, 06/10/09. (edited and condensed)

Shops selling solar power plates report that there has strong increase in sales in recent years. "Solar power is essential in non-electric fed areas. Sale of solar power sets has been brisk for the last two years," a marketing executive, who has been working in the solar power sector and its accessories for over 10 years told Mizzima.

In Pakokku, where electricity supply is available in rotation even consumers of electricity have to use solar power. The owner of 'Zaw' solar power showroom in Pakkoku, a solar power user himself, said, "I use solar power as an alternative power source when electricity supply is irregular during the day. I use a 25-watt solar power source for charging mobile phones and for lighting four to five florescent lamps".

A two-foot by four-foot solar power plate can cost up to K 1 million depending on the country of origin. Most solar power plates are imported from China, Japan or India. Plates measuring a foot by one and half feet made in the PRC sell for as low as K 30,000 and can last up to five years, showroom sales personnel said. Many consumers choose the Chinese made plates and batteries because the price is cheap.

For home use, solar power plates and accessories such as a battery, step-up transformers and wiring can cost up to Kyat 1.8 million, sales personnel of the 'Myanmar Solar Power' showroom in Hlaing township in Rangoon said. Fully charged 360-watt solar plates can be used for about a day to run a TV set, a video player and two-or-three foot-long florescent lamps simultaneously. "Users need to invest only once and there are no recurring costs. Japanese solar power units have a 10-year guarantee. It's more economical than using generators in areas with no electric supply," said a salesman at a solar power showroom in Hlaing township.

Those who want to operate a computer, a refrigerator, a TV and a VCD player have to buy a 100-watt solar power plate. There are at least 10 solar power showrooms in Rangoon.

A official from a development centre affiliated to the Kachin Baptist Church said they are still using a solar power unit installed five years ago at the 'Cart Centre' even though electricity is available at the facility 18 miles from Myitkyina. "The KBC installed solar power in three places in Myitkyina. At Shalom and Cart Centre, they use it during power blackouts. We use solar power to run a computer and three 2-foot long florescent lamps," he said.

Solar power is eco friendly with no noise pollution as generators. It is easier to maintain with no risks of short circuits and fire, users said. "There's no problem if you connect in the correct polarity. If not, the florescent lamps will burn. There are no other dangers. For full recharge, the user needs to remove dust deposited on the plate," a solar power user in Pakokku said. Solar power users generally install power plates on rooftops for better concentration of the sun's rays but some install them on the ground for easier maintenance.

Nyein Chan Win, Director of 'Myanmar Eco Solution', said the use of solar power in Burma will continue to grow since power generation and power supply is not yet adequate in the country. "In the long run, there will be more use of solar power in non-electric fed areas as a sustainable power source," he said. In Burma, solar rays are available for an average of eight hours a day so solar power can be widely used, Nyein Chan Win said.

Additional references

See below: 'Indian [solar lanterns](#) to light up Myanmar huts' (PTI: 07/02/09)

'Pharma factory' nominated for energy award' (MT: 16/06/08)

'Myanmar to build first storm-resistant model village' (Bernama: 12/06/08)

'Solar power' seen as solution for remote villages' (MT: 06/10/03)

AzoClean, 10/02/11. Adapted. <http://www.azocleantech.com/Details.asp?newsID=14216>

OK Myanmar Co Ltd will prepare a plan to provide solar-power sets to meet the power requirements of microwave communication towers, river pump stations and street lamps in Myanmar. The project will focus initially on providing electricity to remotely located microwave communication towers. The company will use solar equipment supplied by Sanyo Photovoltaic Equipment, a Japanese company, and the services of Japanese engineers for installation purposes. It is anticipated that the solar sets will deliver between 10 and 20 MW annually with a 20-years operating guarantee. The company has yet to fix up the cost of these services. OK Myanmar has been operating in Myanmar since 1992. It serves as an outlet for the electronic products of Daewoo, Sanyo and other brands.

Pyi Myanmar, 14/10/10. As reported in the Myanmar Times, 18/10/10, (Vol 25: No. 545). Condensed.

<http://mmtimes.com/2010/timeout/545/med.html>

Hotels and resorts at Ngwe Saung and Chaungtha beaches plan to start using solar power in a bid to reduce energy costs. The popular resort hotels at the two beaches are not connected to the grid and currently rely on diesel-powered generators. "We have already held a meeting at which it was agreed we would install solar panels at some hotels and resorts at Ngwe Saung and Chaungtha. They won't be used to power all parts of the hotel, just some important sections," said U Zaw Waite, the director of OK Myanmar, which is the sole distributor for Sanyo brand solar panels in Myanmar. "Some homes and schools in rural areas where there is not regular electricity are using solar panels but they are rarely used in factories," he said.

NLM, 24/06/10. <http://www.burmalibrary.org/docs09/NLM2010-06-24.pdf>

Solar complete set, solar street light and new solar home system package produced by Myanmar Machine Tool & Electrical Industries were showcased at an exhibition of goods made by companies under the aegis of the state-owned Industry-2 held in Nay Pyi Taw. [Photos of the solar related products are included in the print edition of NLM.]

SECOND SEMINAR ON HYDROPOWER DEVELOPMENT HELD

Aung Shin, Myanmar Times, 14/09/09. <http://mmtimes.com/no488/b005.htm>

Hydropower projects throughout the country are 80 percent complete, said Colonel Zaw Min, Minister for Electric Power No 1 at the opening ceremony of the Second Symposium on Hydropower Development held on August 28 and 29 at the Hydropower Development Training Centre in Paunglaung, Nay Pyi Taw. "Almost all hydropower projects are 80pc complete. A total of 2255 megawatts (MW) of electricity has been generated by hydropower projects nationwide as of 2009," he said.

The government aims to generate 23,324 MW of electricity through hydropower by 2030. There are 18 hydropower projects running at present and 11 more due to start over the next few years. All should be complete within 15 years, the minister said. Surveys suggest that as much as 46,000 MW could be generated by hydropower. [Photos of exhibits at the symposium are available with this article and the one below.]

Additional references

NLM: 29/08/09. <http://www.burmalibrary.org/docs07/NLM2009-08-29.pdf> Edited and condensed.

Speaking at the opening of the second seminar on hydropower development in Myanmar, EPM-1 Zaw Min said the seminar was held with the aim of enabling engineers to share experiences with one another. At the first seminar, resource persons had submitted 23 research papers, but this year engineers from the ministry and companies engaged in the hydropower sector had submitted 51 papers, 35 of which would be read at the seminar. The ministry was constantly engaged in improving the construction methods used in various types of dams and tunnels, the building of RCC embankments, the technologies involved in the construction

of power plants, the efficient use of heavy machinery, conducting of feasibility studies and drawing designs for the hydropower projects and generating of electricity. The government had begun implementing a 30-year electricity strategy project in 2001- 2002, he said. Presently the ministry was implementing 28 hydropower projects with a total generating capacity of 28,808 MW, and plans were under way to implement 11 additional projects with a capacity of 5233 MW. As a result, the country would be supplied with 23,324 MW by 2030-2031.

ASIA GENERAL ELECTRIC TO PRODUCE **HIGH VOLTAGE SWITCHGEAR**

Nilar Win, Myanmar Times, 14/09/09. <http://mmtimes.com/no488/n011.htm>

A local company has announced plans to produce high-voltage 33KV switchgear in Yangon and hopes to win market share from more expensive imports.

U Khin Maung Myat, managing director of Asia General Electric, said there were currently no companies making high-voltage switchgear locally. He said the future expansion of Myanmar's power generation capability meant there was a lot of potential in the high voltage switchgear market. "There are many government electricity projects – some are finished but many are still under construction," he said. "We will also need a lot of electrical equipment, like distribution transformers and high-voltage switchgear, for other projects in both the public and private sectors – on construction sites and in industrial zones."

U Khin Maung Myat said while the company was initially targeting the local market, it hoped to eventually tap into the export market as well. "In 2015, the Asian free trade zone project will come into effect in Myanmar. We want to be ready to export under this program."

He said Asia General Electric is now seeking a project partner that could provide the technology required to make the switchgear. The company already produces medium voltage 11KV switchgear with technology licensed from Japanese company Mitsubishi Electronic. It also produces distribution transformers under a partnership with Thailand's QTC Transformer Company.

He said buying trends in Myanmar were gradually changing and customers were now putting more emphasis on buying quality products. "Locally, customers' interest has changed from cheap but low-quality products to high-quality products, as they realise that there are long-term benefits from doing so. "Knowledge about the value of product quality is starting to spread among local consumers so we think there is a bright future for companies that produce such products."

RANGOON FACTORIES ORDERED TO INSTALL **CAPACITOR BANKS**

Ni Moe Myint, Mizzima, 03/09/09. Edited.

<http://www.mizzima.com/news/inside-burma/2716-factories-directed-to-install-capacitor-bank.html>

All industrial zones in Rangoon have been instructed by the city's Electric Power Supply Board (YESB) to direct factories to install 'capacitor banks', a sort of transformer, at their own expense. The factories are to install these capacitor banks if the installation of transformers in the industrial zones does not solve the power crisis.

"We have received a lot of complaints about low voltage, which resulted in machines breaking down. Moreover unstable power supply can cause frequent short circuits and fires. The capacitor banks can step up and regulate the voltage. We have found similar capacitor banks in industrial zones in foreign countries during our study tours," an official of the City Electric Supply Committee said.

A garment factory owner said that factories flouting instructions from the committee would have their power supply cut off. The deadline for the installation of the capacitor banks was not set by the City Electric Supply

Board but by the Industrial Zone Management Committee. It must report the deadline set to the Electricity Supply Board.

The cost of a domestically produced 120 KVA capacitor bank with Chinese parts is at least K 3 million while imported machinery would cost from K 5 to 20 million, according to market sources. Though the cost would not be prohibitive for large industries, it would be a big burden for small and medium factories and workshops, especially during the current economic recession and reduced operations, the owner of a battery factory in South Okkalapa township said.

An owner of a value-added wood factory in South Dagon industrial zone said he had installed a capacitor bank in his factory, but that it was not the solution to the power crisis as voltage to the industrial zone was very low. "We lodged a complaint regarding the problem of irregular electricity supply and low voltage at the industrial zone management committee meetings, attended by the regional commander and Bureau of Special Operations Commander Myint Swe. But there was no improvement. We received this instruction instead," he said.

There are four large industrial zones divided into about 20 industrial districts in Rangoon. The zones were first set up in 1990 to segregate the factory areas from residential districts. The industrial zones get power supply between 9 and 16 hours a day in turn.

Additional references

Ni Moe Myint, Mizzima, 16/09/09. Edited and condensed.

<http://www.bnionline.net/news/mizzima/7055-industrial-zones-get-only-5-hours-worth-of-electricity.html>

The supply of electricity to IZs in Rangoon has been reduced to five hours per day since the first week of September. Under the new system, IZs are getting power from the city's Electric Supply Board (YESB) either from 7am to 12 noon or from 12 noon to 5pm. Rationing was introduced because of severe voltage fluctuations under the previous 9-hour-per-day system.

"Under the old system, we were unable to supply full power and some factories could only use the power we supplied for lighting purposes. They had to use their own back-up generators for production and manufacturing. So, we changed to the five-hour system to be able to supply full voltage instead of more hours with low voltage," an engineer from IZ Electric Power Supply Committee said. "We consulted the members of the Industrial Zone Management Committee about how to solve the problem – offering either 9 hours a day on alternate days or 9 hours daily. If they had to use their generators all day, there would be a risk of fire plus health hazards for the workers. So, we decided in consultation with them to supply only 5 hours a day," he added.

The cost of diesel for factory owners to run their own generators is higher than before by about K 30,000 per barrel, so some have had to reduce their working hours by half. Electricity is provided by the YESB at a cost of only K 50 per KWh, but they cannot supply adequate power. Commercial and industrial customers who run their own generators, have costs as high as K 300 per kWh.

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POWER SUPPLY IMPROVES IN RANGOON

May Kyaw, Mizzima, 28/07/09

<http://www.mizzima.com/news/inside-burma/2523-electricity-supply-improves-in-rangoon.html>

There has been a substantial improvement in electricity supply in Rangoon after severe shortage for months on end. The city townships area are divided into four groups -- A, B, C & H. The H group gets round the clock electricity supply daily. The A, B and C groups are now getting electricity continuously from 11pm to 5am and power alternatively and equally for the rest of the day.

Hospitals, CNG filling stations, police battalions, army units, cemeteries and Township Administration Offices in H Group get round the clock electricity daily. But industrial zones are getting power for only nine hours

during the daytime but do not get power at night. Power generation is not yet adequate to provide electricity at night.

Though the availability of power has improved to a large extent in Rangoon, people living in a city used to severe power shortages for a long time are still worried. "Yes, electricity has become regular but it has been so for just a few days. We are not sure how long it will last," a local resident of Rangoon told Mizzima. Another local resident said that they are getting power regularly in the afternoon and alternatively at night and getting continuous electricity from 11 p.m. till morning. But in Syriam, in the outskirts of Rangoon, they do not get power even alternatively. "In Syriam we are not getting electricity regularly. It is available off and on. Currently there is no power here," a resident of Syriam said.

The availability of power has improved in Rangoon because electricity is now available from a hydropower station on the Shweli river near the border with China, a staffperson with the city's Electricity Supply Board (YESB) said. "The power situation has improved because of supply from Ruili Station. [But] three natural gas turbines that supply electricity to the city are still under repair because of leaking gas pipes," he said.

YESB Electric Power Board Secretary Lt. Col. Maung Maung Latt recently told domestic news journals that they would supply Rangoon round the clock electricity within the month.

Additional references

See above: 'Rangoon reels under [severe power cuts](#)' (Mizzima: 02/04/10)
 See below: '[Gas turbine failure](#) restricts electricity supply in Yangon' (Xinhua: 01/02/09)
 '[Generator sales spike](#) upward in Yangon' (MT: 15/12/08)
 'Gas in [short supply](#) to meet demand for electricity' (MT: 17/09/07)
 '[Pipeline to solve](#) electricity shortages' (MT: 16/09/02)

NLM: 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held a co-ordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw of 05/03/10. . . . EPM-2 Khin Maung Myint submitted reports on the renovation of nine national grids, 10 main power station projects and planned major repair of power plants. . . . The power plants to undergo major repairs are No 3 turbine of the Ywama power plant, the No 1 turbine of the Ahlon power plant, the Hlawga recycle steam turbine, the Ahlon recycle steam turbine, the Thakayta recycle steam turbine, the Hlawga power plant, the Thakayta power plant, the No 3 turbine at the Kyunchaung power plant, the Shwedaung power plant, the Myanaung power plant, the steam turbine at the Mawlamyine power plant and the Thaton power plant.

Kyaw Kha, Mizzima, 23/12/09. Edited and condensed

<http://www.mizzima.com/business/3199-financial-crisis-hurts-garment-industry-in-burma.html>

Burma's garment industry in industrial zones is on a downhill slide due to the global financial crisis, the Garment Industry Entrepreneurs Association said. Association Chairman Myint Soe said the industry has suffered a decline of 30pc since mid-November this year. "About 20pc of our industries have either suspended their business due to economic reasons or totally shut down," Myint Soe told Mizzima. There are 171 garment factories under the association of which 150 units are still running and over 20 factories have stopped business. Due to the closure of these factories, over 60,000 workers have been affected and will be laid off if the factories are totally shut down, Myint Soe said. Despite low wages in Burma, factory owners are facing shortage of electricity, high fuel and transportation costs, difficulty in accessing internet telephone and email, foreign currency exchange fluctuation and unavailability of business loans from the government. "We suspended business in this unprofitable situation. There's no electricity and the cost of alternate energy source such as diesel is too high," said an official from the Rangoon based 7 Star Co Ltd.

DPA, 20/12/09.

The YCEPSB launched a rotation system on 03/12/09 to manage the electricity needs, said the board's general secretary Maung Maung Latt. Under the system, the city has been divided into five residential and industrial zones. Each residential zone is to receive electricity part of the day in a three-day rotating system,

Latt said. The cuts will ensure that households get at least six hours of electricity per day. Industrial zones have been split into two groups, with one zone receiving electricity in the morning and the other in the afternoon, the Myanmar Times reported.

Xinhua, 13/12/09. Edited. <http://www.rebound88.net/09/dec/14.html>

Power supply in Yangon has become abnormal again with city dwellers getting intermittent electricity supply. The YCDC has been adopted a system of distributing electricity to most areas alternately for the past week with 18-hour supply planned for downtown and suburban areas, while important government offices, embassies, hospitals, airport, railway stations, banks and schools will receive round the clock service. 24-hour electricity supply had been in effect for the past four months during the monsoon when reservoirs built up water levels to drive hydropower plants. Power supplies were intermittent during a five-month period up to June of 2009.

Saw Yan Naiung, IRROL, 11/09/09. Excerpted http://www.irrawaddy.org/article.php?art_id=16769

Throughout the 1990s, the military authorities were able to provide a 24-hour supply of electricity to Rangoon, except during the dry season—March to June—when the Lawpita hydroelectric dam, located 210 miles (350 kilometers) north of the city, was short of rainwater. However, for the last eight years, electricity has been rationed and reduced due to a rising demand. The Rangoon-based Weekly Eleven journal reported earlier this year that Rangoon's 5 million residents need about 450 megawatts of power every day. However, total national output of electricity is 845 megawatts, less than the national capacity of 1,200 megawatts, and far short of the country's electricity needs.

Aung Thet Wine, IRROL, 20/07/09. (edited and condensed)

http://www.irrawaddy.org/article.php?art_id=16365

Power supply to Rangoon's townships will be rationed to six hours a day because the pipeline carrying gas from the southern Andaman sea to Rangoon power generators has been damaged near Belin in Mon State by flood water near Belin in Mon State. "Belin river was flooded by heavy rain, causing pipeline damage. Repairs could take time," said a MEPE official who asked to remain anonymous. The cut in electricity supply to the former capital is unusual during the monsoon season when electricity is supplied on a 24-hour basis due to extra supply available from the hydropower stations at Lawpita.

SHWELI-1 HYDROPOWER PLANT OFFICIALLY INAUGURATED

NLM, 17/05/09. Edited and condensed. <http://www.burmalibrary.org/docs07/NLM2009-05-17.pdf>

Shweli-1 hydropower plant, 17 miles southwest of Namkham in Shan State North, was opened on 16 May 2009. Speaking on the occasion Prime Minister Thein Sein said it was the first of three large-scale hydropower projects to be implemented on the Shweli river. The project was also the first which had been completed as a co-operative effort between Myanmar and the People's Republic of China and it was fitting that it should be located on the Shweli which originates in China but flows for much of its course through Myanmar where it empties into the Ayeyawady. The Shweli-1 plant was currently the largest power station in Myanmar and the nation's hydropower generating capacity was now in excess of 1400 megawatts. But projects currently underway in the basins of the Ayeyawady, Chindwin, Sittoung and Thanlwin rivers would eventually generate over 32,900 megawatts. Although Myanmar did not have enough electricity at present, in the not-too-distant future, it would be able to not only fulfill domestic electricity needs but also sell power surpluses to foreign countries.*

The Shweli hydropower plant opened today would also fulfill the electricity needs of Shan State North as well as that of the nation to a certain extent, the prime minister said. Lashio and Muse had become the commercial hubs of the border area with the PRC. Moreover, swift commodity flow had developed between Shan State North and interior regions of the country. The Mandalay-Lashio-Muse Union Highway, the Lashio-Tangyan Road and the Lashio-Laukkai Road had been upgraded and were in fine condition today, he said. In addition, the education and health sectors were making remarkable progress in Lashio. The region has opened universities, colleges and hospitals one after another.

Mr. Kou Wei of the Huaneng Group said that the Shweli-1 hydropower project represented the largest BOT investment by Chinese interests in Myanmar. The assistance of the Ministries of Electric Power Nos 1 & 2 had enabled the difficulties encountered in the project to be overcome successfully. Within the short space of two years and nine months from July 2006 to April 2009, six generators had been successfully brought into operation to produce electricity, thereby cementing the friendship between the two countries, he added.

U Hsan Pu, a Palaung national, spoke words of thanks. He said that since time immemorial, local people had been engaging in cultivation of crops and paddy and trading along both banks of Shweli River. Now, the Shweli-1 hydropower plant was supplying the region with electricity around-the-clock, as well as sharing surplus electricity with the national brethren of Shan State North through the power grid. The local people wanted to join hands with the government to carry out development of the nation and to shape a peaceful and stable nation, he said.

After the opening ceremony, officials conducted the Prime Minister and party round the power plant and gifts were presented to mark the occasion.

Shweli-1 hydropower project is located near Mantat Village, 17 miles southwest of Namkham. The 600-MW power plant receives water through an intake tunnel located at a dam that was built across the Shweli river. It is expected to supply 4022 million kilowatt hours annually to the nation through the power grid.

[A good aerial photo of the power plant accompanies the article in the print edition of NLM.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-01: Mong Mit Shweli no 1 hydropower project near Man Tat village [23° 41' N, 97° 29' E], grid square reference: 12\1, 23\3 <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-1.jpg>
See also maps in *Under the Boot*, published by the Palaung (Ta'ang) Youth Network Group, Dec 2007, pp 11, 14, <http://www.salweenwatch.org/downloads/UndertheBootEnglish.pdf>

Additional references

Data summary [Shweli-1](#)

See below: 'Border towns unhappy with power supply from Shweli-1' (IRROL: 22/07/10)
'China's first BOT hydropower project in Myanmar revs up' (Mekong News: 30/12/06)
'Shweli transmission line contract Signed' (People's Daily Online: 10/10/03)
'Contract for Shweli hydropower project signed with YMEC' (NLM: 09/08/03)

Capitalvue: 29/12/10. <http://www.capitalvue.com/home/CE-news/inset/@10063/post/1271941>
China Southern Power Grid imported three TWh of electricity from Myanmar in the first 11 months through its subsidiary, Yunnan Power Grid, reports yicai.com, citing a release by Southern Grid. Based on an average coal consumption of 334 grams per kWh in the first 10 months, imports of electricity from Myanmar saved 1.02 million tons of coal and cut 2.66 million tons of carbon dioxide emissions. [Compiler's comment: It would appear that most of the 3000 GWh of electricity imported from Myanmar by Yunnan Power Grid was sourced from the Shweli-1 power station, as the Tapein-1 power station near the Yunnan border in southern Kachin state did not come online until Sept 2010.]

NLM, 11/09/10. <http://www.burmalibrary.org/docs09/NLM2010-09-11.pdf>

On 08/09/10, MD Aung Than Oo of Myanma Electric Power Enterprise (MEPE) and MD of Shweli-1 Hydropower Co Ltd (SHPC) Ma Lipeng signed contracts [for the supply of power] in Nay Pyi Taw.

NLM, 14/02/10. <http://www.burmalibrary.org/docs08/NLM2010-02-14.pdf>

EPM-1 Zaw Min received Chairman Huang Guangming and President Jiang Diwei and party of the Yunnan United Power Development Co. Ltd (YUPD) of the PRC at the Ministry on 11/02/10. Director-General Myint Zaw of the Hydropower Planning Dept and Ch Huang Guangming of YUPD signed a Supplementary Agreement to the joint agreement for implementing Shweli-1 Hydropower Project and exchanged notes.

NLM, 28/09/09. <http://www.burmalibrary.org/docs07/NLM2009-09-28.pdf>

A power purchase agreement was signed between Myanmar Electric Power Enterprise (MEPE) and Shweli-1 Hydropower Co Ltd at the hall of EPM-2 in Nay Pyi Taw on 24 September. Signing for MEPE was Managing Director Khin Maung Zaw, while Managing Director Ma Lipeng signed on behalf of Shweli-1 Hydropower Co Ltd. [Compiler's note: For details on the arrangements to supply power from Shweli-1 to Myanmar see entries under China's first BOT hydropower project in Myanmar].

NLM, 15/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-15.pdf>

Shweli-1 hydropower plant is due to be equipped with six 100-megawatt generators. So far, five of them have started generating electricity, and the last one will be installed in the plant soon. . . . Shweli-1 hydropower plant will be able to generate 100 more megawatts when the last generator is installed.

NLM, 30/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-30.pdf>

The control building of the 66/11-kV, 5-MVA Namkham sub-power station is 80pc complete, and the switch yard and electrical installations are 100pc complete. Electricity will be supplied to Namkham, Muse and Kyugok (Pansai) through the Shweli-Namkham-Muse 66-kV power grid.

Xinhua, 06/12/08. http://www.yn.xinhuanet.com/newscenter/2008-12/06/content_15112250.htm

Shweli-1 power station, China's biggest hydropower project in Myanmar, has begun to supply power to China. No 2 generating turbine officially started operations on 04/12/08. The BOT (Build-Operate-Transfer) project is the first power station outside the country to supply electricity to China. The hydropower station, located on Myanmar's Shweli (Ruili) river, is [to be] equipped with six 100-MW generating turbines. It is being jointly built by Huaneng Lancang River Hydropower Co, Yunnan Hexing Investment and Development Co, and Yunnan Machinery and Equipment (I-E) Co. The BOT contract will last for 40 years. The generating station is connected to China's power grid, which serves the mission of China's "West-to-East Power Transmission". [Original in Chinese. Translation: Kevin Li]

Country Report Myanmar on Power Development Plans and Transmission Projects, Greater Mekong Region ADB Consultation, 21 November, 2008, pp 25-26.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

A diagram lists Yunnan United Power Development Co Ltd (YUPD) and the Dept of Electric Power Implementation of EPM-1 (HPID) as the joint venture partners of Shweli-1 Hydropower Co Ltd (SHPC). YUPD holds 80% of the equity in SHPC and is entitled to 90% of the profit of SHPC, while HPID holds 20% of the equity and is entitled to 10% of the profits of SHPC. The three partners of YUPD are listed as Yunnan Machinery & Equipment Import & Export Corp, Hydro Lancang Co and Hexing Co Ltd. Shweli-1 power station will have six generators with a cap of 100 MW each. No 1 machine will generate 75 MW, No 2 machine will generate 100 MW and No 3 machine will generate 100 MW. Commercial operations are due to start on 05/11/08. For the moment, Myanmar will take only its share of free energy of 15%. A power purchase agreement (PPA) between EPM-2 and YUPD is currently under negotiation. Myanmar is entitled to purchase up to 300 MW. A cross-border, 72-hour test-run was successfully completed on 23/10/08. It is planned to start the cross border commercial operation with 100 MW.

OFFICIAL VISIT GIVES IMPETUS TO **UPPER SEDAWGYI DAM PROJECT**

NLM, 23/04/09. Edited and re-written. <http://www.burmalibrary.org/docs07/NLM2009-04-23.pdf>

Gen Shwe Mann and accompanying party of military officials and cabinet ministers arrived at the worksite of the Upper Hsedawgyi multi-purpose dam project on Nampat creek in Madaya township on 19 April. The project is 33 miles upstream from the existing Hsedawgyi dam on the same river and is being implemented by A&IM in co-operation with EPM-1.

The earthen embankment at the site will be 3200 feet long and 240 feet high and the reservoir behind the dam will hold back 500,000 acre feet of water. The position of the embankment was chosen after conducting a feasibility study of three tentative alignments. Preliminary tasks including the construction of an approach

road and work on a diversion tunnel and the main embankment and spillway are being carried out by the Ministry of Agriculture and Irrigation.

The Ministry of Electric Power No 1 will construct the power intake structure, the intake tunnel, the water tank, the penstock pipes, the power plant, the drain and the switch yard. The Upper Hsedawgyi project to be installed with three 20-megawatt generators which will be capable of producing 315 million kilowatt hours yearly. The construction of the dam will also make it possible to increase the power generation of the existing Hsedawgyi dam from 134 million kwh at present to 194 million kwh annually. Together the two dams will generate a total of 509 million kwh yearly.

The Electric Power Ministry No 2 is making arrangements to supply power from the Hsedawgyi station to the Upper Hsedawgyi worksite.

Gen Shwe Mann stressed the need for the ministries involved to draw up a [co-ordinated] work plan and to supervise the construction tasks, use of manpower, finance, heavy machinery and construction materials.

During the visit of the official party, discussions took place about the areas to be irrigated, river water pumping projects and prospects of extending sown acreage of paddy and local rice sufficiency. The Upper Hsedawgyi dam will feed the Hsedawgyi dam in such a way as to enable the existing dam to irrigate an additional 10,000 acres of summer paddy. Departmental officials of Mandalay division submitted reports on changing crop items in the irrigation areas, increasing sown acreage of crops and extended cultivation of paddy. General Shwe Mann instructed the officials to endeavour to achieve local rice sufficiency in Mandalay and Magway divisions and to give priority to conducting an agricultural census.

The use of the electricity produced at the Upper Hsedawgyi dam for regional purposes in Mandalay division was also discussed. [An aerial photo of the site of the Upper Hsedawgyi project is included in the print edition of NLM. The river on which both dams are located is variously known as the Nampai, the Nampok, the Nampat and the Chaungmagyi.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-05: Maymyo
The Upper Sedawgyi dam, 33 mi from Sedaw [22° 19' N, 96° 19' E], grid square reference: 14\3, 37\1
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-5.jpg>

The sluice gate of the dam and the reservoir are clearly visible on Google Earth at 22° 20' 50" N, 96° 16' E.

Additional references

Data summary: [Upper Sedawgyi](#)

For other electric power projects under planning by Htoo Trading Co see: 'Htoo Trading to build [Htakha](#) hydropower project on B.O.T. basis' and 'Agreement signed on [coal-fired thermal power plant for Yangon](#)'.

See below: 'Power and irrigation functions of [Sedawgyi dam](#) to be improved' (NLM: 28/12/04)

NLM, 18/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-18.pdf>
Photo of site of Upper Hsedawgyi hydropower project in Madaya township.

NLM, 22/04/10. <http://www.burmalibrary.org/docs08/NLM2010-04-22.pdf>
Gen Than Shwe and party visit the site of the Upper Hsedawgyi hydropower project in Madaya township where EPM-1 Zaw Min reports that it will be regulating dam upstream of the Hsedawgyi multi-purpose dam in Madaya township. Duties have been assigned to A&IM to build the regulating dam and to EPM-1 to undertake the hydropower buildings. In connection with hydropower installations at the dam the Htoo Trading Co Ltd will assume joint responsibility for the facilities at the Upper Hsedawgyi project. Chairman U Te Za of Htoo Trading reports preparations made by the company, conditions of the main embankment, water diversion tunnel, spillway, power intake structure, water tunnel and intake canal, as well as the main sectors of the project and yearwise tasks. The visitors viewed progress of main embankment and spillway. The regulating dam is expected to control the flow of silt along the river and the water supply at the Lower

Hsedawgyi dam. U Te Za also submits reports on preparations for a coal-fired power plant that Htoo Trading will undertake in Htantabin township on the outskirts of Yangon and on the Htakha hydropower project which the company is to implement on Htakha Creek, three miles southeast of Htanga Village in Machanbaw township.

Wai Moe, IRROL, 04/01/10. Excerpt. http://www.irrawaddy.org/print_article.php?art_id=17523
According to a short report published 31/12/09 in Myanmar Alin, EPM-1 and Htoo Trading Co Ltd signed an agreement on 29/12/09 to build, operate and transfer electricity from the Hsedawgyi and Htaka hydro power projects. . . . Sources in the Rangoon business community said the contract between the government and Htoo Co. was for 75 years.

NLM, 01/01/10. <http://www.burmalibrary.org/docs08/NLM2010-01-01.pdf>
An MoU was signed between Hydropower Administration Department of EPM No 1 and Htoo Trading Co Ltd to co-operate in [the development] of the Upper Hsetawgyi and Htakha hydropower projects through the Build-Operate-Transfer (B.O.T) system in Nay Pyi Taw on 29/12/09. EPM-1 Zaw Min extended greetings and Chairman of Htoo Trading Co Ltd U Teza explained the purpose of the MoU. Later, the director-general of the Hydropower Administration Dept and a responsible person of Htoo Trading Co Ltd signed the MoU and exchanged documents.

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>
At a co-ordination meeting (1/2008) of the Special Projects Implementation Committee in the office of the Commander-in-Chief (Army), EPM No 1 Zaw Min gave a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the Committee. [Among] the fifteen is the Upper Hsedawgyi hydropower project (60 megawatts) in Mandalay division.

"Myanmar Country Report on Progress of Power Development Plans and Transmission Interconnection Projects" (17/06/08), p 15.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/PWG5-Appendix4.4.pdf>

The Upper Sedawgyi hydropower project with a capacity of 60 MW will be implemented in the near future.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%20Country%20Report%20Tin%20-%20Myanmar%20-%20Presentation.pdf

The Upper Sedawgyi dam will be 73.2 m [240 ft] high and the power station with a planned capacity of 60 MW is expected to generate 315 million kWh annually. It is currently in the planning stage and will be carried out by the ID and HPID,

NLM, 23/09/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060923.htm>

Hsedawgyi supporting dam will be built 33 miles from Hsedawgyi dam in Madaya township. Chaungmagyi creek, where Hsedawgyi dam is situated, can provide more water than the water storage capacity of the dam. In addition to generating electricity and supplying irrigation water, 800,000 acre feet of water are being released from the dam. To make full use of water supply of Hsedawgyi creek, Hsedawgyi supporting dam project has to be undertaken. On completion, 60 MW of electricity can be generated and the Hsedawgyi dam will generate 60 million kWh of electricity.

NLM, 28/12/04. www.myanmar.gov.mm/NLM-2004/Dec04/enlm/Dec28_h14.html

Lt-Gen Thein Sein and party inspected the project site of Nanpet dam. It will be a supporting facility for Sedawgyi multi-purpose dam in Madaya township. Director of Construction Group No 4 of the ID Maung Maung Tin and Director of Mandalay division Irrig Dept Aye Thein reported on the project. The water storage capacity of the Sedawgyi multi-purpose dam, which was built in 1987, is only 363,000 acre feet. 800,000 acre feet of overflow water from the dam is diverted to the spillways each year. For full utilization of water from Chaungmagyi creek on which the Sedawgyi dam is built, Nanpet dam is being implemented on Nanpet Creek [aka Nampok, Nampai, Chaungmagyi], 12 [32?] miles upstream from the Sedawgyi dam. The supporting dam will be able to generate 60 MW and will contribute to the generation of electric power from Sedawgyi dam.

BHAMO WITHOUT ELECTRICITY FOR FOUR DAYS

Kachin News Group, 20/04/09. http://www.kachinnews.com/index.php?option=com_content&view=article&id=796

Residents of Bhamo in lower Kachin state have been without electricity for four days and nights after fierce winds laced with heavy rain uprooted electric poles, throughout the city.

A resident of Bhamo told KNG today that most of the electric poles in Bhamo are wooden. Many of them were uprooted by the storm which hit the area last weekend. This happens frequently whenever the gusty winds and heavy rains sweep through the upper Irrawaddy valley where the city is located.

Generally, the supply of electricity in Bhamo is appallingly poor, and residents do not get power regularly. Electricity supply is in rotation every two days, except when the city is visited by military officials. "When officials visit, electricity is available. The electricity supply is cut off when the officials go back home," a local person said,

The China Datang Corporation is constructing two dams and hydropower plant on the Taping River near the Sino-Burma border in the Bhamo district. However electricity generated at the plants is to be sold to neighbouring China, said local sources.

Additional references

NLM, 11/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-11.pdf>
Construction work is underway at Bhamo subpower plant in Hanhe village

NLM, 23/06/99. <http://mission.itu.ch/MISSIONS/Myanmar/99nml/n990623.htm>

A ceremony to put a 66-KV power grid into service was held at the power sub-station in Bahmo on 21/06/99. A crowd exceeding 60,000 people from Bahmo, Shwegu, Moemauk and Mansi townships was present for the occasion. Brig-Gen Tin Soe of Bahmo Station and U Soe Myint Lwin, assistant chief engineer of MEPE for Kachin State, opened the sub-station. The 66-KV power grid is formed by transmission lines that stretch 153 miles from the mining town of Kaukpahtoe in Kawlin township through Shwegu to Bahmo. It was built at a cost of US\$2.596 million and K275.775 million provided by the government, and K3.51 million contributed by the public beginning in May 1996. Power can now be supplied to Bahmo, Moemauk and Shwegu round the clock.

PM CALLS FOR BIO-BATTERIES IN EVERY CYCLONE-HIT HOUSEHOLD

NLM, 07/04/09. [edited and condensed] <http://www.burmalibrary.org/docs6/NLM2009-04-07.pdf>

Prime Minister Sein Thein and top officials of the military government visited several of the villages badly destroyed by Cyclone Nargis in Bogale township on 5 April. On arrival at Kadonkani, the PM and party viewed hillocks and cyclone shelters that are under construction and checked on efforts to rebuild the village in a motorcade. At the village hall, the Prime Minister demonstrated to townselders and village residents the use of bio-batteries fuelled by buffalo, cow and pig dung in generating electric current. He told the chairman of the village council to make arrangements to light every household in the village using bio-batteries. Afterwards, he was briefed by U Te Za of Htoo companies on the construction of the life-saving hillocks, and cyclone shelters in the village and gave instructions on growing grass planting windbreaks on the hillocks.

In Shwepyi Aye village (Htawpaing) the Gen Thein Sein and party had photos taken together with the local people and the PM again demonstrated the use of a bio-battery fuelled by buffalo, cow and pig dung in providing light. Following this, he instructed the chairman of the village council to make necessary arrangements for the use of a bio-battery in every house, as it saves money and prevents fire. Next, the PM and others in his party presented a generator and blankets for churches, generators and fluorescent lamps

for the villagers, solar lamps for education, health and social organizations, farm implements and seeds for farmers to officials concerned.

On their way to Kathamyin village, the PM and his party inspected construction of embankments to prevent the inflow of salt water along the Setsan- Kyonkadun road. At the post-primary school in Kathamyin, the PM told the villagers that his party had chosen to visit some of the places worst-hit by the cyclone. Although he himself could not go to other villages that were not as badly damaged, he had arranged everything necessary for emergencies to be provided in response to reports by the local authorities concerned. Then, Forestry Minister Thein Aung demonstrated how bio-batteries could be used to supply of electricity and the PM and the official visitors presented a generator and blankets for churches, generators and fluorescent lamps for the villagers, solar lamps for education, health and social organizations, farm implements and seeds for farmers to officials concerned. On behalf of the local people, Daw Kapaw Htoo and U Saw Gaylay spoke words of thanks. [The article is accompanied by a photo showing the PM demonstrating the functioning of a bio-battery.]

Website reference

EWB Challenge eNewsletter, April 2007. [condensed] <http://www.ewb.org.au/ewbchallenge/files/EWB%20Challenge%20eNewsletter%20Issue%2002%20April%202007.pdf>

Niruttam Kumar Singh and Harvansh Yadaw have developed a cow dung battery that can light up electric bulbs, charge mobile phones and even operate radios. The lack of electricity in Gangagarh motivated the pair to start experimenting with cow dung three years ago. The battery is made by collecting dung in a plastic container holding two discharged batteries. The dung is then charged with a salt water solution, producing positive and negative charges in the batteries. By interconnecting these in series, one unit can produce 1.5 volts of current. The cow dung needs to be replaced every 45 days. The innovation has revolutionised life in Gangagarh and neighbouring villages. Niruttan and Yadas teach villagers how to make the batteries for free. Now over 250 households use the batteries. Reference to an article, 'Now Charge Your Cell with Cow Dung' by R. Sharma in the Times of India (25/01/07) available from <http://www.ewb-international.org/pdf/TimesofIndia.pdf>

Additional references

See below: 'Indian [solar lanterns](#) to light up Myanmar huts' (PTI: 07/02/09)
'Myanmar to build first [storm-resistant model village](#)' (Bernama: 12/06/08)
'[Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)

The items below represent a sampling of the many references to demonstrations of the use of "bio-batteries" and LED bulbs for lighting purposes in rural areas.

NLM, 19/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-19.pdf>

A&I Minister Htay Oo meets with thousands of local people from 23 wards and eight villages in Hinthada township and presents them with 50 LED lamps and explains how to use discarded batteries and a generator charger to make the lamps light up.

NLM, 09/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-09.pdf>

On a tour of Kachin state, Gen Thein Sein and his entourage demonstrate the use of bio-batteries in Tanai. "The Prime Minister explained that the bio-battery can easily be made with the use of materials and instructed officials to supervise use of bio-battery at all houses." [A good close-up photo showing about eight battery boxes wired together for the demonstration accompanies the article in the print edition of NLM.]

NLM, 08/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-08.pdf>

On a visit to the town of Putao in the far north of Kachin state, Gen Thein Sein meets with township representatives from Putao district. Among other items on the agenda is a demonstration of the use of bio-batteries for home lighting purposes by D-G Thant Shin of the Government Office. The PM instructs officials to take measures for extensive use of bio batteries in every house. A similar event takes place when the PM and his entourage visits the Irrawaddy riverport of Hsinbo. The PM states that the use of the bio-batteries is the most economical means of providing home lighting in rural areas ("which costs less, on a wider scale").

NLM, 30/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-30.pdf>

On a visit to Thagara village in Thazi township, Information Minister Kyaw Hsan attends the opening of the village library and presents K 500,000 each for construction of libraries at Hsegyi and Hngetkyithaik villages as well as publications, a bio-battery and bulbs. He goes on to Shante Village in Meiktila township where he holds a meeting with about 5000 people from 11 village-tracts and 14 wards. He makes two more donations of K 500,000 each for construction libraries in Shante and Phayagyi villages, as well as a bio-battery and bulbs, and publications.

NLM, 28/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-28.pdf>

On visits to the rural townships of Mongyan, Metmang and Monghkat in the Kengtung district of Shan State East the Prime Minister together with other generals, SPDC officials, government ministers and deputy ministers meet with local representatives at the township halls. In each place the Col Thant Shin, the director-general of the government office, explains the use of bio-batteries to provide home lighting and the process of making bio-batteries.

NLM, 18/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-18.pdf>

A news item regarding a visit by Gen Than Shwe to the Kyaukse industrial region is accompanied by a photo of the general examining "plastic lanterns made with the use of waste and old dry cells to light LED bulbs". It would appear that the plastic casings for either the 'bio-batteries' or the 'lanterns'; mentioned in other recent articles in the official press are being produced at one of the factories in the Kyaukse area. It is of note that the Biogas Research Technological Institute at the Kyaukse Tech University serves as a research centre for the application of bio-gas in the generation of electricity in rural areas of Myanmar. Further details available in the key article (BG) on bio-gas applications.

NLM, 09/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-09.pdf>

Energy Minister Lun Thim inspected Ywathit village project by the Thakhut river in Kungyangon township, on 5 April. Officials of Asia World Co that is in charge of the township reconstruction project gave an account of progress in establishing the village. The four storm-hit villages of Kangyigon, Myakyuntha, Yaydagar and Ywathit have been merged to form the combined Ywathit village. The minister touched upon the sample of low-cost bio-electricity lanterns to be given away to each household in Kungyangon township. On completion, the village will have a school, health care centre, a library, water supply facilities, in addition to 133 houses. [A photo of the minister showing a sample of the "bio-electricity lanterns to be given away to every household in Kungyangon township" accompanies the news item in the print edition of NLM.]

NLM, 09/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-09.pdf>

Western Commander Thaung Aye and Industry-2 Minister Soe Thein on 5 April met with local people in Rathedaung town in Arakan and introduced the use of the bio-battery as a way of lighting homes that will cut down on expenses on a year-round basis. They also presented a sample set of a bio-battery and 1,500 lamp shades installed with 60-watt LED bulbs to officials. At the Basic Education Primary School in Yachaung village of Ponnagyun township, they met with local residents and, after explaining the use of the bio-battery, donated 100 lamp shades installed with 60-watt LED bulbs and 1,600 batteries to officials. In Ponnagyun town the commander and the minister introduced the use of the bio-battery to the people and gave a sample set consisting of a bio-battery and 2,000 lamp shades installed with 60-watt bulbs. [A photo of the demonstration in Yachaung accompanies the news item in the print edition of NLM.]

NLM, 08/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-08.pdf>

Prime Minister Thein Sein and party visit the villages of Setsan in Bogale township and Daw Nyein and Daminseik in Pyapon township, in each of which a demonstration of the bio-battery's electric current producing capabilities takes place. "At the meeting in Daw Nyein, Maj-Gen Soe Naing explained the use and making of a bio-battery to the local people. Next, the PM said that local people can easily produce a bio-battery with the use of wastes available in their surroundings, calling on the village chairman and officials concerned to make arrangements for every house to have easy access to electricity in the villages in 2009. Afterwards, the ministers and deputy ministers presented bio-batteries, vegetables seeds, clothes and milk powder tins through officials concerned."

NLM, 06/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-06.pdf>

Prime Minister Thein Sein and party arrived by helicopter at Theikpan-gongyi village in Labutta township where they met with departmental officials and local people and explained the use of bio-batteries in combination with cow dung and salt to produce electric current that could light their homes. **[Compiler's note:** Photos of Theikpan-gongyi village (15° 57' N, 94° 36' E), near the mouth of the Ywe river and one of the villages hardest hit by Cyclone Nargis, accompany the article in the print edition of NLM. This is the first mention of the use of bio-batteries in Myanmar.

NLM, 06/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-06.pdf>

Gen Myint Swe of the MoD and Yangon Commander Win Myint visit the factory of MMTEI on Parami street in Hlaing township in Yangon. They are briefed by an adviser on production of LED bulbs and bio-batteries and the generation of solar-power. **[Compiler's note:** A photo of the generals and factory officials inspecting the production of the bulbs accompanies the news item in the print edition of NLM. A variety of equipment is listed as being manufactured at the factory on the MMTEI website <http://www.industry2.gov.mm/mtei.htm>. Generators of varying capacities from 5 KVA up to 100 KVA have also been produced and tested at the factory.

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OFFICIAL OPENING OF KENGTAUNG FALLS HYDROPOWER STATION

NLM, 25/03/09. (edited and abridged) <http://www.burmalibrary.org/docs6/NLM2009-03-25.pdf>

A ceremony to open Kengtawng hydel power plant was held at the plant near Kengtawng waterfalls [on 21 March, 2008] with an address by Prime Minister Thein Sein. Among those present were Deputy General Manager Shoji Tsutsui of Kansai Electric Power Co of Japan, technicians of China National Electrical Equipment Corporation (CNEEC) and Zeing Orient Holding Group of China, government officials, army officers, performing troupes, local authorities, departmental personnel, social organizations and local people.

General Thein Sein said that the 54-MW Kengtawng plant and the recently completed 600-MW Shweli hydel power plant in Shan State North are large scale hydel stations that will be connected with the national grid and contribute to both regional and national development. At present, power generated from Kengtawng hydel power plant is being distributed to Kengtawng, Loilem, Namhsan (Namzang), Langkho, Mongnai, Mongpan, Maukmai, Panglong and Laikha in Shan State South and will assist in improving the socioeconomic status of those regions. Moreover, the Upper Kengtawng hydel power project, under implementation, will be able to feed power to the output of Kengtawng power plant and contribute a lot to both Shan State and the nation.

Up to 1988, he said, there were only three small-scale hydel power plants in Shan State, one in Namkhan, one in Muse and one in Tatgyi. Since then small and medium scale hydel power plants such as Namhmyaw, Namhsaungngon, Pakyethaw, Namhsaung Creek, Zawgyi-1, Zawgyi-2, Namshan Creek, Namwout, Maipan, Mongla, Namlap, and Hsilu have emerged.

Since 1988, he said, the Tatmadaw government had commissioned a total of 12 hydel power plants, namely, Hsedawgyi, Baluchaung-1, Zawgyi-1, Zawgyi-2, Zaungtu, Thaphanseik, Paunglaung, Mone, Pathi, Yenwe, Khabaung and Kengtawng, that together are capable of generating 599 megawatts for the national grid. Power generated from hydel power plants has increased three times when compared with the period before 1988 when the Lawpita-2 and Kinta power stations, with a [combined] generating capacity of 196 [224?] megawatts, were the only large hydropower plants in the country. Moreover, the Shweli and Upper Kengtawng projects in Shan state, the Yeywa, Upper Paunglaung and Namcho projects in Mandalay division, the Lower and Upper Bu projects and Kyi-ohn Kyi-wa projects along Mone creek in Magway division, the Htamanthi, Shwesaye, Manipur, Yazagyo, and Myittha projects in the Chindwin basin, the Phyu creek, Kun creek, Shwekyin and Thaukyekhat- 2 projects in Bago division and the Thahtay creek, Saingtin and An creek projects in Rakhine state are all under implementation. Feasibility studies are being made for the implementation of major projects on the Thanlwin and Ayeyawady.

Eastern Commander Yar Pyae clarified that Kengtawng hydroelectric power plant would bring about industrial developments in Mongnai, Langkho, Mongpan and Maukmai where power could not be fully supplied in the past. He said that river water pumping projects could now be operated with electricity produced by the hydropower station. This would mean that double and triple cropping would be seen in the agricultural sector. He expressed thanks to the staff of the HPID of the EPM No 1 for their active participation in the timely completion of the facility. On behalf of the local people, U Yaw Han Kha from No 5 Ward of Kengtawng expressed thanks to the government for the establishment of the facility.

After the ceremony the PM inspected the sluice gate, the water intake structure and the channel above the Kengtawng waterfall. Then he posed for a documentary picture with Mr Shoji Tsutsui of the Kansai Electric Power Co.

Kengtawng hydel power plant is near Kengtawng waterfalls on Namtein creek about 30 miles north-east of Mongnai in Shan State South. It was started in 2004 by Construction Group-7 of the HPID. Test run operation of the plant was begun on 30 October 2008. The three 18-MW generators installed at the facility will produce an average of 377.6 million kilowatt hours a year. Power will be supplied to the townships of Loilem and Langkho districts through 132-kV power lines, as well as to other states and divisions through the national grid. It was built at a cost of K 15285 million and US\$ 19.56 million. [Photos of the power plant and switching yard with the waterfalls in the background are included in the print edition of NLM.]

Additional references

Data summary [Kengtawng Falls](#)

See '[Kengtawng hydropower plant](#) nearly ready to produce electricity' (MT: 29/0908) for details of the project leading up to the commissioning.

Yan Gyi Aung, NLM, 20/04/09. (edited and abridged)
<http://www.burmalibrary.org/docs07/NLM2009-04-20.pdf>

The installation of transmission lines and construction of power stations that will link the Kengtawng generating plant to the main towns in the Loilem and Langkho districts of Shan State South is still underway. A total of 114 miles of 132-KV transmission lines, 211 miles of 66-KV transmission lines, 75 miles of 33-KV lines and 81 miles of 11-KV lines are under construction. 132-KV transmission lines are being used along the 73 miles between Kengtawng, Kholan and Namhsan (Namzang) power stations and the 41 miles between Namhsan and Pinpet. 66-KV transmission lines are being installed along the 82 miles between Namhsan, Loilem and Mongkai, the 44 miles between Kholan and Mongnaung, the 33 miles between Kholan and Kunhing, and the 52 miles between Namhsan, Mongnai and Langkho. 33-KV power lines are being used along the 38 miles between Mongnaung and Monghsu, and the 37 miles between Mongnaung and Kehsi. 11-KV power lines are being installed along the 18-mile section from the power plant at the falls to the town of Kengtawng, as well as the 32 miles between Mongnai and Maukmai and the 31 miles between Langkho and Mongpan. Plans are also underway to provide electricity to other states and divisions through the national power grid. [Two photos showing the interior of the generating station the Kengtawng Falls accompany the article in the print edition of NLM. One shows the control room, the other, the three "vertical-type Francis generators" installed in the plant. Other details omitted here are covered by the key article on the inauguration above. For a bird's-eye view of the of the transmission lines and towns mentioned in this item, see [Map 4](#) near the end of the compendium. Unfortunately, there are no names on the map, but by pinpointing the location of the Kengtawng falls plant (the middle blue box in the row of three in Shan State South), it is possible to plot out most of the connections mentioned.]

HYDROPOWER PROJECTS GENERATE [CONCERN IN SOUTH ASIA](#)

Steve Herman, Asian Energy, 15/03/09.

<http://asianenergy.blogspot.com/2009/03/hydro-power-projects-continue-to.html>

Asia is grappling with how to balance its burgeoning demand for energy against protection of the environment and society. The conflict is apparent in some of the region's most ambitious infrastructure projects, which involve building dams, changing courses of rivers and erecting transmission lines to bring electricity to energy, deprived homes and businesses.

In New Delhi, an ethnic group from the border region of India and Burma, known as Kukis, marched to protest construction of the Tamanthi Dam in Burma. By Indian standards their protest was small and quiet. Most passersby near the parliament in New Delhi ignored the 50 tribal demonstrators, including women and young children. They are opposed to the plan by Indian state-owned companies to harness Burma's Chindwin River and export 2,400 MW of electricity to India. The dam is also touted for controlling flooding and irrigating farms.

Patrick McCully, executive director of Rivers International, an environmental advocacy group, argues that these projects do more harm than good. "They destroy rivers. They eradicate whole eco-systems," he said. "This may come as a surprise to a lot of people but big reservoirs in tropical areas have very high emissions of greenhouse gases because of all of the rotting vegetation in the reservoirs. The global warming impact of big reservoirs in the tropics can be even higher than coal-fired plants."

Such projects frequently displace communities. "Very few of those people are able to regain their previous living standards. People are impoverished, pushed off into slums, indebted," he added. "They lose their land. They lose jobs. They lose the social cohesion of their communities. The record of the authorities, in terms of being able to enable people to regain or improve their living standards, is abysmal."

Lulun, the president of the Kuki Student Democratic Front, says this is already happening to his people in Burma (also known as Myanmar) where their ancestral land is being cleared to build the Tamanthi Dam. "There is forced labor. Land confiscation is there. Two, three villages are already relocated without any compensation. They lost their paddy fields. They lost their houses and they have many hardships," said Lulun. "Apart from that we are concerned with environmental degradation. There are tigers, lions, even elephants there."

The World Bank, which is not funding the Tamanthi Dam project, estimates that Burma has the potential to generate annually 100,000 megawatts of electricity from its rivers. The World Bank itself, in recent years, however, has backed away from supporting large-scale, hydro-power projects in Asia. "The institutions didn't appear to be as sensitive to some of the environmental and social concern of this development than we felt comfortable with. So it was really more of a reputational risk issue," said Salman Zaheer, the bank's South Asia energy sector manager.

Rivers International estimates that, in India alone, somewhere between 20 million and 50 million people have been evicted from their homes by hydroelectric projects. China, as well as India, is looking beyond its borders for new sources of hydro-electricity. The Chinese are planning or implementing such projects in Burma, Nepal and Thailand.

Environmentalists acknowledge the huge unmet power needs in the developing world. But McCully contends many of the dams would not need to be built if the existing infrastructure was more efficient. "There's a huge amount of energy wasted in the existing systems, in terms of how electricity is generated and transmitted and used by the end-user," said McCully. "The first priority should always be to make the system as efficient as possible before adding all the expense and the environmental impacts and the social impacts you get with most of the new types of supply."

A study, partly funded by the World Bank, has shown that many of the more ambitious hydroelectric schemes have not lived up to expectations - generating less power and irrigating far fewer hectares than forecast. Zaheer says backers of these projects need to learn from the past and be aware of emerging challenges. "I think we have to approach hydropower development, particularly in the Himalayas, with the utmost humility," added Zaheer. "These are young mountains. As we face climate change it is causing glaciers to melt faster and more unpredictably. So it is bringing down a lot more silt, boulders and other things than before." Such

events diminish the capacity of the dams and disrupt the function of power generation stations. It also adds another layer of concern for those funding and building such projects.

Additional references

See below: 'China petitioned on Burma dam projects' (dpa: 02/12/07)
'Plans for [Htamanthi](#) dam project on Chindwin near finalization' (MT: 28/08/06)

See also other articles listed under Export Projects in the Topical Index [EP](#)

THAILAND TO ASSIST MYANMAR IN [STUDY OF WIND GENERATION OF ELECTRICITY](#)

Xinhua, 12/03/09. (edited)

http://www.macaudailytimesnews.com/index.php?option=com_content&task=view&id=24005&Itemid=32

Myanmar Ministry of Energy and its Thai counterpart have agreed to cooperate in generating electricity from wind in Myanmar's coastal regions during 2009, sources with the Myanmar Hydrology and Meteorology Department said yesterday. Under an MoU between the two parties, Thai electrical experts will come to Myanmar in the near future to study the feasibility of installing equipment to measure the potential of wind energy in the country.

The study follows up a similar co-operative endeavour in 2008 when the two parties constructed five solar energy measurement towers in the Yangon, Mandalay, Shwebo, Meikhtila and Pyay regions, the report said.

Meanwhile, a project implemented by the Myanmar Engineering Society to apply the movement of ocean tides to the generation of electricity is to resume. The project was initiated in a village in Ngaputaw township in 2006, but was set back by flooding in the area caused by Cyclone Nargis last year.

The use of bio-digesters that use animal waste to produce electricity has also become widespread since 2007. According to a local report, since the bio-digesters were introduced in Bago and Ayeyawaddy divisions, they have been used to electrify over 2,000 houses in 12 villages.

Additional references

See below: 'Delta holds great potential for [tidal power generation](#)' (Voice Weekly: 13/02/06)
'Wind power [system ideal](#) for villages, says engineer' (MT: 05/12/05)
'[Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)
'[Solar power](#) seen as solution for remote villages' (MT: 06/10/03)

[STUDENTS DEMAND BETTER ACCESS TO ELECTRICITY](#)

Wai Moe, Irrawaddy Online, 10/03/09. http://www.irrawaddy.org/article.php?art_id=15276

On the evening of March 6th, high school students on about 50 motorcycles held a small protest in Moulmein, the third-largest city in Burma, ahead of university entrance examinations on March 11th. The high school students didn't shout slogans about politics or democracy; they just demanded better access to electricity for citizens. The protest spread to Twante, a town near Rangoon.

Burma has one of the world's worst systems of energy distribution. Outside of Naypyidaw, most of the country is in the dark more often than not. Even residents of Rangoon, the country's main commercial center, receive only meager rations of electricity; 24-hour access hasn't been seen for more than a decade. "Although Rangoon is a dark city at night, every corner of Naypyidaw has light," said a government staffer in the new capital.

High-ranking generals and the state-run media often claim that the regime is making great strides in providing the country with a reliable supply of electricity. Senior members of the junta are routinely shown inspecting new hydropower projects. According to the CIA's World Factbook, Burma's electricity production in 2006 was 5.961 million kWh, while consumption was just 4.289 million kWh.

In response to the protest in Moulmein, local authorities provided electricity for all areas of the city on March 7th. "It was really unusual in Moulmein. We did not see electricity across the city for many years," a resident said.

But the near-miraculous event was short-lived. The situation has since returned to "normal," and people remain as energy-starved as ever. "Now, as usual, there is no electricity," said a journalist in Moulmein, adding that the authorities have tightened security in the city, checking people as well as motorcycles.

Additional references

See below: ['Gas turbine failure' restricts electricity supply in Yangon](#) (Xin: 01/02/09)

Mon Son & Asah, IMNA, 09/03/09

<http://www.bnionline.net/news/imna/5945-electricity-returns-after-students-stage-protest-in-moulmein-.html>

At least one hundred students in Moulmein staged a protest to complain about lack of electricity on Friday, March 6th. Electricity was restored the next day, say local sources, while the owners of student hostels were also ordered to purchase generators. About 30 students began gathering in Myaing-tha-yar Quarter at about 9 pm. Hostels in Myaing-tha-yar Quarter have been the primary housing for students since Burma's military junta abolished on-campus dormitories in 1996. Twenty minutes later, the group moved on to the Ngante electricity station, which distributes power to the city. This time they were met by the station's on-site guards who heard their demands and then asked them to leave. The group next went to the headquarters of the Southeast Command, which controls Burmese army battalions in Mon State. The students, however, dispersed quickly after arriving at the headquarters which are surrounded by a large fence and armed soldiers posted at the front gate. Though electricity supplies are frequently inconsistent and weak, the demonstration appears to have been set off by the students' desire to study for approaching exams and frustration with trying to do so in the dark. "Grade 10 students and university students are near sitting their exams. So if we don't get electricity, it is very difficult for us and especially for the students to study," explained a hostel owner. Exams for 10th standard students are on March 11th, while university students have exams all week. "We did not get electricity for 3 days," said a student. "It was difficult for us to get water [because our pump did not work], it was difficult for us to study. And it was very close to our exams." Electricity supplies resumed the next morning. According to a Myaing-tha-yar resident who works in another quarter, the renewed electricity supply is citywide. "Since the students protested, we've had electricity every day," said the resident. Student hostel owners, meanwhile, have been ordered to purchase generators to provide electricity to students when future supplies are inconsistent. At 8 am on Saturday, the Myaing-tha-yar Quarter headman summoned hostel owners to a meeting. According to a source who spoke with a hostel owner present at the meeting, the owners were each made to sign a paper promising to purchase generators within the next week. Not all hostel owners were present at the meeting, he added.

RISKY JOB FOR LINE CREW ON [BAGO RIVER CROSSING PYLONS](#)

Kayan Soe Myint, NLM, 27/02/09 (edited and rewritten)

<http://www.burmalibrary.org/docs6/NLM2009-02-27.pdf>

Work on the section of the transmission line across the Bago river between the Thakayta and Thanlyin power stations is nearing completion. The Bago river crossing section is part of the 68.73 mile-long, 230-kV grid that will link Kamanat with Thanlyin and Thaketa. The Kamanat power station is already linked with generating plants in central Burma through a 230-kV transmission grid.

Superintending Engineer Saw Win Maung of the Power Supply Project (South) said the installation of the power lines across the Bago River was being carried out jointly by the Power Supply Project (South) of

MEPE under the EPM No 2, Public Works of the Construction Ministry, and the Marine Administration Dept of the Directorate of Water Resources. He added that the project was launched in the first four-month period of 2008, and was scheduled to be completed by March 2009. Tasks for installing power lines on Thakayta side were being carried out under the close supervision of the Chief Engineer and on the Thanlyin side, under the close supervision of Chief Engineer Than Shwe in co-operation with Chief Engineer Win Aung and party. I saw the workers installing the cables atop the pylons in the river at risk to their lives.

Altogether there will be 308 pylons along the line between Kamanat, Thanlyin and Thakayta. Work on transmission towers has been carried out by private companies on a contract basis. [Photos of a line crew at work and the Bago river crossing operation are included in the print edition of NLM. The article was first published in Burmese in Myanma Alin on 25/02/09.]

Compiler's note:

The 230-kV transmission grid connecting Kamanat with the sub-power station near Phayagon village in Thanlyin is a key factor in the development of a special economic zone (SEZ) that is expected to attract foreign industry to the Thilawa port area along the Yangon river. Several news items on the Thilawa SEZ are included below.

Map references:

The power station at Kamanat (near Bago) will be the main distribution point for the transmission lines connecting the developing network of generating stations in the Sittaung valley with Yangon. Its present and future connections with the the Sittaung generating plants and the substations in the Yangon area can best be seen by comparing the maps found on Slides 34 and 35 of the Myanmar presentation to an ASEAN policy seminar on regional power issues in Sept 2007. <http://burmalibrary.org/docs2/MMpresentation.pdf>
Up until the present, the only connection with Yangon has been through the 230-kV line connecting Kamanat with the power station at Hlawga, north of Yangon. When the Kamanat – Myaungdaga and the Kamanat – Thanlyin – Thaketa 230-kV transmission lines are completed sometime in 2009-10, there will be three interconnecting grids. The sub-power station at Thanlyin is presently linked with Thaketa by means of a 66-kV line. Note that Kamanat also serves as the connection point for the 230-kV transmission line that connects the generating station at Thaton with the national grid.

Additional references

See above: 'Towers on [Hlinethaya-Ahlon power grid](#) under construction' (NLM: 31/01/11)
See below: '[Power hungry Myaungdagar industrial zone nearly ready](#) nearly ready (MT: 25/02/08)
'[Grid Map 4](#): Transmission System as it existed in mid-2007'
'[Grid Map 5](#): Grid projects underway 2007 - 2009

NLM, 16/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-16.pdf>

EPM No 2 Khin Maung Myint inspects installation of the 230-kV, twin-bundle, double-circuit transmission line at the Bago river crossing point on the Thanlyin-Thaketa line. Project Manager Saw Win Maung of MEPE reports on construction of the power grid and installation of the power line between towers 9 and 16. A puller machine is being used in construction of the power line while a tensioner is being used to install the 605-MCM ACSR conductors.

NLM, 19/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-19.pdf>

EPM No 2 Khin Maung Myint inspects a pile driver preparing for construction of pylon 248 at MP 60 along the Bago-Thongwa-Yangon road near the village of Thahtaykwin Sanpya in Thongwa township. He goes on to the main sub-power station in Thanlyin and checks on construction of the switch yard there. A total of 272 pylons is being erected along the Kamanat-Thanlyin power grid and 36 pylons along the Thanlyin-Thakayta [twin]-bundle, double circuit transmission line, as well as 230-kV and 33-kV switching bays at the Kamanat and Phayagon (Thanlyin) main sub-power stations. [A photo of the pile driver is included in the print edition of NLM.]

NLM, 02/07/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080702.htm>

Lt-Gen Myint Swe of the MoD arrives at Kamanat main sub-power station of MEPE where an official reports on completion of the concrete [bases for the] towers of the 61-mile-long, 230-kV Kamanat – Thanlyin – [Thaketa] power line and the 40-mile-long, 230-kV Kamanat - Myaungtaga power line. The general calls for a speedy completion of the two lines, as they are needed to supply the electric power demand in Yangon.

NLM, 18/03/08. <http://burmalibrary.org/docs4/NLM2008-03-18.pdf>

Construction of the 230/33/11-kVA (100 MVA) Phayagon sub-power station in Thanlyin township continues, including work on the switch yard and connections to the 230-kV grid.

NLM, 09/05/07. <http://burmalibrary.org/docs2/NLM2007-05-09.pdf>

Director Thein Hlaing reports on the plan to set up six pylons across the Bago river on the 230-kV power line between Thakayta and Thanlyin. The operation will be undertaken in co-operation with the Directorate of Water Resources and Improvement of River Systems. Measures will need to be taken to ensure that the towers are resistant to storms and the strong current in the river.

NLM, 11/01/07. <http://burmalibrary.org/docs2/NLM2007-01-11.pdf>

EPM No 2 Khin Maung Myint visits the site of the 230/33 kV sub-power station near Phayagon village in Thanlyin Township were Project Manager Saw Win Maung reports that 90pc of the construction tasks have been completed. Arrangements are being made to supply power through eight feeders. [A photo of the switching yard of the station is included in the print edition of NLM.]

NLM, 13/12/06. <http://burmalibrary.org/docs2/NLM2006-12-13.pdf>

Director Thein Hlaing of Electricity Distribution Project (South) reports to EPM No 2 Khin Maung Myint on the construction of the 230-kV Thakayta-Thanlyin grid over the Bago River. Daw Soe Soe Tint of Myanmar V-Pile Co Ltd gives an account of the plan for setting up the towers for the grid. An inspection of the sites for towers on the Thakayta side [of the Bago river] ensues.

Thilawa Special Economic Zone

Shan Herald, 14/03/07. www.shanland.org/humanrights/2007/rice-paddies-seized-for-thilawa-sez/

Thousands of acres of rice fields in the Thilawa Special Economic Zone (SEZ) project area near Rangoon are being confiscated by junta authorities leaving farming families in the area landless, reports Chai Sayam. The seized land is being sold to Chinese, Japanese and Indian investors by auction. Announcements have promised a round-the-clock water and power supply to the entrepreneurs. Land seized by the authorities covers adjoining areas of Thanlyin and Kyauktan townships southeast of Rangoon. One paddy field owner, Daw San Yi, 54, who lived at Bogyoke village in Syriam, took suicide by leaping into a reservoir near her home on 6 March after losing her land.

Ye Lwin, Myanmar Times, 13/02/07. <http://www.mmtimes.com/no354/b002.htm>

Land at the proposed Thilawa Special Economic Zone south of Yangon is being set aside for investors from Japan and Singapore as well as China, an official from the Ministry of Commerce said last week. "Previously, only China was interested in establishing factories there, but Japan and Singapore have also shown interest," said the official. The Thilawa zone in Kyauktan township will be established once the draft Myanmar Special Economic Zone Law is enacted. The proposed zone is near Thilawa international port, one of the biggest in Myanmar. China and Japan have each been allocated 3176 acres at the 7000-acre zone and another 247 acres has been set aside for investors from Singapore. "The Thilawa zone will meet international standards and will be the biggest of six designated free trade areas," the official told The Myanmar Times on January 30. The Thilawa site is expected to attract an initial investment of US\$700 million. Foreign direct investment in the zones will include the establishment of labour-intensive factories aimed at creating job opportunities.

Xinhua: 20/12/05. www.china.org.cn/english/international/152520.htm

A master plan for Myanmar's Thilawa Special Industrial Zone designed by Chinese experts was formally handed over to the Myanmar government on Tuesday. The plan for the special zone was developed by a team of experts from China's Shanghai city over a period of 10 months following an agreement on economic and technical co-operation between the two countries signed on March 24, 2004. The industrial zone, 25 km

south of Yangon will cover an area of 12.8 square-kms. It has been designed as an export processing zone, the first of its kind in Myanmar, according to a Myanmar construction official. Chinese Ambassador to Myanmar Guan Mu and Myanmar Deputy Minister of Construction Tint Swe attended the presentation ceremony. Observers said that if the Thilawa zone is built in accordance with the master plan, it will absorb huge foreign investment to promote Myanmar's industrial development, export and economic development.

DIVERSION PHASE OF [NANCHO HYDROPOWER PROJECT](#) NEARS COMPLETION

Maung Maung, NLM, 25/02/09. (edited and re-written)

<http://www.burmalibrary.org/docs6/NLM2009-02-25.pdf>

Nancho hydropower project is being implemented by Construction Group 1 of EPM No 1 on Nancho creek, a tributary of the Paunglaung river. The dam on Nancho creek will be 12 miles upstream from the 280-MW Paunglaung hydropower station and seven miles from the confluence of Nancho creek and the Paunglaung river. The Nancho dam will contribute to generation of hydroelectricity [downstream] by storing water that flows into Nancho creek in the rainy season. Construction work is not expected to slow the flow of water in Nancho creek.

Annual rainfall is about 65 inches in the 317-square-mile watershed area above the dam. As a result, approximately 1024 cubic feet of water per second flow into Nancho creek, amounting to a total of 767,110 acre-feet per year. The water will be stored behind an embankment that will be 443 feet long and 167 feet high. To conserve the natural environment of the area, the embankment will be constructed with conventionally vibrated concrete (CVC) rather than roller compacted concrete (RCC) with an earthen core.

Water from the reservoir will be funneled through a concrete intake structure installed with a 49-foot-wide, 73-foot-high sluice gate into a 7330-foot-long, 15.5-foot-wide channel that will lead to a 1,269 foot-long, 79 foot-wide control lake. From the control lake a 13-foot-diameter, 876-foot-long prestressed steel pipeline will lead to two Francis-type turbines in the power station. Surplus water from the reservoir will be released through a 349-foot-wide overflow type spillway.

Two 20-megawatt generators at the power plant will eventually supply 152 million kilowatt hours to the national grid. Nancho hydropower project is scheduled to be completed in 2010.

Since Salu Creek is located between the intake structure and the water control lake, the two intake tunnels will be connected with a 15.5-foot-diameter, 384-foot-long aquaduct that will keep the creek from being blocked. The aquaduct will pass over the creek bed on a bridge supported by two concrete posts. At present, a temporary embankment and the conduit are under construction. This will complete the diversion operation so that construction of the main embankment can begin.

To provide electricity during the construction period, a smallscale hydropower plant that generates 60 kW has been constructed on Hsaungtaung creek.

[This article was originally published in Myanmar Alin on 17/02/09. It is accompanied by several valuable site photos taken by the journalist. A diagram showing the layout of the main features described in the original would have been very useful. The original version in English should be consulted for clarification.]

Topographic map references: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-01: Pyinmana Nancho creek dam, 16 miles east of Pyinmana [19° 46' N, 96° 19' E], grid square reference: 10\9, 25\9, <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-1.jpg>

Additional References

Data summary [Nancho creek](#)

See below: "Agreement signed on [Upper Paunglaung](#) hydropower project (MIC: 04/09/05)
'[Paunglaung](#) power plant Myanmar's first underground station' (MT: 14/03/05)

NLM, 17/11/10. <http://www.burmalibrary.org/docs09/NLM2010-11-17.pdf>

EPM-1 Zaw Min visits the Namcho hydropower project site, 16 miles to the southeast of Pyinmana, and checks on construction work. It is expected to generate 152 million kilowatt hours of electricity annually and is about 58.11pc complete.

NLM, 29/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-29.pdf>

EPM-1 checks on land preparations for laying the steel penstock and construction of the power station and switch yard at the Nancho hydropower project, seven miles upstream of the confluence of Nancho creek and the Paunglaung river. He also looks into construction of the concrete water control tank and digging of the entrance and exit at no. 2 water tunnel and concrete lining works of no. 1 tunnel. Work is proceeding on concrete embankment and water intake structure. The whole project is now 57.47pc complete. [A good photo of the underlying skeleton of the main embankment and control gate is included in the print edition of NLM.]

Khin Maung Than (Sethmu), NLM, 21/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-21.pdf>

Nancho creek originates at the border of Kayin and Kayah states and flows into the Paunglaung river. The Nancho hydropower project is located near the point where Salu, Hsaungtaung and Sayit creeks flow into the Nancho. Salu creek flows across and below the entrances to two water intake tunnels that link the intake structure of the millrace channel and the water control lake. The two water intake tunnels will be connected by a 15.5-foot-diameter, 384 feet long aquaduct that carries the millrace above Salu Creek. The bridge will be supported by two concrete posts. The bridge has been built so that the aquaduct will not block the flow of water in Salu Creek as well as to conserve the natural beauty of the location. A total of 23 civil engineers, two mechanical engineers and two electrical engineers together with 35 civil workers, 10 mechanical workers and 120 other skillful workers are striving for timely completion of the project. [A photo of one of the entrance to one of the intake tunnels that shows its location above the course of Salu creek accompanies the article. Another photo shows construction activity in one of the tunnels. This article originally appeared in Burmese in Kyemon on 16/03/09. It repeats many of the details in the key article published in Myanma Alin on 17/02/09 (see above). The two journalists appear to have visited the project at the same time.]

NLM, 13/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-13.pdf>

EPM No 2 Khin Maung Myint inspects the foundation of No 1 tower and the installation of tower No 19 of the Ahtet Paunglaung – Nancho - Paunglaung 230-kV power grid.

NLM, 08/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-08.pdf>

Earth and concrete work continues. A site for a shed to store pozzolan is being prepared. The Nancho project is now 30.5pc complete.

NLM, 12/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-12.pdf>

Work on the construction of the water intake tunnel at the Nancho hydropower project, 16 miles east of Pyinmana is ongoing. [A photo showing evidence of clear cutting along the sides of the reservoir basin is included in the print edition of NLM.]

NLM, 05/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-05.pdf>

EPM No 1 Zaw Min inspects the Nancho hydropower project about seven miles upstream along Nancho creek in Pyinmana township. Director Thaung Han of No 1 Construction Group reports on work in progress, follow-up programmes, arrival of materials and requirements. So far, the project is 24pc complete.

NLM, 07/07/08. <http://www.burmalibrary.org/docs5/NLM2008-07-07.pdf>

The Minister and Deputy Minister of EPM No 1 visit the Nancho project where they inspect sites for the head tank along the water intake canal. The Nancho hydropower will be able to generate 152 million kWh of electricity per year.

NLM, 04/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080204.htm>

The Nancho hydropower project on Nancho creek, 16 miles from Pinyinmana, will generate 40 MW. The drilling of water tunnel No 1 and the portal of water tunnel No 2 are underway. Preparations are being made for the construction of the power station. The project is 17pc complete.

NLM, 23/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n071223.htm>

Nay Pyi Taw Commander Wai Lwin inspects the Nancho hydro power project in east Pinyinmana. Work is proceeding on the construction of a [diversion] tunnel and drilling of the stone wall. The project is expected to generate 152 million kWh a year. After visiting Wepauk and Gamong Taung villages, he goes on to the [Upper] Paung Laung dam site.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf

The Nancho dam and power station with a planned capacity of 30 MW is under implementation by the HPID. It will generate 128 million kWh when it comes on-line in 2009.

NLM, 25/02/07. <http://burmalibrary.org/docs2/NLM2007-02-25.pdf>

General Than Shwe and party are taken by helicopter to the site of the Nancho hydropower project on Nancho Creek where EPM No 2 Khin Maung Myint reports on the water storage capacity of the dam and how electricity produced will be distributed from the various projects in the region to the national grid. Gen Than Shwe says that the projects are being carried out to provide power for Nay Pyi Taw and environs and the whole country. To preserve the flow of water into the dams in the Paunglaung watershed he warns against cutting timber and use of burning to clear land for agricultural purposes in the watershed areas of the dams. At the Nancho Creek project a fruit basket is given to the civil engineers of Kansai Electric Power Co, Inc. The Nancho creek project is about 12 miles upstream from the Paunglaung hydel power plant. A concrete embankment 505 feet long and 166 feet high will be built. It will be able to generate 40 MW. [See the print edition of NLM for site photos. Video footage of the visit with some good shots of the dam site is also available at <http://video.google.com/videoplay?docid=-7694807271238560047>. Commentary is in English.]

Kayan Women's Union, ***Drowning the Green Ghosts of Kayanland: Impacts of the Upper Paunglaung Dam in Burma***, June, 2008. <http://www.salweenwatch.org/downloads/DrowningtheGreenGhostsEnglish.pdf>

In October 2005, the Myanmar military junta informed the KNLP that the mountains east of Pinyinmana were to come under its direct control and that the KNLP should withdraw its troops from village mouth and southwest of Paunglaung valley. This order was in direct contravention of the 1994 ceasefire agreement between the KNLP and Myanmar military, and the KNLP did not immediately withdraw its troops. Shortly afterwards, in November 2005, troops of LIB 141 opened fire on the the Kayan village of Bawgahta [in the valley of the Nancho], killing a KNLP policeman and injuring a woman and a child. The incident co-incided with the move of the SPDC to the new capital of Nay Pyi Taw near Pinyinmana, [15 miles to the east]. Unwilling to provoke further bloodshed, the KNLP then withdrew its troops from most of the villages to the southwest of the Paunglaung valley. After August 2006, the Myanmar Army began patrolling even more frequently these villages from the KNLP had withdrawn and established permanent bases in the villages of Ledukaung, Bawgahta and Bawlake, south of the dam-site. **[Compiler's note:** In fact, the villages mentioned in this part of the KWU report are in the upper reaches of Nancho valley closer to where the Nancho hydropower dam is under construction. For reasons not explained, this dam is not mentioned in the Green Ghosts report and the Nancho is not shown on the map on p 6 of the report.

NLM, 09/05/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nml/n060509.htm>

EPM Tin Htut and D-G Win Kyaw of the Hydropower Dept inspect the Upper Paunglong hydel power project. Site where clearing is underway. They go on to the Nancho hydel power project area and check on sites for building the power station and water intake structure. Land and timber clearing are being carried out. The Nancho hydel dam and power station will be built on Nancho creek, a tributary of the Paunglong, 12 miles upstream from the Paunglong hydel power station. Feasibility studies indicate the project will generate 40 MW. It will also regulate the flow of water into the existing Paunglaung dam.

Kayan Women's Union, *Drowning the Green Ghosts of Kayanland: Impacts of the Upper Paunglaung Dam in Burma*, June, 2008. <http://www.salweenwatch.org/downloads/DrowningtheGreenGhostsEnglish.pdf>

Until 2004, there had been no Myanmar Army (MA) troops permanently stationed in the Upper Paunglaung area. Occasionally MA troops stationed at temporary camps south of the Upper Paunglaung valley would patrol along the valley. This was in accordance with the ceasefire signed between the Kayan New Land Party (KNLP) and the Myanmar military regime in 1994 which granted the KNLP control over the valley and surrounding territories in southwest Shan State. However, in February 2004, troops from LIB 606, which had been stationed at Sinkwin, four miles east of the Upper Paunglaung dam site, set up a new camp called Kywe Yoe ("Buffalo Bone") on a mountain at the southern end of the Paunglaung valley, six miles north of the dam site. Under threat of a cash fine or detention, these troops ordered civilians from the villages of Sinkwin, Ywagyi, Gwelon and Thinbawgon to clear land around their new camp from top to bottom of the mountain on which it was set up. Following the establishment of the base, the battalion required the villages in the Thabyegon tract to form a local militia units which had to post sentries around their villages at night and to monitor the movements of anyone traveling through the area.

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BILUCHAUNG NO 3 HYDROPOWER PROJECT MOVING AHEAD

NLM, 14/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-14.pdf>

Prime Minister General Thein Sein inspected Biluchaung No 3 hydropower project being implemented by the Ministry of Electric Power No 1 on 10 February. Accompanied by various generals and government officials, the PM arrived at Lawpita village where they were welcomed by departmental officials of the Hydropower Generating Enterprise. At the construction site of the Biluchaung No 3 project, the PM heard reports by EPM-1 Zaw Min on the implementation of the Biluchaung projects and the progress being made on Biluchaung No 3 project.

Afterwards, the Managing Director of Future Power Co Ltd reported on undertaking six main tasks at the Biluchaung No 3 project including the use of heavy machinery and the number of workers employed on the project. In reply, the Prime Minister gave instructions on meeting the standard set for implementation of the project, its timely completion, the supply of heavy machinery to the worksite and attention to be paid to worksite safety. He also viewed samples of stones taken out from the water intake tunnel by a drilling machine that were on display near the briefing hall. At the approach tunnel No 2, the walls of the tunnel are being lined with concrete.

Biluchaung No 3 Hydropower Project site is located at the confluence of Bilu Creek and Pun [Paw] Creek, 16 miles southeast of Loikaw. It will have an roller-compacted, ogee-type diversion weir and water intake tunnel. Two 24-megawatt generators will be installed at the station which will generate an average of 334 million kilowatt hours yearly. [A photo of the entrance to one of the approach tunnels to the Biluchaung No 3 hydropower project is included in the print edition of NLM.]

Topographic map references: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-01: Pyinmana Moby dam, just north of Mong Pai [19° 44' N, 97° 05' E], grid square reference: 10\9, 26\6
Datacha dam, near Datacha [19° 39' N, 97° 16' E], grid square reference: 10\8, 26\8
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-1.jpg>

Additional references

Data summary: [Biluchaung-3](#)

See below: 'Lawpita power plants and associated dams' (Appendix 1)

NLM. 07/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-07.pdf>

A photo of the entrance to the intake tunnel of No-3 Biluchaung hydropower project is included in an article on Kayah state.

Text and photos by Thet Htet Ko, NLM, 05/09/10. Edited and condensed.

<http://www.burmalibrary.org/docs09/NLM2010-09-05.pdf>

Belu Creek hydropower project No 3 is being constructed under the B.O.T. system which partners the Hydropower Implementation Dept of EPM-1 with the Future Energy Co Ltd, an associate of High Tech Concrete Technology Co Ltd. The project is divided into six main phases: (1) pre-engineering works (now completed), (2) digging of the water intake tunnel including the main tunnel and approach tunnels, (3) construction of the diversion weir, (4) construction of the regulating lake, spillway and canal, (5) construction of the penstocks and power station, and (6) construction of the switchyard and transmission line. The construction of the diversion weir and the water intake system is a massive undertaking. The large workforce that includes 44 Myanmar engineers works on both day and night shifts. Dump trucks and excavators busily ply between stone grinders and cement mixers. 722 metres of the 4,300-metre-long main intake tunnel have now been finished, and the 100-metre-long No 2 approach tunnel and the 220-metre-long No 4 approach tunnel have been completed. Along the oxygenated main intake tunnel were Myanmar engineers conducting surveys. I was amazed at the impressive work being carried out by these engineers and local workers. A young Myanmar engineer, wearing a smile on her face, conducted me around tunnel No 4. Afterwards, we observed construction of the regulating lake, spillway and power station. Construction was started in 2008 and is due to be finished in 2012. Two 26-megawatt, vertical-shaft, Francis turbines that are expected to generate 334 million kWh per year will be installed.

[Photos showing the approach water intake tunnel No 4, an aerial view of earthworks for the penstocks, the roofing of a section of main water intake tunnel and excavation work at the regulating lake are included in the print edition of NLM.]

NLM, 31/12/09. http://www.burmalibrary.org/docs08/Electricity_article-NLM2009-12-31.pdf

Completion of Biluchaung-3 hydropower project is expected in 2012.

China Gezhouba Group, 18/09/09. <http://finance.sina.com.cn/roll/20090918/13596768767.shtml>

On 14/09/09, China Gezhouba Group International Engineering Co Ltd and Myanmar Future Energy Co signed an agreement in Yangon for construction of the diversion tunnel (CW1 tender) at Baluchaung-3 hydropower station. The Baluchaung-3 hydropower station project will be self-financed by Myanmar Future Energy Company. The contract is worth US\$ 21.04 million and is to be completed within 28 months.

China Gezhouba Group, 31/08/09. <http://finance.ifeng.com/roll/20090831/1175077.shtml>

On 24 August, the Gezhouba Group was notified by Myanmar Concrete Technology Co that it had been awarded the contract to construct the diversion tunnel for the Baluchaung-3 hydropower station in Myanmar. The contract is worth US\$ 21 million. Baluchaung-3 hydropower station is the third cascade dam on Myanmar's Baluchaung river. It will have an installed capacity of 52 MW. The contract includes excavating and shoring the diversion tunnel and lining it with concrete, as well as grouting and tunnel blocking. The work period is 28 months.

Kyaw Ye Min, NLM, 20/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-20.pdf>

Baluchaung-3 and Sai Tin hydropower projects are being implemented jointly with foreign investors.

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

At the co-ordination meeting (1/2008) of the Special Projects Implementation Committee in the office of the Commander-in-Chief (Army), EPM-1 Zaw Min gave a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the Committee. [Among the the fifteen are] the Bilu Creek No 3 hydropower project (48 megawatts) in Bago [sic] division.

"Myanmar Country Report on Progress of Power Development Plans and Transmission Interconnection Projects", *Fifth Meeting of Planning Working Group of the Regional Power Trade Coordination Committee, Greater Mekong Subregion* (Vientiane, 17/06/08), Appendix 4, p 22.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/PWG5-Appendix4.4.pdf>

An MOU on Baluchaung-3 hydropower project (48 MW) was signed between the Ministry of Electric Power-1 and High Tech Concrete Technology Co Ltd on 2nd May 2008.

NLM, 18/01/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080118.htm>

On a visit to Biluchaung-3 hydropower site Lt-Gen Kyaw Win of the MoD is briefed on arrangements for implementation of the project, construction of the power intake tunnel and power plant and the future generation of power by project co-ordinator Tin Maung Win of HPID. Kyaw Win checks the water current at the confluence of Bilu creek and Pun [Paw] creek. HPID and High Tech Concrete Technology Co Ltd will jointly construct the diversion dam and the power intake tunnel of Biluchaung-3 hydropower project. On completion, the power plant of the project will generate 344 million kWh yearly. At Biluchaung-2 hydropower plant, Kyaw Win inspects the operation of the machines and the control room and is briefed by the plant manager, Superintending Engineer Hoke Shein. Biluchaung-2 Hydropower Plant installed with six 28-megawatt generators is producing 1,200 million kWh yearly.

Kyaw Thu, Myanmar Times, 26/11/07. <http://www.mmtimes.com/no394/b005.htm>

Two private Myanmar companies developing hydropower projects are planning to hire foreign consultant companies, said an energy expert close to one of the companies on November 20. Asia World and Olympic Construction are the first two private, local firms to have been entrusted to build hydropower projects in Myanmar. Asia World is slated to build the Thaukyegat hydropower project in Bago Division, which is expected to produce some 140 MW, while Olympic Construction will build the Baluchaung-3 project in Kayah State. This project is hoped to deliver a further 48 MW. "The two companies have been running feasibility studies and preparing to submit a proposal to the Myanmar Investment Committee," he said. When finished, the electricity generated by the two projects will be sold to the EPM-2 for distribution through the national grid.

MEPE information on ASEAN Energy website, [circa 2000].

www.aseanenergy.org/energy_sector/electricity/myanmar/future_electricity_projects.htm

Feasibility study for Baluchaung-3 in Kayah state, 48 MW, expected to generate 327 GWh annually, completed by NEWJEC.

WPD, 02/01/93. <http://www.ibiblio.org/obl/docs3/BPS93-01.pdf> [doc p 48]

Special Projects Implementation Committee receives a report on the Baluchaung-3 hydel project to be carried out in Loikaw township.

INDIAN SOLAR LANTERNS TO LIGHT UP MYANMAR HUTS

PTI, 07/02/09. <http://www.in.com/news/readnews-current-affairs-indian-solar-lanterns-to-light-up-myanmar-huts-7907577-54248-1.htm>

Indian solar lanterns will light up more houses of the poor in Myanmar, in areas devastated by killer storm Nargis in May last year.

India handed over 250 solar lanterns to Myanmar yesterday, with Minister of State for Defence M M Pallam Raju handing over nearly two of them to Myanmar's Social Welfare and Rehabilitation Minister Maung Maung as a symbolic gesture on the first day of Vice President Hamid Ansari's four-day visit to this country.

The lanterns were given on a request from Myanmar following good feedback on the performance of 500 such lanterns, supplied by India soon after the cyclone struck this country killing more than one lakh people.

Website references:

Ashden Awards for Sustainable Energy, 2005. <http://www.ashdenawards.org/winners/nest>

NEST is a private company based in Hyderabad, India, which was set up to develop a very small solar lantern, the 'Aishwarya®', as a safe substitute for the kerosene wick lamp. Over 65,000 lanterns have been produced and distributed during the past five years. It is estimated that in India alone, about 100 million households use kerosene wick lamps as their main source of light. Such lamps produce poor quality light and unhealthy fumes, and present a serious fire risk particularly when used in thatched homes. Fluorescent lamps with batteries recharged using solar photovoltaics (PV), can provide much better quality and safer light, but the cost of such a lantern can be prohibitive. NEST have brought down this cost, by making a PV lantern which is small and light-weight, with strict attention to quality of manufacture. By working closely with

a network of dealers and sub-dealers, through whom they provide credit, spares and support, they have enabled very poor people in the most remote villages to buy PV lanterns without subsidies. Over 75% of the Aishwarya lanterns produced by NEST have been sold in this way, throughout the states of Andhra Pradesh and Maharashtra. The Ashden judges commended NEST for developing an attractive and high-quality lantern specifically for the poorest households, and setting up a financial and service structure which enables such households to purchase without subsidy and receive proper after-sales support. These achievements were made possible by effective management within NEST and their active links with subcontractors and their dealership network.

Stanford Institute of Design, [2007]. Adapted. http://extreme.stanford.edu/success_stories/dlight_design.html
A team of four Stanford students has come up with a clean and efficient LED light that may prove to be a next best solution for the 1.6 billion people in the world who have no access to electricity. Erica Estrada and Xianyi Wu (mechanical engineering) along with Sam Goldman and Ted Tozun (business) began their project by studying the habits and needs of rural villages in Myanmar. Inspired by the night vendors they saw using candles, they designed LED light for use on a night vendor's stall. After further development, they realized their product was a highly desirable household item, and shifted their focus to the home where lights needed to be hung easily from the ceiling, from the walls, and still carried comfortably in the hand for outside excursions. They honed in on the size of battery that would be necessary for night-time household use. They chose LEDs that offer enough light for the household tasks they saw (children studying, nighttime income generating activities, etc.) at the lowest price. Encouraged by successes in competitions in which they took part, they entered the Draper Fisher Jurvetson Venture Challenge and walked out of the competition with a check for a quarter of a million dollars. Several weeks later, d.light design was formed as a for-profit company. After gaining additional backing from other investors, d.light spent the next eight months doing extensive user testing, refining the design, and developing relationships with manufacturers and distributors. Eventually, they were ready to move their operations entirely overseas. Their product design and manufacturing operations are now located in Shenzhen, China, while Delhi, India is home to their sales and marketing headquarters. d.light's first product to hit stores was the Nova, a solar-rechargeable LED lamp that is 10-20 times brighter than a kerosene lantern. It has four different light settings, and will provide light for 5-200 hours on a single charge, depending on the setting. The form factor ensures that it can be hung from the ceiling or walls, or carried by hand or with the included neck strap. The light retails for \$20-\$30, and has been selling in Africa and Asia. The Nova is only the first in a line of affordable lights. d.light will soon be unveiling several other models at even lower price points. d.light will also be expanding its market further into Africa and Asia, as well as to other countries where kerosene lanterns are prevalent. In the next 10 years, d.light's goal is to replace every kerosene lantern in the world with safer, brighter, and more affordable lighting. For more information about d.light, check out www.dlightdesign.com.

Additional references

See above: 'PM calls for [bio-batteries](#) in every cyclone-hit household' (NLM: 07/04/09)
See below: 'Myanmar to build first [storm-resistant model village](#)' (Bernama: 12/06/08)
'[Solar power](#) seen as solution for remote villages' (MT: 06/10/03)

Agreement signed during visit of General Than Shwe to India, 29/07/10.

<http://www.burmanet.org/news/2010/07/29/mea-government-of-india-joint-statement-during-the-visit-of-chairman-state-peace-and-development-council-of-myanmar/>

Among other things noted in the Agreement was India's willingness "to explore possibilities for cooperation in the field of solar energy and wind energy in Myanmar", and an "offer to provide Myanmar, training in related fields".

Business Standard, 28/04/09. <http://www.business-standard.com/india/news/let-there-be-light/356364/>

Philips Electronics India has a portfolio of lanterns ready for areas with no electric power. These come in the price range of Rs 1,000 to Rs 3,000. Philips has made two categories of lanterns: one, which can be charged on a solar panel; and two, which can be charged from electricity. In most rural households which do not run on electricity, people use kerosene to light their lamps and lanterns. This is unhealthy. To address this demand, Philips has come out with lanterns. These can be used at home or can even be carried to the fields. At the moment, Philips' lanterns are ready for the market. Apart from the lighting network, the company has

dovetailed its lanterns into the "Lighting a Billion Lives" initiative of The Energy & Resources Institute. Over 2,000 lanterns have already been distributed in 42 villages across nine states. Five hundred have been deployed in Myanmar.

NLM, 27/09/08. <http://www.burmalibrary.org/docs5/NLM2008-09-27.pdf>

Indian Ambassador Bhaskar Kumar Mitra donated 250 solar lanterns and 250 solar torches for the storm-affected regions on behalf of Director-General R K Pachauri of the Energy and Resources Institute (India). Chairman of the Tripartite Core Group (TCG) Kyaw Thu accepted the donations at the Ministry of Foreign Affairs in Yangon.

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ELECTRICITY FLOWING FROM [MONK-DRIVEN PROJECTS](#) IN MON STATE.

Rai Maraoh, IMNA, 05/02/09. <http://www.monnews-imna.com/newsupdate.php?ID=1311> (edited)

Electricity is flowing from two monk-led local development projects in Mon state, as the government continues to leave much of the rest of southern Burma without power. The projects -- in Chaungzone and Paung townships -- have both been organized by monks or former monks, and are bringing electricity to over 600 households, with capacity for hundreds more.

The wattage from the project on Belukyun Island has residents raving. "The power supply is very good," said the Dare resident. "We can cook, we can iron. We can use a refrigerator, fill batteries or even watch TV."

The project in Dare was spearheaded by the abbot of the Mingalala Thu Kat monastery, who organized a group of 15 laymen that purchased a generator from Rangoon in December. About 120 of Dare's 200 households are currently drawing power. "Our village has electricity now, because of the efforts of the monk and monastery donors," said a woman from Dare village in Chaungzone township, on Belukyn island. "If we had just waited for electricity from the government, our village would never have it."

The project in Paung township is centered in Mu Naing village, where former monks from the local monastery raised money to buy a hydroelectric generator in November. The project has capacity for more than a thousand households, with 514 currently connected.

"Paung town itself has electrical wires from the government, but it is rare that we get any power," added a resident of the township centre. "That's why some villages try to get electricity themselves. Even if they get electricity from the government, it is not enough power to do anything."

Meanwhile, in Moulmein, the capital of Mon State, residents have been complaining about the decreasing wattage of the power they receive. Last week, Mon State officials extended electricity to villages in nearby Mudon township but, apparently, they did so without increasing the power output from the Ngante station in Moulmein.

Additional references

See below: ['Interest growing](#) in rice-husk generation' (MT: 10/07/06)

NLM, 09/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-09.pdf>

Lt-Gen Tha Aye of the MoD attended the opening of the self-reliant 750-KVA paddy husk-fired power plant in DaungU Village of Chaungzon township on 2 February.

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[GAS TURBINE FAILURE](#) RESTRICTS ELECTRICITY SUPPLY IN YANGON

Xinhua: 01/02/09. (Edited and corrected)

http://news.xinhuanet.com/english/2009-02/01/content_10744064.htm

Maintenance work on an undersea gas pipeline and explosions on a transmission line have caused serious losses in the supply of electricity to Yangon, according to the Sunday edition of the New Light of Myanmar.

The pipelines of the Yadana natural gas project off the Mottama coast have been under maintenance since 24 January, causing a reduction in the supply of gas-powered electricity to the country's largest city, the newspaper said. As a result more power was being supplied from hydro electric sources to cover the loss of power available from city's gas-fired turbines.

The situation worsened on 26 January, however, when two towers on the Lawpita-Toungoo grid that transmits electricity from hydropower stations were blasted by anti-government armed groups of the Kayin National Union (KNU) and Kayinni National Progressive Party (KNPP), the report said.

Yangon has been under alternate electricity supply with six hours on and six hours off since early December 2008. According to an earlier report, operations at gas-run power plants at Hlawga, Ywama and Thakayta in the city had to be shut down due to problems with a section of pipeline carrying gas from the Yadana gas field, the Yangon Electricity Supply Board was quoted as saying. The problem in the pipeline that occurred in Ye township in Mon state was under repair, the YESB said.

Losses caused by the shutdowns at the three natural-gas-run power stations amounted to 140 MW since the end of November last year. With business and industrial enterprises mostly situated in Yangon, the former capital's electricity consumption takes up 60 percent or about 530 MW of the total national capacity.

There are 22 hydropower projects under implementation with 15 more to be added in the future, according to the Ministry of Electric Power.

Additional references

See above: 'Power [supply improves](#) in Rangoon' (Mizzima: 28/07/09)
 'Students demand better access to electricity' (IRROL: 10/03/09)
 See below: 'Generator sales spike upward in Yangon' (MT: 15/12/08)
 'Gas in [short supply](#) to meet demand for electricity' (MT: 17/09/07)
 'Pipeline to solve electricity shortages' (MT: 16/09/02)

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

EPM-2 Khin Maung Myint informs a meeting of the Special Projects Implementation Committee in Nay Pyi Taw about plans to for repair thermal power plants in various parts of the country. They include major repairs to No 3 turbine of the Ywama power plant, to No 1 turbine of the Ahlon power plant, to the Hlawga, Ahlon and Thakayta recycle steam turbines, to the Hlawga power plant, to the Thakayta power plant, to No 3 turbine at the Kyunchaung power plant, to the Shwedaung power plant, to the Myanaung power plant, to the steam turbine at the Mawlamyine power plant and to the Thaton power plant.

Xinhua, 20/03/09. Edited and abridged.

http://news.xinhuanet.com/english/2009-03/20/content_11039486.htm

Presently, Yangon's electricity demands of over 500 MW daily have to be met by the city's four gas-run power plants which have a maximum capacity of only 300 MW, the local Biweekly Eleven reported on Friday (20/03/09). Low water levels at the country's hydropower generating facilities have reduced the supply of power otherwise available to Yangon. In order to supply electricity to homes and industrial zones for at least five hours day, authorities have temporarily suspended supply to high power-consuming heavy industries such as some steel plants in the Myaungtika Industrial Zone [in Hmawbi], the report said. About 450,000 workers are employed in the industrial zones of the former capital.

Arka, IMNA, 02/03/09. <http://www.monnews-imna.com/newsupdate.php?ID=1339>

Local sources say that a gas pipeline which burst in southern Mon state on 18 February had been leaking for months. The pipeline burst between Lamine town and Hnitkayin village with a thundering rush at nine o'clock at night, but the gas did not ignite and no one was injured. Residents say the noise sound lasted for about an hour. The explosion occurred about 60 feet from the nearby Ye to Moulmein railway line and a

local cart path. A villager noted that the pipeline had been leaking since at least the 2008 rainy season. The section that exploded becomes submerged during the rains, said the source, who described seeing bubbles rising from the pipe to the surface of the water. A villager from nearby Kawdood agreed. "The gas that exploded this time was the gas that was leaking since the rainy season," he said. "Nobody repaired the pipe even though the rainy season finished. That's why the pipe could not stay any longer. That's why it exploded."

Xinhua, 02/03/09. <http://english.people.com.cn/90001/90778/90858/90863/6603407.html>

A leak in the natural gas line between Yay and Lamine in southern Mon state has reduced the supply of power in Yangon, the Voice Weekly reported on 01/03/09, quoting the Yangon City Electricity Supply Board. Although the leak, which occurred on 18 February, had been repaired, time was needed for pressure in the line to build up to normal levels, the source said. Residents in the former capital are generally experiencing a hard time with power supply being available for an hour at a time instead of periods of at least a few hours, and the situation has caused extreme inconvenience to the public in daily life.

Xinhua, 07/02/09. <http://www.hindujobs.com/thehindu/holnus/003200902071023.htm>

Electricity service in Yangon will resume on a quota basis days after the supply was cut late in January, sources with the Yangon City Electricity Supply Board said on Saturday. According to the sources, one third of the repair work on destroyed towers on the Lawpita-Toungoo transmission line near Thaukyaykhat creek that provides electric power to the former capital of Myanmar has been completed. Full service would be restored soon, the sources said, estimating that complete resumption of electricity supply would be possible after the second week of February.

IMNA, 03/12/08 <http://www.bnionline.net/news/imna/5506-gas-pipeline-fails-near-lamine>

The Kanbawk to Myaing Kalay gas pipeline burst near Lamine village, northern Ye Township, in the early morning of November 25th, say local sources, although the gas did not ignite. A resident who lives near the pipeline said she heard a loud sound. The pipeline appears to have failed at a joint between two sections of pipe. Villagers say a large crack is visible at the seam between the two pipe sections. Local sources report that the flow of gas was shut down and the crack in the pipeline repaired by the end of the day. Trains between Lamine and Ye were also canceled on the 25th because the tracks pass close to the pipeline. Residents who live close to the line live in fear that explosions which occur from time to time along the line will cause their homes to be destroyed by fire. According to a report issued by the Human Rights Foundation of Monland in September, this has happened at least fifteen times since pipeline construction in the region started in 1998. Villagers are also forced to guard the pipeline from rebels and face violent retribution should an attack or explosion occur.

SELF RELIANT HYDROPOWER PLANT SERVING 600 HOMES IN KANAN

Kalay Win Thu, NLM, 30/01/09. (Revised and rewritten)

<http://www.burmalibrary.org/docs6/NLM2009-01-30.pdf>

Kanan village is about 20 miles south of Tamu in Sagaing division and lies close to the border with India. There are more than a thousand houses in the village which is home to about 6,000 people of various Chin ethnic groups. The villagers depend on agriculture for their livelihood with over 2,000 acres of farmland. When we visited in January about 500 acres had been put under summer paddy. They also plant cold season crops such as beans and pulses, onions, potatoes and mustard. Bananas, corn and pineapple are planted on the slopes of the Lethataung range where the village is located. The pineapples are of a distinctive Tamu species which are planted on a commercial scale in the Khampat area. The Kanan villagers also breed fish. There are three primary schools and a middle school in the village where a large new two-storey school building is under construction. There are many cottage industries, three video lounges, and a rural dispensary in Kanan.

Villagers in Kanan also enjoy the benefits of electricity which they have installed on a self-reliant basis. Electric power is supplied from a small hydropower plant fed with water from Nanpalaw creek (Tuipu Dung)

which rises near Shayshweli (Shiallup) village in Tonzong township in Chin state. The water reaches the power plant through a six-foot wide, 200-foot-long canal.

The head of the village council, U Nu Lyan Htan Ngar, told us the turbine/generator set in the hydropower plant had been installed by U Sein Toe who is based in Kalay Industrial Zone. According to him, it the largest power plant he has ever put together in the region. The plant was launched at the beginning of 2004 and there are currently more than 600 houses in the village hooked up. Each household has at least one two-foot fluorescent lamp which is serviced with electricity from 7pm to midnight daily at a cost of only K 540 monthly. Altogether there are 800 fluorescent lamps in the village. Electricity is provided on a year-round basis. The plant was built at a cost of K 3.1 million contributed by 70 wellwishers. Close to it, we noticed another small-scale hydropower plant constructed in 1994 that can generate enough electricity to light 500 two-foot fluorescent lamps.

[Originally published in Burmese in Kyemon on 25/01/09. In the print edition of NLM, the article is accompanied by photos of the mill-race and the turbine/generator set.]

Additional references

NLM: 28/11/08. <http://www.burmalibrary.org/docs6/NLM2008-11-28.pdf>

Kalay IZ has four functioning sectors: automobile manufacture, production and distribution of agricultural equipment, production of electric power generating equipment and the manufacture of general industrial products. In the 2008-2009 financial year, . . . a total of 120 pieces have been manufactured against the target of 424 [needed for] 10 power generation items.

SAI TIN HYDROPOWER PROJECT PLANS ANNOUNCED

NLM, 28/01/09. Edited and condensed. <http://www.burmalibrary.org/docs6/NLM2009-01-28.pdf>

Prime Minister General Thein Sein and his entourage met with state, district and township level officials, townsenders and ward administrative bodies at the hall of Sittway Station and discussed regional development and natural disaster preparedness.

Previous governments had not been able to carry out development tasks in Rakhine state effectively, he said, but the Tatmadaw government had given special attention to development in the state, he said. He drew attention to the construction of the Yangon-Sittway Road which was started in 1996 and completed in February 2000 and to the difficulties in building the Yangon- Kyaukphyu Road which now linked the southern and northern sections of the state.

Current requirements for the development of Rakhine State included advanced communications, smooth transport and sufficient supply of electricity, he said. He continued to say work was under way to construct Thataychaung hydropower plant in southern Rakhine State, which, on completion, will be able to generate 417 million kilowatt hours a year.

He also announced that Sai Tin hydropower plant would soon be built to supply electricity the northern part of Rakhine State. It had not been undertaken previously, he said due to a scarcity of water [at the falls] in the summer. This would be remedied by plans to create a lake on Sai Tin creek above the falls which would store water in rainy season. Eventually, the power plant there would able to produce 236 million kilowatt hours a year which would be provided to Sittway, Buthidaung, Maungtaw, Kyauktaw, MraukU and Minbya townships.

Afterwards, EPM-1 Zaw Min reported on measures being taken to build the Thahtaychaung hydel power project and An Chaung hydel power project as well as plans for the Sai Tin hydel power plant project in Buthidaung Township. When these were finished there would be sufficient electric power for the whole of Rakhine state, he said.

EPM-2 Khin Maung Myint reported on the power grid network system for the country, and measures to link the network with Rakhine, Kachin, Chin and Shan East states and Taninthayi division. .

Topographic map reference:

Saingdin Falls in Buthidaung township [co-ordinates n.a.], grid square reference: 12\4, 21\6 [?]
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-14.jpg>

Additional references

Data summary: [Sai Tin](#)

See below: 'Mini-hydro facilities slated for [dams in Kyauktaw township](#)' (NLM: 26/11/08)
 'Bangladesh, Myanmar to sign hydropower deal' (Xinhua: 15/07/07)
 'Thahtay creek dam and other hydropower projects in Arakan' (NLM: 20/04/06)
 'Electric power supply in Arakan state' ([Appendix 10A](#))

NLM, 20/01/11. Excerpt. <http://www.burmalibrary.org/docs11/NLM2011-01-20.pdf>

EPM-1 Zaw Min met with V-P Zou Jiahua of China Datang Corp and Pres Kou Bingen and party of China Datang Overseas Investment Co Ltd in Nay Pyi Taw for discussions on joint implementation of hydropower projects. Afterwards a ceremony to sign MoAs on the implementation of the Ywathit, Nampawn, Namtamhpak, Lemro, Lemro-II and Saingdin hydropower projects was signed between the HPD of EPM-1, China Datang Overseas Investment Co Ltd and Shwe Taung Hydropower Co Ltd [of Myanmar] took place in Yeywa Hall of the Ministry.

NLM, 18/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-18.pdf>

Photo of site of Saiding hydropower project in Buthidaung township included in the print edition of NLM.

NLM, 19/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-19.pdf>

EPM-1 Zaw Min explains to Prime Minister Thein Sein the reasons for the failure of previous attempts to harness Saidin waterfall. Aung Zaw Naing of Anagutswanah Co Ltd reports on geological and weather conditions in the area and on a land survey. The KTA company compiled a feasibility study in 1956, but the project could not be implemented due to operations of insurgents in the area. A medium- size hydropower plant that will generate an average of 220 million kwh of electricity annually is underway. It will supply electricity to the ten northern towns and other places in Rakhine state.

Tin Zar Zaw, Popular News, 09/12/09 <http://popularmyanmarnews.com/epaper/?p=386>

The State has begun cooperation with private companies to implement hydropower projects since November 2009. The Electricity Planning Dept ((HPID) of EPM-1 has signed MoUs with Anargat Swan Arr Co Ltd for the Sai Din hydro-electric power project and with Minn Anawrahta Co Ltd for the Upper Biluchaung project. The companies will carry out the projects under the Build, Operate and Transfer (BOT) system.

Narinjara News, 11/06/09

<http://www.bnionline.net/news/narinjara/6462-six-tribal-villages-relocated-for-hydro-power-project.html>

Six Khami ethnic villages in Buthidaung township have been forced to relocate recently by the Burmese military junta in order to proceed with the Sai Dan hydro power project. The villages were located above the Sai Din waterfall area, 30 miles east of Buthidaung town. The six villages are: Swa Yay, Li Bo, Dauk Souk Pai, Mari Mi, Ree Chaung and Pana Chay. The authorities have relocated the villages to upper Pana Chay village. There are about 50 households on an average in each village and most villagers depend on the Sai Dan Creek for their survival, a villager said. A lot of equipment and a number of foreign engineers have arrived in the area to work on the project.

NLM, 24/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-24.pdf>

Maj-Gen Ko Ko of the MoD visits the Saidin hydropower project where he views sample iof stones and the site for construction of the power plant.

NLM, 21/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-20.pdf>

On a visit to Rhakine state, PM Thein Sein is taken to the Thahtay hydropower project and briefed on technological data regarding landslides that took place at the entrance to the diversion tunnel. Major tasks of the project such as construction of the separation wall have been completed. Construction work on the intake structure for the hydropower station and tunnel is ongoing. [Photos of the dam site are included in the print edition of NLM.]

Narinjara, 03/04/09.

<http://www.bnionline.net/news/narinjara/6090-resumption-of-sai-din-hydropower-project.html>

Work has begun on the Sai Din hydropower project with the help of the Chinese government, according to an engineer in the Buthidaung municipal office. "It is a five-year project set to be completed in 2014," he said. Burmese governments in the past, including the U Nu government, tried to set up a hydropower plant at the Sai Din waterfall but were unsuccessful due to a number of obstacles. In 1952, a foreign engineer was killed by a group from the Burma Communist Party while he was working on a hydropower project in the area. After the incident, the government stopped work on the project. Soon after the current military regime took over power in 1988, it announced that it would set up a plant at the site, but three years later the project was postponed for unknown reasons. Many in the Arakanese community believe the announcement is a ploy intended to garner support for the pro-military government party in the 2010 elections. "I'm sure this time the junta will set up the power plant despite previous projects failing, because many materials are arriving at the construction site and many engineers are working at the site now," the municipal engineer said.

NLM, 01/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-01.pdf>

Sai-Tin hydropower project will be able to generate 75.5 MW or 236 million kilowatt hours a year. Many local people in Kanyinchaung village-tract and Yaybu village will get job opportunities.

Kaladan News, 27/02/09. http://www.kaladanpress.org/v3/index.php?option=com_content&view=article&id=1821:authorities-force-villagers-into-construction-work-at-sine-dine-water-fall-in-buthidaung&catid=93:february-2009&Itemid=2

Residents of villages close to Sine Daung (Saingdin) waterfall in Buthidaung township have been forced to work on construction of roads and to level out places for houses in the area over the last two months, a local village elder said. About a hundred people daily required to work at the site daily. They have to take their own food. The authorities are not even providing any wages for the work they do.

Kyaw Ye Min, NLM, 20/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-20.pdf>

Baluchaung No 3 and Sai Tin hydropower projects are being implemented jointly with foreign investors.

NLM, 30/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-30.pdf>

EPM No 1 Zaw Min and EPM No 2 Khin Maung Myint check on the flow of water into Sai Tin creek and the place chosen for the construction of a dam at the site of the Sai Tin hydropower project, 10 miles east of Buthidaung in Rakhine state. They are briefed by D-G Win Kyi of HPID on the implementation of the project where generators with a capacity of 70 MW will be installed. [A photo of Saingdin falls is included in the print edition of NLM.]

Independent (Bangladesh), 29/10/07. <http://www.theindependent-bd.com/details.php?nid=61718>

Bangladesh may drop the idea of importing electricity from Myanmar for reasons of security as well as the huge cost of establishing a power plant there. Local experts feel an investment of US\$2 billion could yield more benefit by being utilised within Bangladesh. They cite difficulties in setting up a power grid in hill and forest areas and in monitoring and of maintaining it in difficult terrain. The Power Ministry will still invite Myanmar power sector officials to visit Bangladesh in November, but more as a diplomatic courtesy. The rivers close to the Bangladesh border do not have much power potential; the Michaung can produce 100 MW and the Saingdin has a potential of 80 MW, while the Lemro has a potential of up to 400-600 MW. For every MW of capacity, it is necessary to invest TK5.5 to 6.5 crore (US\$800,000 – 950,000).

Narinjara News, 11/05/05. www.burmanet.org/news/2005/05/11/

In 1989, the military junta also attempted to build a well-publicized hydro-power project at Sai Dunn Water Fall, in Buthidaung township; however, it was withdrawn 3 years later without any explanation; every

government, since that of U Nu, has tried to woo the people of Arakan with the promise of building a power plant at Sai Dunn.

Narinjara News, 24/10/01. [not available on-line]

The SPDC junta began to construct a hydro-electric dam with much fanfare at Saingdin Falls in Rakhine state in 1990, but the project fizzled out in 1995. **Compiler's Note:** The Saingdin River, a tributary of the Mayu, flows south through Buthidaung township in the northern part of the state. According to local sources, the falls was first surveyed as a potential site for hydroelectric development in the early 50s.

WPD, 15/09/90. <http://www.ibiblio.org/obl/docs3/BPS90-09.pdf>

Saing Din hydro-electric project, Buthidaung township, (15 MW), will serve ten northern Rakhine state townships, rather than providing 76.5 MW of industrial power as originally anticipated in 1956; it will cost K 335 million (including US\$ 32 million).

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[Start 09](#)

[PADDY HUSK-FIRED ENGINE USED TO IRRIGATE CROPS IN BALAR REGION](#)

Tin Htwe with photos by Thaung Myint (MNA), NLM, 08/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-08.pdf>

The Balar river pump project is one of a set of similar projects in Hmawby, Hlegu and Mingaladon townships in Yangon division. It is located close to the Yangon-Mandalay Highway No 3 in Mingaladon township and gets its water from the main canal of Ngamoeyeik dam. The first phase of the project which can pump water to a height of 10 feet was completed in February 2005. It consists of a fixed stage to pump water along with a 2500-foot long main canal and tributary canals stretching 13,000 feet with 46 canal structures in total. It has two sets of 40hp, 30-kW water pumps which irrigate 300 acres of farmlands.

The second phase of the of Balar pump project was started in 2005 and completed in 2006. It is also situated alongside the Yangon-Mandalay Highway and gets water from the new Barlar canal of Ngamoeyeik dam. The second phase can pump water as high as 15 feet and consists of a fixed pump stage, a 10,000-foot-long main canal, tributary canals stretching 19,000 feet and 52 canal structures in total. The second phase has a 30hp dual-type engine which is reinforced by a paddy husk-fired engine. This combination has proved successful. It helps to reduce diesel consumption by two-thirds and saves costs of K17,730 per acre during the summer paddy season.

Farmers in Hlegu and Mingaladon townships used to have wait for their supply of irrigation water in cultivating summer paddy because the pumps could not be operated due to power shortages. But now, irrigation water can be pumped at any time due to the use of paddy husk-fired power generator. The paddy husk used to fuel the standby pump motor is purchased from them at the price of K200 per basket. So, they benefit in two ways.

The Water Resources Utilization Dept of the Ministry of Agriculture is planning to use of paddy husk-fired engines to irrigate crops on a large scale across the nation. It is also working hard to supply electric power through paddy husk-fired power plants in rural areas. [The article in the print edition of NLM is accompanied by photos of one of the canals and of water being pumped at one of the stations. Another photo shows husk being fed into a tank that is used to produce the methane gas that serves as fuel for the engine. A fourth photo is of the gas-driven engine that powers the pump. This article was originally published in Burmese in Myanmar Alin on 07/01/09.]

Additional references

See below: 'Village rice husk power plant will serve as [research centre](#)' (MT: 24/09/07)
 'Plans for [7-million-dollar](#) rice husk power plant edge forward' (MT: 27/08/07)
 '[Rice-husk generators](#) slated for villages in Yangon division' (MT: 11/06/07)
 '[Inventor co-op](#) society exports first rice-husk generators' (MT: 21/08/06)

'Interest growing in rice-husk generation' (MT: 10/07/06)

'Paddy husk power plant tested to cut rice [milling costs](#)' (MT: 19/12/05)

'Engineer touts [methane from landfills](#) to generate electricity' (MT: 09/08/04)

'Biomass gasifier used for [tobacco curing](#) in Myingyan' (TERI: 08/04)

Tin Htwe, NLM, 03/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-03.pdf>

Since 1995, Yangon Division WRUD has been carrying out river-water pump jobs that use diesel-fueled engines but it is now starting to use electric motors. It is learnt that the eight remaining river-water pump projects in the division are being undertaken using biomass gasifier engine pump sets. This method is cost effective and will ensure more income for farmers and reduce air pollution.

NLM, 22/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-22.pdf>

A&IM Htay Oo inspects the Balar-2 water pumping station in Mingaladon township. The station is supplying water to summer paddy fields with the use of a paddy-husk-powered gasifier. The Water Resources Utilization Dept built Balar-1 and Balar-2 stations for the 1000-acre Balar model farm project in Hlegu and Mingaladon townships. This year the Balar-2 station will supply water to 400 acres of farmland for cultivation of crops.

NLM, 27/11/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051127.htm>

Barlar No 2 river pump station project is close to the junction of the six-lane Yangon-Bago road and No 3 Highway between Mingaladon and Hlegu townships. It will irrigate 1,000 acres of farmland when completed.

NLM, 20/12/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n041220.htm>

Yangon Command has been growing paddy on a 85-acre farm between Hlegu and Mingaladon townships. A project aimed at irrigating the paddy field in summer is underway. Irrigation canals are being dug and a pump house is being built. Arrangements have been made for the installation of 40-hp motor and 315-kVA transformer.

GENERATOR SALES SPIKE UPWARDS IN YANGON

Thike Zin, Myanmar Times, 15/12/08. <http://mmtimes.com/no449/b004.htm>

Electricity blackouts have led to a tenfold increase in generator sales in Yangon, shopkeepers say. Following the end of the rainy season, when electricity could reliably be generated by hydropower, power stations are trying – not always successfully – to take up the slack. “We are selling 25 to 30 home generators a week now, compared to two or three a week before,” said U Lu Lay, the owner of Lu Lay generators shop.

Electricity blackouts affect different parts of the city at different times, and for variable periods. Some areas in downtown Yangon are now receiving only 66 hours to 78 hours of electricity supply a week.

Among the generators on the market, Chinese models are selling faster and getting 90 percent of market share, while Japanese generators occupy the remaining 10 percent. “Chinese generators are moving faster because Japanese units cost four times as much,” said U Khin Aung, a sales manager of Honda Generator Shop. While a Chinese generator of 800 watts (W) costs K85,000, a Japanese generator with the same capacity goes for K350,000, said U Khin Aung.

Chinese brands Kenbo, Doyen, Shanho, and Japanese Honda, Elemax and Yamaha generators are available in Yangon. “Generators with an 800W and 2 kilowatt (KW) capacity are more popular. Some consumers choose 800W for lighting and TV, while others go for 2KW in order to power water pumps as well. Consumers prefer Chinese generators that come with a six-month guarantee, and the shop owner has to provide maintenance service if the unit breaks down within that period,” said U Khin Aung.

Generators sales are usually cool between June and October, when heavy rains provide hydropower at full capacity. But when the rains stop, the blackouts begin. [Photo showing popular brands of home generators available at a Yangon shop accompanies the article.]

Additional references:

See below: 'Gas in [short supply](#) to meet demand for electricity' (MT: 17/09/07)
 'Market expands for [generator and rental shops](#)' (MT: 09/05/05).

Saw Yan Naing, IRROL, 12/12/08. http://www.irrawaddy.org/article.php?art_id=14789

Residents of Rangoon report that electricity supply in the city has been rationed for the past week. Win Maung who lives in Tamwe township, told The Irrawaddy on Thursday that his house had only been connected to the electricity grid for six hours a day since Monday. For purposes of electricity distribution, the city has been divided into three sectors: A, B, and C. Six hours electricity per day is supplied to each sector on a rotating basis. Sector A receives electricity from 5am to 11am, Sector B from 11am to 5pm, and Sector C from 5pm to 11pm. Despite the strict limits imposed on electricity distribution, there has been no official statement by the government. However, observers say that power cuts are inevitable all over Burma every year in late November and December because of a lack of water in the country's hydropower dams. The current electricity rationing has affected all local households and companies in Rangoon and has forced certain businesses—such as Internet cafés, printers and local journals—to close their doors during the cuts. The owner of an Internet café in Rangoon's Sanchaung township said he cannot make a profit these days because he has to use all his cash flow on buying gasoline to run his shop on a generator. He said he has to close his shop sometimes during the day. Speaking on condition of anonymity, the editor of a Rangoon journal said he had been running his office on a diesel generator since Monday. He said that he has to buy three gallons of gasoline a day, which costs about 10,000 kyat (US \$8) a day.

ONE THIRD OF THE [MYITTHA DAM](#) EMBANKMENT FINISHED

Article and Photos: Khin Maung Than (Sethmu), NLM, 11/12/08.

<http://www.burmalibrary.org/docs6/NLM2008-12-11.pdf>

Myittha Multipurpose Dam Project is located near Pyintha village in Gangaw township. An earthen embankment is being constructed to dam the waters of the Myittha River which rises in the mountain ranges of southeastern Chin State and empties into the Chindwin River. On completion, the project will be able to benefit 12,000 acres of farmland and generate 170 million kilowatt hours a year.

The project is being undertaken by Construction Group 8 of the Irrigation Dept. A UN mission visited Myanmar and observed the site for the project in 1962. In 1985, a team of Myanmar engineers studied the feasibility of constructing a dam at a site near Pyintha and Myayni villages which had been submitted by the UN group. But it was not until November 2002 that a final determination of the site near Pyintha village was made after further study.

The main dam will be 29,750 feet long and 205 feet high. So far about 10,000 feet of the embankment have been completed. The reservoir's full tank level will be 1010 feet [asl] and its dead storage level, 932 feet [asl]. Its maximum water storage capacity will be 377,600 acre feet, while its stagnant water storage capacity will be 70,800 acre feet; its water surface 5,788 acres. A diversion canal 14,300 feet long and 100 feet wide [is under construction]. The spillway is to be 1040 feet wide and will be of duek [sic] bill type.

The catchment area of the reservoir amounts to 700 square miles and the annual inflow is estimated at 1,310,000 acre feet. The dam is designed to store 377,600 acre feet and to benefit some 12,000 acres of farmland. The area to be irrigated is on the left side of the Myittha River. Gangaw township gets a large amount of precipitation in the rainy season, but water is scarce in summer. The dam will make it possible to have multiple and mixed-cropping patterns in the irrigation area.

The power generated at the dam will be distributed to Gangaw Township and surrounding areas. It is expected to produce about 170 million kilowatt hours a year. [Photos in the print edition of NLM include one of a completed section of the embankment of the Myittha dam and another of a power shovel and several large dump trucks onsite.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-07: Gangaw
 Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-11: Mount Victoria
 Myittha dam near Pyintha [22° 00' N, 94° 04' E], grid square reference: 13/7, 23/2
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-11.jpg>

Additional references

Data summary [Myittha](#)

See below: 'Speedy completion of [Manipura dam](#) urged' (NLM: 22/12/04)

PRC Embassy, Yangon. 06/08/09. (translation, courtesy Keven Li) edited and condensed)
<http://www.fmprc.gov.cn/chn/gxh/tyb/zwbdt/577208.htm>

A contract was signed between China Gezhouba Group and Myanmar's Ministry of Agriculture and Irrigation on 06/08/09 for metallic structures and electro-mechanical equipment at a hydropower project on the Myittha river in Magwe Division. China Gezhouba will design, supply and provide technical supervision and training for the installation of the structures and equipment in the power house at the project site. Installed capacity of the generators will be 40MW. The contract is worth US\$ 14.7 million.

NLM, 18/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-18.pdf>

Assistant Director Tin Win of Construction Group 8 of the ID briefs visiting generals on developments at the Myittha dam project. They view earth and gravel work on the main embankment and the site for construction of the spillway. Two 20-megawatt generators will be installed at the dam.

NLM, 21/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080821.htm>

On a visit to the Kyeohhn-kyeewa multi-purpose dam project Maj-Gen Khin Zaw of the MoD is told by Director Tin Win of Construction Group 8 of the ID that the Myittha [Pyintha] dam project in Gangaw township will have a generating capacity of 40 MW.

NLM, 28/01/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080128.htm>

The Myittha dam in Gangaw township will benefit 12,000 acres of farmland and generate 40 MW.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%20/Country%20Report%20/Tin%20-%20Myanmar%20-%20Presentation.pdf

Pyintha [Myittha] dam will be 62.5 m [215 ft] high. The power station with a planned capacity of 30 MW is expected to generate 170 million kWh annually. It is currently in the planning stage and will be carried out by the ID.

NLM, 27/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070527.htm>

Lt-Gen Ye Myint of the MoD visits the Myinttha dam project site. The dam will be 205 feet high and 29,750 feet long.

DVB, 20/02/07. www.burmanet.org/news/2007/02/20/

Several villages in Gangaw township are being forcibly relocated by the Burmese military to make way for the Pyintha dam project, residents told DVB. Sabai, Kha Mahn, Yinma and Khin Mon villages have all been ordered to move by March 31 as a result of military plans to confiscate more than 3,500 acres of private land. "The place we are going to be relocated to is 'kyat' land which is not good for cultivation. We are still unable to get drinkable water from the wells there," a villager said. The Pyintha dam project was launched in 2003 and is due for completion by 2008. Large amounts of inhabited land are expected to be completely flooded once the dam is finished. But many of the villagers told to relocate have approached the issue pragmatically, saying they would not mind moving if their new land was better and they had more access to health care. "We must be given land that is fertile," the villager said.

NLM, 12/04/06. www.mission.itu.ch/MISSIONS/Myanmar/06nlm/n060412.htm

Lt-Gen Ye Myint of the MoD visits the Myittha Dam project site near Pyntha Village in Gangaw township. The dam there will be 29,750 feet long and 205 feet high and have a storage capacity of 377,600 acre feet at full brim. It will be able to irrigate 12,000 acres and will generate 170 million kWh annually

NLM, 03/12/05. <http://www.ibiblio.org/obl/docs2/NLM2005-12-03.pdf>

On arrival at the Myittha dam project near Pyntha village in Gangaw township, PM Soe Win hears reports on the various kinds of machinery to be used, the watershed areas, prospects for water supply, and geographical facts. He inspects construction of the diversion tunnel. [Photos of the site are available in the print edition of NLM.]

NLM, 22/12/04 <http://www.ibiblio.org/obl/docs2/NLM2004-12-22.pdf>

General Than Shwe and party visit the site of Myittha dam to be implemented near Pyntha Village [22° 00' N, 94° 04' E] in Gangaw township where they are briefed by A&IM Htay Oo on the salient points of the project. Later, Energy Minister Lun Thi reports on arrangements for supply of fuel to the project. In response, General Than Shwe gives guidance, calling on officials concerned to fulfil the needs including fuel since the Myittha and Manipur projects are huge ones, and the Irrigation Dept is to complete the tasks as soon as possible. Afterwards, Senior General Than Shwe and party inspected the site chosen for construction of the main embankment. Myittha Dam project will be implemented by Construction Group No 8 of the Irrig Dept. It will benefit 12,000 acres of farmland and generate 40 MW. [Photos of the Manipura and Myttha dam sites are included in the print edition of NLM.]

NLM, 28/05/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040528.htm>

Lt-Gen Ye Myint and party inspect the Myittha dam project. They are briefed on arrival of machinery and construction materials. The 29,750-foot-long and 205-foot-high dam will be able to irrigate 12,000 acres of arable land and contribute towards multiple cropping and mixed cropping in Gangaw township. It will also generate 30 MW.

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MINI-HYDRO FACILITIES SLATED FOR [DAMS IN KYAUKTAW TOWNSHIP](#)

Khin Maung Than (Sethmu), NLM, 26/11/08. <http://www.burmalibrary.org/docs6/NLM2008-11-26.pdf>

I visited the Zeechaung (Zigyaung) dam site northeast of Kyauktaw about two miles from the Paletwa road in company with Staff Officer Sao Khun Oo of Construction Group 3 of the Irrigation Dept. The dam is being built to supply water to a thousand acres of farmland, so that summer paddy and other double cropping can be undertaken. Although the Kyauktaw area of Rakhine state receives an average of 190 inches of rain yearly, the region is very dry once the monsoon season is over.

A total of 13,200 acre-feet of water flows into the dam annually. The earthen embankment will be 115 feet high and 840 feet long. It will be able to store 7,530 acre-feet at full brim and 580 acre-feet at minimum level. The water surface of the dam will cover 154 acres. The dam will have one 640-foot-long, 4-foot wide and 6-foot-high reinforced concrete conduit. The main canal of the dam will be three miles long and its tributary canal, five miles. A total of 80 [outlet] structures will be built along the canal.

There is also a plan to supply electricity [from a power house at the dam] to the town of Kyauktaw. Two 40-kW generators will be installed.

Construction of Zeechaung dam started in 2005-2006. It should be completed in 2008-2009 financial year and will be opened soon. The Pyaingchaung dam, also in Kyauktaw township, was inaugurated on 30 March 2007. It irrigates 4,000 acres of summer paddy and a total of 5,000 acres of cropland. [This feature article is accompanied by three photos of the Zeechaung and Pyaingchaung dam sites in the print edition of NLM. It was originally published in Burmese in Kyemon on 13/11/08.]

Compiler's note: It remains to be seen whether turbines and generators will actually be installed at either the Zichaung or the Pyaingchaung dam. Given the seasonality of the water supply and the small storage capacities of the dams, electric power supply for much longer than six months during the year would be

doubtful. The Kyauktaw area is bound to increase in importance as plans progress for the Kaladan waterway which India has committed itself to develop.

Map references

The best maps for viewing the areas where the dams named in this section are located are in the older topographical series: NF 14 (Myohaung) <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-14.jpg> and NF 15 (Akyab) <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-15.jpg>

The village of Zigyauung (20° 53' N, 93° 04' E) and the creek of the same name are visible just to the north of the Maha Muni shrine site close to which the road to Paletwa now branches northward from the Sittway highway. The villages of Mindanywa (20° 54' N, 92° 53' E) and Laungbangya and Pyaing creek are visible on the Akyab map about 10 km (6 mi) directly to the northeast of Kyauktaw.

Additional references

See below: 'Sai Tin hydropower project plans announced' (NLM: 28/01/09)
'Thahtay creek dam and other hydropower projects in Arakan' (NLM: 20/04/06)
'Bangladesh, Myanmar to sign hydropower deal' (Xinhua: 15/07/07)
'Electric power supply in Arakan state' ([Appendix 10A](#))

Kyaw Sein, NLM, 07/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-07.pdf>

Ongoing irrigation tasks at Pyaingchaung dam are being carried out to supply water to 4,000 acres of summer paddy and 700 acres of summer sesame in order to meet the targets set for FY 2008-09. Digging operations along dam canals were delayed as a result of the late harvest last year but re-started in December, according to a local staff officer of Construction Group 3 of the ID. Efforts are also being made to complete the installation of two 40-kilowatt generators at the dam which will supply power to Kyauktaw and surrounding villages. Arrangements are being made to launch the supply of electricity in the month of May. Pyaingchaung Dam has an annual inflow of an average 29,985 acre feet and can store over 25,000 acre feet of water at its highest level. [Site photos by Tin Soe of Myanma Alin, including one of the mouths of the east and west canals of the dam.]

Kaladan Press, 06/03/09.

<http://www.bnionline.net/news/kaladan/5937-zee-chang-dam-may-destroy-nearby-villages-moc-9.html>

A report that villages around the newly opened Zeechaung dam could be flooded out during the coming monsoon season has been refuted by the engineer in charge of the building of the dam. The report, prepared by the headquarters of 9th Military Operations Command in Kyauktaw, warned that the people in at least five villages could be affected -- Thayagone with 600 families and Thetthapin with 300 families in the upper reaches of the dam reservoir and Maungpyataung with 800 families, Tharaktapin with 1000 families and Shwepalee with 300 families in the lower reaches of the dam. In spite of the assurances by the engineer, villagers near the dam are going to move to places where they can be safer, said a teacher from Kyauktaw. "The authorities are looking only for profit; they don't care about the people. If the dam waters spill over in the monsoon, who will take care of the people living nearby?" he asked.

Kaladan Press, 23/02/09.

http://www.kaladanpress.org/v3/index.php?option=com_content&view=article&id=1806:deputy-minister-inaugurates-dam-in-kyauktaw&catid=93:february-2009&Itemid=2

Two generators have been set up at Zeechaung dam which was opened on February 21. They will supply electricity to Mahamrat Muni Pagoada and nearby army battalions, according to a source close to the army in Kyauktaw township. The dam is situated on land seized from local people of Kyauktaw township.

NLM, 23/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-23.pdf>

Zeechaung dam was inaugurated in Kyauktaw township on 21/02/09. The dam which was built by the Irrigation Dept has an earthen embankment 840 feet long and 115 feet high. It can store up to 7,530- acre feet of water and supply water to 1,000 acres of cultivable land. It will also be able to generate 80 kW of electricity.

Singu Soe Win, NLM, 13/12/08. <http://203.81.72.132/newpaper/1312newsn.pdf>

Zeechaung dam project is about five miles from Kyauktaw. The dam will be able to benefit 1000 acres of summer paddy and generate 80 kilowatts for the Maha Muni Buddha Image. The project has a five-kilowatt turbine that supplies power to the worksite. There is a 4' x 6' reinforced concrete type outlet which is 577 feet long with a water outflow rate of 100 cubic feet seconds and a 30-foot wide board crested type spillway with a water outflow rate of 1700 cubic feet per second. The project has a three-mile long main canal, a five-mile-long distributory (secondary) [canal], and 80 canal structures. The project has a workforce of 200 white collar workers plus blue collar workers. It is currently 90pc complete. [Three photos accompany the article in the print edition of NLM: one of the main embankment, another of the control tower and a third showing a bulldozer and trucks operating at the project site. This article was originally published in Burmese in Myanma Alin on 12/12/08. Details noted in this summary are either not found in the key article above or differ from it. The journalists responsible for both articles appear to have visited the dam on the same occasion.]

Kaladan News, 24/11/08.

http://www.kaladanpress.org//index.php?option=com_content&task=view&id=1638&Itemid=2

The Burmese Army has been using forced labor from among Zeechaung villagers of Kyauktaw township since the second week of November to construct a dam that will generate hydro-electricity. Everyday, 100 to 150 residents of nearby villages have to go to the site and work from 6 am to noon. Although no wages are provided, the workers do receive two kgs of rice a day. Most of the laborers are Rohingya Muslims even though there are many Rakhine villages close to the dam site. The dam is near the Maha Mrat Muni Buddha statuette. The HQ of the Second Military Operations Command (MOC) will be shifted to Kyauktaw township in 2009 and it is expected that this office will be supplied with electricity from the Zeechaung dam according to an informant close to military sources in Kyauktaw. As a result, the concerned authorities are trying very hard to finish the project by 2009. There are three MOC headquarters in Arakan State under the Western Command, added the official. (Kaladan: 24/11/08);

NLM, 01/04/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070401.htm>

A ceremony to inaugurate Pyaingchaung Dam built by Irrigation Dept was held near Mindan village in Kyauktaw township on 30 March. In his address, Western Commander Maung Shein said that although the area has an average annual rainfall of 190 inches, double cropping could not be undertaken. But the emergence of Pyaingchaung dam will mean that 4,000 acres of summer paddy and a total of 5,000 acres of farmland can be irrigated, while the surrounding area can be supplied with electricity. A&IM Htay Oo said that Pyaingchaung dam is a medium-sized facility that can store 24,290 acre feet of water. The main section of the dam is 106 feet high and 860 feet long. It was built at a cost of K 4,460 million. After "a local" expressed gratitude for construction of the dam, the commander unveiled the stone plaque and the minister formally opened the dam. Director Tun Aung Lwin of Construction Group 3 of the Irrigation Dept reported that a pipeline had been installed to generate hydropower. Irrigation ditches will provide water from the dam to three village-tracts in the township. [Photos of the main embankment accompany the NLM on-line and print editions of this article.]

NLM, 16/10/02. http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n021016.htm#_4

Lt-Gen Khin Maung Than of the MoD and party inspected the site chosen for Pyaing creek dam project near Laungpankya village in Kyauktaw township. The Irrigation Dept has completed a feasibility study of the project and arrangements are being made for the arrival of machinery at the site. The general said that all necessary assistance had been provided. He stressed the need to start the project immediately so that the dam and the canals could be completed by April 2003 and would be ready for irrigation in the summer of 2003-2004. On completion, the project will be able to irrigate 5,000 acres of farmland and generate 250 kilowatts of electric power.

BONTALAR HYDROPOWER STATION IN MATUPI VISITED

Tin Win Lay and Htay Aung, NLM, 23/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-23.pdf>

The Kyemon Daily team visited Bontalar [Bungtla] hydropower station, six miles from Matupi in southern Chin State. Standing at an altitude of 3303 feet with an area of 1906 square miles, Matupi is the largest township in Chin State. The Bontalar station generates hydropower using the current created by the Bontalar waterfalls in the Lemyo [Lemro] river that rises on the Lonhein Mountain, north of Matupi. The facility is one of the hydropower projects in the region for improving the living standard of local people and the supply of electric power to urban and border areas. The station is of reinforced concrete type with two 250-kilowatt Francis hydropower turbines. We noticed that thanks to the access to electricity, the region was lively with activities of local people even at night.

Compiler's note: Excerpted from a longer article originally published in Burmese in Kyemon on 20/11/08. The translation in the print edition of NLM of 23/11/08 is accompanied by three photos including an aerial view of the waterfall, an outside shot of the hydropower station building and an interior view showing the 250-kilowatt Francis hydropower turbines in operation.

Additional references

See above: 'Minister clarifies [grid connection plans for Chin State](#)' (NLM: 22/03/11)

See below: '[Manufacture of small hydro turbines](#) in Myanmar' (JICA: Sept 2003)

'Rural [power services in Chin State](#)' (Appendix 10)

NLM, 23/03/11. Edited. <http://www.burmalibrary.org/docs11/NLM2011-03-23.pdf>

Chin State Representatives Paul Lyan Lwin and Paul Than Htai submitted a proposal to build a 'heavy' hydropower station at Bontalar waterfall in Matupi township to the Amyotha Hluttaw [Nationalities Chamber] of the Parliament on 22/03/11. U Paul Than Htai said that a large-scale generating facility at the falls, which is 15 miles from the town of Matupi, could supply power not only to Matupi but also to villages in the neighbouring townships of Mindat, Haka and Thantlang.

Replying to the proposal EPM-1 Zaw Min noted that up to 2008 the State had already built 33 small power plants not linked with the national grid. The smallest were equipped with generators which were able to generate 120 kW, while other larger ones could generate up to five megawatts. Even a power plant which can generate 10 megawatts is still considered as small, he added. According to a survey, the Minister said, waterpower at Bontala falls could be used to generate at least 1.8 megawatts. That would only be sufficient for the local community and would not qualify as a 'heavy' hydro power station.

[Further to the proposal, Minister Zaw Min pointed out that] according to Schedule 2 of Section 188 of the 2008 Constitution, (p 189), Paragraph 4 (a) reads "Medium and small scale electric power production and distribution that are not linked with the national power grid are to be managed by the Region or State, whereas large-scale electric power production and distribution is within the jurisdiction of the Union".

Since the building of small hydropower plants falls within the jurisdiction of the respective state governments, [the Minister continued], the proposal should be submitted to the Chin State government. Besides, private and cooperative sectors are allowed to invest in building power plants and selling the electricity. Therefore, the proposal to build a 'heavy' hydropower plant at Bontala waterfall in Matupi Township should not be brought to the Amyotha Hluttaw as the proposal is not eligible to be carried out by the Union and should be withdrawn.

Following the discussion, the Speaker of the Amyotha Hluttaw dismissed the proposal.

Khonumthung News, 28/11/08. http://bnionline.net/index.php?option=com_content&task=view&id=5478&Itemid=1

In Matupi Town the supply of electricity is irregular. There is no electric power during the time that residents prepare food in the morning and evening. Power is available around 10am and in the evening between 9 and 10pm, said a local in Matupi. Power from the Rha Laung [Bungtla falls] station is mainly used for army camps. The only area in Matupi that has regular power supply is the Lawngvan block. Nevertheless,

residents have to pay between K800-1000 per month for the service. Subscribers are very angry about it. The Lawngvan block is backed up by 200 kW from the Namlawng hydro-electric plant separately, but it does not get electricity regularly.

NLM, 25/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060725.htm>

Lt-Gen Ye Myint of the MoD visited Bontalar hydel power project site where Managing Director of Myanmar Machine Tool and Electrical Industries U Kyaw Win reported on installation of generators. Two 250 kilowatt turbines will generate power and over 88 per cent of the project has been completed.

Khonumthung News, 27/04/06. [not available on-line]

Construction has been restarted at the Bungtla waterfall hydroelectric power site on the Rha Lawng river in Matupi township. Work was suspended due to heavy rain during the last monsoon season but started again on orders of Col San Aung, tactical commander in Matupi tsp. The project was initiated in 2005 and was originally scheduled for completion in May 2006. The hydropower plant which is expected to generate 600 kwh will supply electricity to battalion HQ in Matupi but not tsp but not to civilians.

Khonumthung, 09/07/05. <http://www.khonumthung.com/kng-news/05-news-archive/july-2005/hydro-electric-power-construction-comes-to-halt-due-to-rain/>

A hydropower project under construction by military engineers at Thi Coeng village near Bungtla, the largest waterfall in Chin State, has come to an abrupt halt due to heavy rainfall in the area. Thi Coeng village is about fourteen miles from town of Matupi town in southern Chin state. An anonymous caller told our reporter that roads to the project site have been damaged by rain and that construction materials could not be transported to the site. Work on the project which started in Jan 2005 may resume in Oct or Nov after the monsoon ends. The power is station expected to produce 600 kW but power will only be supplied to places along the road between Matupi and Pha Neng and to the military camp of LIB 304 and tactical HQ in Pha Neng. The Bungtla Falls station will bring to four the number of hydropower plants in Chin state.

KENGTAWNG HYDROPOWER PLANT NEARLY READY TO PRODUCE ELECTRICITY

Aung Kyi and Aung Shin, Myanmar Times, 29/0908. <http://mmtimes.com/no438/n009.htm>

More electricity supply is just around the corner in Shan State, according to U Win Kyi, the director general of the Hydropower Implementation Department of EPM No 1. "The Kengtung [Kengtawng] hydro-electric power plant will be inaugurated by the end of this year," said U Win Kyi.

Located near Kengtung [Kengtawng] in Mongnai in southern Shan State, the hydropower plant, with a capacity of 54 MW, is expected to produce an average of 472 million kilowatt-hours a year. "We've almost finished the Kengtung [Kengtawng] hydropower project, and we are now testing the hydraulic generators and turbines, starting this month," said U Win Kyi.

Three 18-MW generators have been installed at Kengtung hydropower plant. The generators, transformers and electrical equipment worth US\$11.5 million have been purchased from a Chinese consortium made up of China National Electric Equipment Corporation (CNEEC) and Zhejiang Orient Holdings Group Limited. Under the deal with CNEEC, the Hydroelectric Power Department has also bought ironwork valued at US\$3.5 million from CNEEC. On completion, the hydropower station will supply electricity to the townships in Loilem and Langkho districts in southern Shan State, and surplus electricity will be sent to other areas through the national grid.

"The inauguration ceremony for the Kengtung hydroelectric power plant will follow the inauguration of the 600-megawatt Shweli hydroelectric power plant by the end of the year," said U Win Kyi.

The Kengtung hydro-power station will produce electricity generated by a waterfall on the Pawn River and the hydropower plant is likely to be followed by an upper Kengtung hydroelectric project to be built 20 miles farther up the same river, where two 160-megawatt capacity hydraulic generators are slated to be installed.

Topographic map references: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-14: Mong Pan Kengtawng Falls, 14 mi south of Ton Hoong [20° 45' N, 98° 21' E], grid square reference: 11\9, 28\0 Upper Kengtawng project, 10 mi south-west of Kengtawng [20° 45' N, 98° 17' E], grid sq ref: 12\0, 27\9 <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-14.jpg>
See also the map at http://www.shanland.org/environment/2003/plant_awaits_power_producer_from.htm

Additional references

Data summary: [Upper Kengtawng](#)

See above: 'Official [opening of Kengtawng](#) falls power station (NLM: 25/03/09)

NLM, 12/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-12.pdf>

The Upper Kengtawng hydropower project in Langkho district will generate 41 megawatts

NLM, 10/04/10. <http://www.burmalibrary.org/docs08/NLM2010-04-09.pdf>

The Hydropower Implementation Dept of EPM-1 and the China National Technical (Import & Export) Corporation (CNTC) of the PRC signed a contract for the supply of generators, turbines and machinery to be used in Upper Keng Tawng Hydropower Project at the meeting hall of the ministry on 08/04/10. D-G Myint Zaw of Hydropower implementation Dept and Executive Vice President of CNTC Sun Weiming signed the contracts and exchanged documents.

NLM, 25/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-25.pdf>

Construction of the Upper Kengtawng power station that will be capable of generating over 50 megawatts is underway. On completion of the project, there will be sufficient power supply in Shan State and surplus electricity can be used in other regions. [This edition of NLM carries an account and pictures of the opening of Kengtawng Falls hydropower plant. See Official [opening of Kengtawng](#) falls hydropower station' for a description of the ceremony marking the commissioning of the power plant on 21 March 2009.

Hseng Khio Fah, Shan Herald, 06/01/09.

<http://www.shanland.org/environment/2009/kengtawng-hydro-power-plant-opened-without-informing-locals>

Authorities in Shan State South have opened the Kengtawng hydropower plant without informing the local people, according to sources. The opening ceremony was presided over by Eastern Regional Commander Ya Pyae on 30 December 2008 according to a local villager who wishes to remain anonymous. However, a week before the ceremony, each household in every village was told to pay K400,000 (US\$333) to the electricity department to cover meter box taxes and the costs of wiring. Villagers had not yet received electricity even though construction work was completed long ago, said one villager. "They just started providing electricity to us on the day of the opening ceremony. We have never seen any light around our village before today. We are not still sure whether this will last forever or just a short time," he said.

NLM, 05/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-05.pdf>

During a visit to the Kengtawng hydropower project on 02/11/08, EPM-1 Zaw Min presented gifts to Chinese technicians working there. The project is nearing completion. The Kengtawng station is already supplying round-the-clock electric power to towns in Shan State South including Kengtawng, Langkho, Mongpan, Monei, Maukmai, Namkham, Loilem, Mongpan, Panglong, Leikha, Hopong and Taunggyi.

NLM, 22/09/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080922.htm>

EPM -2 Khin Maung Myint inspects the construction of pylons along the 132-kV Nanhsan [Namzang] – Loilem – Pinlet [Pinpet] power line in Loilem district.

NLM, 29/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080829.htm>

Maj-Gen Min Aung Hlaing of MoD inspects the Kengtawng hydropower project being implemented by HPID of EPM No 1. Installation of the generators is continuing.

NLM, 22/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080822.htm>

DepEPM-1 Myo Myint visits the Kengtawng hydropower project. He checks on the two diversion weirs, the construction of the intake structure and canals and the laying of steel pipelines. The sub-power station is

also under construction. Stator coils are being installed in No 3 power generator and the stator coil foundation plate in No 2 power generator. Work is proceeding on the excitation panel and control room in the power plant. A gift is presented to Niuton Yan of CNEEC Co Ltd of the PRC.

SHAN, 27/02/08. http://www.bnionline.net/index.php?option=com_content&task=category&sectionid=1&id=8&Itemid=6

Authorities in Southern Shan State have allowed locals to open gambling houses in order to obtain funds for the opening ceremony of the Kengtawng hydro power plant. On 14 February, they were open for five days at a location east of the TPDC office, near Mwaydaw Narm Mong pagoda. On February 18, gambling was moved to Wan Gao Nawng Lao, Kunlong tract, west of Kengtawng waterfalls. The project was started 19 November 2001 and construction was completed at the end of January 2008. The opening ceremony is to be held on 21 March 2008, the Full Moon Day of the fourth month, according to the lunar calendar.

NLM, 01/02/08. <http://burmalibrary.org/docs4/NLM2008-02-01.pdf>

At the Kengtawng hydropower project, EPM-1 Zaw Min briefs visiting generals on construction work at the site. The two diversion weirs, the power intake building, the inlet channel, the channels, the water tanks and other tasks have been completed. The laying of the pre-stressed pipelines is 65pc complete and the construction of the power station, 80pc. It is expected that the whole project will be finished by mid-2008. EPM No 2 Khin Maung Myint reports that preparations are underway to transmit power from the Kengtawng Falls plant to townships in the Loilem and Langkho districts through the Namsang power station. Any surplus will be supplied to the main grid through the 132-kV Namsang-Pinpet-Kalaw power line. Work is underway on the Kengtawng-Namsang, Namsang-Pinpet, Namsang-Loilem and Namsang-Mongnai power lines, construction of power stations in Namsang, Loilem and Mongnai, and installation of power lines such as those from Mongnai to Maukmai and Langkho to Mongpan and a power line from the falls to the Kengtawng area. [Sub-]power stations are under construction in Mongnai, Maukmai, Langkho, Mongpan and Kengtawng. One generator of the plant at Kengtawng falls is already in operation. A fruit basket is presented to Wu Jing De, project manager. [A photo of the falls is included in the print edition of NLM.]

NLM, 26/01/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080126.htm>

At the briefing hall of the 132/66-kV main power station (branch) of MEPE [in Nansang], Lt-Gen Kyaw Win of the MoD is briefed on the distribution of electricity in Shan State South and the installation of the 132-kV power line between Kengtawng and Nansang [Namzang]. When the Kengtawng hydropower station is completed, the power line will supply electricity to areas of Shan State South.

NLM, 18/01/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080118.htm>

EPM No 1 Zaw Min visits Kengtawng hydropower project site on Nanhtein creek, 30 miles northeast of Mongnai and checks into construction tasks and the installation of machines at the power plant. Work is proceeding on the digging of the tailrace channel, concrete laying and earth work in connection with the switch yard. He also oversees the laying of pipelines and progress in building the water intake structure. The project is 86pc complete.

NLM, 17/01/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080117.htm>

EPM-1 Zaw Min visits Upper Kengtawng hydropower project and inspects the work-site, waterfall and the place to install power station. It is on Namtain Creek, about 10 miles northwest of Kengtawng and is the first hydropower project to start up in 2008. It will eventually produce 52.5 MW.

NLM, 10/08/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070810.htm>

Project Director U San Wai reports that 76.3% of the construction work on the Kengtawng project has been covered.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)

In October 2002, preliminary work got underway on the Kengtawng hydroelectric project on Namtein Creek, 50km east of Mongnai. In June 2005, MEP signed agreements with CNEEC and Zhejiang Orient Holdings Group Ltd (ZOHG) for the purchase of construction materials and electrical equipment for the project. The total value of the contracts was US\$15 million. Three 18-MW units are being installed at the site with annual output expected to be about 470 GWh. Electricity will be supplied to southern Shan townships in Loilem and

Langkho districts and to the national grid at 132kV. The power will also be distributed to other townships including Taunggyi via a new 66kV line. Kengtawng falls could be on-line in 2008.

NLM, 28/04/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070428.htm>

The Kengtawng project covers 11 major tasks of which the construction of diversion dams Nos 1 and 2, the power intake building, the power intake canal, the silt lake and water channel are finished. The water control lake, pre-stressed pipeline, power plant, sub-power station and outlet channel of the plant are under construction. The whole project is 73pc complete. Arrangements are underway to undertake the Upper Kengtawng hydropower project on Namtein creek, 10 miles northwest of the town of Kengtawng. It will store water for the power station at Kengtawng Falls. A feasibility study indicates that it could also generate 60 MW. A detailed survey is to be carried out.

NLM, 06/11/06. www.myanmar-information.net/infosheet/2006/061106.htm

In Nanning in the PRC EPM No 1 Zaw Min meets with Chairman Zhao Ruolin and party of CNEEC about the timely arrival of electronic and mechanical equipment for Yenwe, Yeywa, Khabaung and Kengtawng hydel power projects.

NLM, 07/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060607.htm>

Two small-scale power stations which generate 135 kW to be used for construction tasks at the project are underway. Work continues on two concrete diversion dams and two bridges across Nanttain creek. The project will supply power to Namsang, Laikha, Panglong and Loilem in Loilem District and to Mongnai, Langkho and Mongpan through Namsang sub-power station. Surplus power is to be supplied to the national power grid through Kalaw sub-power station.

NLM, 03/01/06. <http://http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060103.htm>

Work continuing on No 1 and 2 diversion weirs, intake structure, canal and other facilities. Project is 46pc complete

MIC, 23/08/05. <http://www.myanmar-information.net/infosheet/2005/050823.htm>

HPD signed a 4.56-million-dollar contract with Zhejiang Orient Holdings Group Limited- ZOHO to buy 132-kV cables and electrical equipment from China.

NLM, 17/06/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n050617.htm>

HPD signed two agreements with China National Electric Equipment Corp [CNEEC] and Zhejiang Orient Holdings Group Ltd [ZHOG] for the purchase of construction materials and electrical equipment for the Kengtawng project. Under the agreement with the CNEEC-ZOHG consortium, the HPD will purchase generators, transformers and electrical equipment worth US\$11.5 million. Under the deal with CNEEC, HPD will also buy ironwork valued at US\$3.5 million from CNEEC.

[**Compiler's note:** The Hunan Savoo Overseas Water and Engineering Co has also participated in the construction of the Yenwe dam and powerhouse, probably as a sub-contractor to CNEEC for hydraulic steel equipment. See pictures and text in Chinese on the Hunan Savoo website.]

<http://www.hhpdi.com/hhpdi/ShowArticle.asp?ArticleID=113>

SHAN, 08/06/04.

http://206.225.87.154:9080/live/shan/articles/environment/2004/Kengtawng_to_light_Shan_State_South_by_2006.htm

Burma's military authorities recently postponed the startup of the Kengtawng Falls power station from 2004 to 2006, according to sources from Kengtawng, a sub-township 100 miles east of Taunggyi, where they have been trying to harness the Zong-argng waterfalls since 2001. A trader said the source of the information was U Nyi Nyi Aung, sub township officer. "When we asked him why, he just told us there were some technical problems." Bowing to the advice of the Japanese experts to preserve the natural beauty as much as possible, Burmese engineers have constructed a diversion two-and-a-half miles long, a local quoted a government official as saying.

NLM, 26-05-04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040526.htm>

General Khin Nyunt and party arrived at Kengtawng hydel power project near Kengtawng waterfall on Namtein creek, 31 miles east of Mongnai in Loilem district. Deputy EPM Myo Myint reported on salient points regarding the project including geological conditions, current of Namtein creek, hydrological findings, construction of the diversion weir under the project, process for generating electricity, measures for installation of power lines. Director U Soe Myint of HPD reported on the construction of the first diversion weir, the intake structure, the silt settling tank and other matters. Afterwards, the PM inspected the flow of Namtein creek and Kengtawng waterfall. The hydel power plant will be installed with three 18-MW turbines and will be able to generate 472 million kilowatt hours annually. **Compiler's Note:** Pictures of the falls are available at <http://www.mrtv3.net.mm/pages/kengtaun.html>.

NLM, 01/08/03. <http://http://www.myanmar.gov.mm/Article/Article2003/aug/Aug01b.htm>

Preparatory tasks are being carried out to build a hydel power station at the 410-foot-high Kengtawng falls on Nanttain creek about 30 miles east of the town of Mongnai. The flow of water along the 210-mile-long creek is about 3,500 cu feet per second. The reinforced concrete hydel power plant at Kengtawng Falls will be 175 ft by 120 ft and 90 ft high. The project includes a 150-ft-long and 12-ft-high concrete weir, a 4-ft-long and 6-ft-high under sluice, a 60-ft-long, 40-ft-wide and 32-ft-high intake structure, a 6,560-ft-long, 15-ft-wide and 12-ft-high perpendicular intake channel, a 360-ft-long, 80-ft-wide and 20-ft high storage tank and a 1,500-ft-long and 10.5-ft-wide steel pipe. The project started in 2002-03 and will be completed in 2004-05. The Department of Electric Power will install 66-kV power lines along a 130-mile route from Kengtawng Falls to Taunggyi -- 31 miles from Kengtawng to Mongnai, 30 miles from Mongnai to Namsang, 12 miles from Namsang to Loilem and 57 miles from Loilem to Taunggyi. A total of four sub-power stations -- an 11/66-kV station in Kengtawng, a 66/11-kV-5M station in Mongnai, a 66/11-kV 30-MVA station in Namsang and a 66/11-kV 10-MVA station in Loilem -- will be built to supply electricity to Mongnai, Lankho, Mongpan, Namhsan, Loilem, Mongpun and Taunggyi from Kengtawng and to Panglong and Laikha from Loilem.

NLM, 20/05/03. <http://http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030520.htm>

The Kengtawng project will be undertaken without tarnishing the natural beauty of the waterfalls and its environs. Three 18-MW turbines capable of generating 472 million kWh annually will be installed. The power will also be distributed to 11 townships including Taunggyi after the extension of a 66-kV line.

NLM, 01/01/03. <http://www.myanmar.gov.mm/Article/Article2003/jan/jan1d.html>

A survey was conducted for implementation of Kengtaung hydel power project at Kengtaung waterfalls on Nantim creek, 31 miles east of Mongnai. Construction is under way. Three turbines will generate 30 MW in the first phase of the project, a 15-MW turbine will be added in the second phase.

SHAN, 28/09/02. <http://www.burmaissues.org/En/Old>

A ten-man team of Japanese engineers was recently at Shan State's biggest waterfall on an initial surveying trip, reported local sources coming across the border. The team arrived on 19 September and spent about three hours at Zong-arng, the 975-ft high chute with a probable generating capacity of 60MW, before returning to Taunggyi. During their three day visit, the Japanese team inspected the western part of Zong-arng, 14 miles south of Tonhoong, the sub-township seat. The visit followed the abandonment of the project by Chinese engineers in December 2001 after 62 people including 19 Chinese, 21 Burmese employees and 22 Burmese soldiers died under mysterious circumstances within a span of one month.

GENERATOR FIRED BY PHYSIC NUT OIL SUPPLYING POWER IN WAMMAISON VILLAGE

May May Ni, NLM, 28/09/08. <http://www.burmalibrary.org/docs6/NLM2008-09-28.pdf>

Wammaison Village in Laikha township, Shan State South, is one of the villages under the development programs of the government. The main business of the village is agriculture and livestock breeding. Local people grow paddy, maize, groundnut, soya-bean and garlic. Due to the use of fertilizers and weeding work, paddy yields in the village area are 105 baskets of paddy per acre and farmers are able to store paddy for their own consumption. 40,000 acres of paddy are grown in Laikha township which has a rice sufficiency rate of 269pc. Wammaison villagers have also planted orange and mango trees such as orange. The people are conserving fuel-wood plantations and reserve forests for greening the region.

There are 115 houses in the village which has a primary school and a self-reliant library. Potable water is available from the village-owned tube-well. Earth lanes have been built connecting the houses in the village.

Thriving physic nut plantations can also be witnessed in Wanmaison. On 12 September 2008 a ceremony was held to launch a village-owned generator fired by physic nut oil. On the occasion, Laiikha Township Electrical Engineer Myo Min Hlaing explained matters related to the construction and installation of the generator. At present the generator is supplying power to the whole village. As a result, local people can enjoy the TV programs at home.

Compiler's Note: This is an abridged version of the original article. A photo in the print edition of NLM shows people of the village celebrating the opening of their power plant.

Website reference

<http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>
Information presented by the Energy Planning Dept of the Myanmar Ministry of Energy at the second subregional energy forum in Ho Chi Minh city on 22/11/08 indicates that the Dept of Alternative Energy Development and Efficiency (DEDE) of the Ministry of Energy (MOE) of Thailand is sponsoring a community-based bio-diesel demonstration project in Myanmar.

Additional references

See below: 'Use of [bio-diesel fuel](#) for rural electrification to get attention' (NLM: 28/09/08)

NLM, 06/10/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nml/n081006.htm>

PM Thein Sein visits the factory of Tawwin Industrial Co Ltd in Mandalay where he looks over samples of physic nut oil produced by the physic nut mill made by the company. The Prime Minister speaks about arrangements for production of quality machines, constant study and innovation in order to produce high quality machines.

NLM, 31/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-31.pdf>

At the bio-diesel plant of the Eastern Command in Taunggyi, Maj-Gen Min Aung Hlaing of the MoD and Chairman of Shan State Commander Brig-Gen Ya Pyae view the generating of electricity with the use of two-way gasifier and production of physic nut oil.

NLM, 18/05/07. <http://burmalibrary.org/docs2/NLM2007-05-18.pdf>

The Taw Win Industrial Co Ltd is making the MR 072 brand oil mill at its foundry and machine shop at the corner of 51st Street and Pho Yarzar Road in the No 2 Industrial Zone in Pyigyidagun township in Mandalay. On a visit to the plant, Central Commander Khin Zaw said the Head of State had encouraged entrepreneurs to take innovative measures to produce high quality machines to extract physic nut oil and that MR 072 brand machine was a result of this initiative. The commander said that it was necessary to readdress weak points in the production of bio-diesel at the laboratory stage. In addition, preparations were to be made to produce larger machines. The MR 072 machine can mill two or 2.25 baskets of physic nut seeds per hour and can produce physic nut oil from the seeds.

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[NATCHAUNG MODEL VILLAGE WELL SUPPLIED WITH ELECTRIC POWER](#)

NLM, 15/09/08. <http://www.burmalibrary.org/docs6/NLM2008-09-15.pdf>

Natchaung (23° 00' N, 94° 02' E), the largest village in Kalay township of Sagaing Division, is home to 5,250 people. It is located at the foot of the Chin Hills, 15 miles south of Kalay. The village was first established with 21 houses in 1258 Myanmar Era [CE 1896] by village head U Yan Naing. After 100 years in 1358 ME [1996] the number of houses at the village reached 1,110. In 2008, there are 1,225 houses.

The distance between Natchaung and Falam of Chin State by road is 54.5 miles and 82.5 miles by road from Gangaw in Magwe division. A 15-mile-long tarred road connects Natchaung with Kalay. The village is located on the Kalay - Gangaw railroad line and daily train service is provided between Natchaung and the two cities as well as Hanthawady and Mwele. In addition, three-wheeler taxis and buses run along the Kalay-Natchaung road. The Kalay-Natchaung-Gangaw road can be used all the year round. Even in the rainy season, local people of Natchaung can use express buses to travel along the Kalay-Mandalay-Monywa road. Apart from these transport services, the people can travel to Gangaw and Kalay from Natchaung by motorized boat along the Myittha River.

In the past, Natchaung Village lagged behind in development but in 2008, it was upgraded to the status of model village. A Basic Education High School Branch located in the village and three boarding schools have produced many students who passed the matriculation examinations and degreeholders yearly. Six staff members provide health care services at the 16-bed station hospital in the village. Over K 2 million have been donated to the medical trust fund of the hospital. There is also a fire brigade and watch tower. The post office serves as the communication centre of Natchaung. A self-reliant telephone station has three autotelephones installed and over 200 hand-carrier telephones not only for the local calls but also for the overseas calls daily. Natchaung also has a library, youth centre, park and playground. To ensure availability of potable water, there are 344 wells including tube-wells and artesian wells. Fly-proof latrines have been built in Natchaung.

At present, local people get electricity generated by one government-owned 12-KVA generator, three privately-owned hydropower turbines, nine privately-run diesel generators and one 200 KVA paddy husk fired power generator. At night, all the houses and streets in the village are illuminated.

With regard to the agriculture sector, a total of 3,832 acres of farmlands are put under monsoon paddy, monsoon sesame, pigeon pea, lentil, groundnut, sunflower, corn and maize. In addition, over 50 acres of physic nut plantations are being nurtured for producing bio-fuel. In the time of the State Peace and Development Council, remarkable progress can be seen day after day in Natchaung Model Village in southern part of Kalay Township that is home to local farmers.

Out of 1,683 acres of farmlands, 428 acres of farmlands to the south of the village are supplied with water from Panmun Creek, 68 acres of farmlands are also supplied with water from Chaungchawk Creek and 1,195 acres are in the irrigated area of private dams. The residents are engaged in cultivation of lentil, groundnut, sunflower, sesame, maize, pumpkin and cucumber plantations on both banks of Myittha River, east of the village. Every day, seasonal crops are available at Natchaung rural market that includes four buildings accommodating 140 shops. Even shopkeepers and customers from Kalay can be seen at the said market.

Additional references:

NLM, 14/06/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040614.htm>

PM Khin Nyunt and party arrived Kalay Industrial Zone where they heard reports on the assembly of automobiles and the manufacture of hydro electric turbines and agricultural equipment by U Aung Min, V-C of the zone supervisory committee.

See below: 'Rice husk [gasifiers to spur rural electrification](#)' (MT: 21/07/08)
'[Interest growing](#) in rice-husk generation' (MT: 10/07/06)

FACILITIES AND SERVICES OF THE YANGON ELECTRICITY SUPPLY BOARD

Kayan Soe Myint, NLM, 31/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-31.pdf>

Yangon Electricity Supply Board (YESB) was formed on 1 April 2006. Executive responsibility is exercised by its chairman, secretary, a joint-secretary and four heads of department including management, finance, supply and engineering. The Board is responsible for providing power to the households in Yangon division, as well as to industrial zones, municipal waterworks, CNG lines and fuel stations, state-owned factories, lamp-posts and traffic lights and religious buildings.

YESB keeps under its control five 230/66/33-kV [sub] power stations, nineteen 66/33/11 kV [sub] power stations, two hundred, sixty-three 33/11/6.6 kV [sub] power stations and 6,126 11/6.6/ 0.4 kV [sub] power stations. There are also 61.03 miles of 66-kV overhead power lines, 3,204 miles of 33-kV line, 682 miles of 11-kV lines, 394 miles of 6.6 kV lines and 2,359 miles of 0.4 kV lines under control of the YESB. Moreover there are underground power cables: 22 miles of 66-kV lines, 433 miles of 33-kV lines, 120 miles of 11-kV lines, 312 miles of 6.6-kV lines and 162 miles of 0.4-kV lines.

Due to growing power consumption in Yangon division, the YESB has built five additional 66/33/11-kV (sub) power stations, including those at MRTV-3, Tawwin, Waibagi, Shwepaukkan and Dagon Myothit (North). It has also installed 66-kV power lines and four transformers at Patheingyi, Parami Bailey, Kyaikkasan and Hlawga, and one 230/66-kV transformer and seven 66-kV power lines at Hsinmaleik-MRTV-3, Thakayta, Thakayta-Patheingyi, Dagon (East)-Shwepaukkan, Dagon (East)-Waibagi, Dagon (East)-Industrial Zone and Kyaikwaing-Seinpanmyaing.

The YESB supplies electricity to 4,388 factories in 14 industrial zones in Yangon Division. Of these 136 are factories belonging to various ministries including 86 factories of the Ministry of Industry-1, as well as 35 embassies and organizations, 36 CNG filling stations, 42 waterworks stations, 47 hospitals including military hospitals, 134 traffic lights, lamp-post lights and 747,600 houses. The board has also installed paddy husk-fired power generators in Kamamat Village in Kayan township and Thawuntaung Village in Twantay township.

The YESB purchases power from natural gas turbines under the EPM No 2 and from hydropower plants under the EPM No 1 at fixed prices. The Power Control Division of Myanmar Electric Power Enterprise under the Ministry of Electric Power No. 2 is responsible for stabilizing the power supply functions through the line and carrier-PLC system.

In an interview YESB Secretary Maung Maung Latt explained that power consumers are being provided with electric meters at a price of K 57,000 per home. These meters have capacities of 10, 20 and 30 kilowatts. Industrial-use power meters can be installed at designated places in a single day under supervision of the township electrical engineers.

Compiler's Note: This is an abridged version of the original article. A photo accompanying the article in the print edition of NLM shows technicians of the Power Control Division of MEPE discharging duties in front of control panels at a central station in Yangon.

Additional references:

See below: 'YESB: Five billion kyat spent on power [line repair in Yangon](#)' (MT: 16/06/08)
 'Industrial zones recovering from cyclone' (MT: 26/05/08)
 'Myanmar's [biggest city still paralyzed](#) five days after cyclone' (New York Times: 08/05/08)
 'Yangon electricity supplies get boost from [YESB plan](#)' (MT: 24/07/06)
 'Ministry of Electric Power [re-organized](#)' (NLM: 16/05/06)
 'Yangon City Electric Power [Supply Board Law enacted](#)' (NLM: 23/11/05)

[KENGKHAM MULTI-PURPOSE DAM TO HELP 'GREEN' THE MEIKTILA PLAIN](#)

Article & Photos by Khin Maung Than (Sethmu), NLM, 07/08/08. [edited and re-written]

<http://www.burmalibrary.org/docs5/NLM2008-08-07.pdf>

I was able to visit the site of a multipurpose dam which is under construction on Namet creek near Kengkham village in Yaksaw [Lawksaw] township. Accompanied by Staff Officer Tin Aung Myat of Construction Group 7 of the ID, I drove north along the road [between Lawksaw and Indaw] to MP 18 where we turned off to the east. Crossing the Zawgyi river, we went along the Kengkham road until we reached the construction site of the dam on Namet creek. Actually, the construction site is 42 miles from Yaksaw.

Namet creek rises in Hopong township and flows north to the Dokhtawady [Myitnge] river. Plans call for the Kengkham dam to supply water to the Zawgyi dam through Nammelyan creek which is in the Zawgyi watershed. Thanks to the water available from the Kengkham dam, the Zawgyi dam hydropower plant will be able to increase its generating capacity from 6 to 12 megawatts. It will also mean that the Zawgyi dam will be able to supply more water to the the Myogyi dam, presently under construction farther down the Zawgyi in Ywangan township. Together the reservoirs of the Zawgyi and the Myogyi dams will make it possible to divert 990,000 acre-feet of water for the "greening" of the Meiktila plain.

The Kengkham dam will be located about 14 miles from the Zawgyi dam. The project was started in 2005-2006 and it is estimated it will be completed during the 2009-2010 financial year. At present, earthwork is being carried out at the site of the embankment. In addition, land preparations are being made for construction of the spillway and the canals and arrangements are being made for timely completion of the conduit and buildings for the hydropower plant. Two generators of 3-MW each will be installed which are expected to produce about 30 million kilowatt hours yearly. Kengkham dam will provide water for crop irrigation in the Kengkham area. [Photos of bulldozers carrying out land preparations for the dam accompany the article in the print edition of NLM. The article was originally published in Burmese in Kyemon on 05/08/08.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-09: Mandalay Kengkham dam would appear to be located north of Kengkham village [21° 28' N, 97° 10' E], possibly in grid square reference: 13\1, 26\6. Note Milyang [=Nammelyam] creek to the west. Nampar creek is probably 'Nampao' creek shown on the map running through the cluster of villages around Kengkham. If this is the case, then the dam on this creek would not be below but *above* the Kengkham dam.
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-9.jpg>

Additional references

Data summary [Kengkham](#)

See below: 'Myogyi multi-purpose dam to harness waters of the Zawgyi' (NLM: 25/12/06);
 'Zawgyi no 2 hydropower station launched' (NLM: 17/03/00)

NLM, 01/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-01.pdf>
 Kengkham dam will provide water to Zawgyi dam through a 14-mile long canal.

NLM, 17/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-17.pdf>
 During a visit to the Kengkham dam site, General Maung Aye calls for completion of the project on schedule. This means that it will be necessary to 'get rid' of the trees and woodlands in the basin area on time, he says. General Maung Aye also asks about a dam to be constructed on Nampar creek, downstream [upstream?] from the Kengkham dam. A&I Minister Htay Oo tells him that a dam on Nampar creek will be completed ahead of the Kengkham dam project. It will be able to irrigate some 1000 acres of farmlands. It will also supply water to the Zawgyi dam and will include a small-scale hydropower plant. General Maung Aye calls for the Nampar project to be launched as soon as possible. Development of the area including Kengkham village should be expedited, he says. [A photo of a power shovel and dump trucks in operation at the dam site are included with the news item in the print edition of NLM.]

NLM, 29/04/08. <http://www.myanmargeneva.org/08nlm/n080429.htm>
 Gen Maung Aye and party inspect construction activity by Group 7 of the ID at the site of the Kyaingkham (Kengkham) multi-purpose dam. They are briefed by A&I Min Htay Oo who reports on the prospects for generating hydro power at the dam and by Forestry Minister Thein Aung who reports on the condition of forests in the area. The dam is being constructed on Nant-at creek near Kyaingkham village [21° 28' N, 97° 10' E] in Yaksawk township. It will supply up to 990,000 acre-feet of water to the already completed Zawgyi dam and [through it] to the Myogyi Dam which is under construction in Ywangan township. The Kyaingkham Dam will have a water storage capacity of 345,350 acre-feet and is expected to generate six megawatts of electricity.

NLM, 19/08/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nln/n050819.htm>

On a visit to the Zawgyi (Myogyi) dam project site near Myogyi village in Ywangan township, PM Soe Win is informed about preliminary engineering tasks for the implementation of Kengkham dam project. The Kengkham dam on Nan-et Creek in Yaksawk township will supply water to dams in the Zawgyi watershed that will result in the greening of the Meiktila Plain.

HOMEMADE LIGHTING SYSTEM FOR NOODLE VENDOR

Juliet Shwe Gaung, Energy Supplement, Myanmar Times, 21/07/08.

<http://www.mmtimes.com/feature/energy08/eng008.htm>

The room may not be brightly lit, but the noodle seller can do his work. He's saving the money he would otherwise spend on a generator or candles, and the technology he uses is as green as they come. Ko Pyone Cho, 35, owns and runs a small roadside noodle shop in Insein township, where he also lives. He is saving money by using biomass to power five light-emitting diode (LED) bulbs, instead of buying and burning candles. He has the right to tap into the diesel generator collectively owned by residents in his quarter, which would enable him to power a 4-foot-long fluorescent light, but resents that cost. Ko Pyone Cho doesn't see why he should pay the K2500 required, especially when the raw materials needed for his biomass light are readily available.

The secret to powering the five LEDs, modest though they are, is fascinating: It's a mixture of chemistry and backyard mechanics. And it works. The power is produced mixing together 2 viss each of cow dung and salt (1 viss equals 1.6 kilograms or 3.6 pounds). The mixture is then poured into five 1-litre plastic bottles with the tops cut off. He then sinks one old, but not yet dead, battery into each bottle and wires them all together, positive to negative. This 'battery' is then connected with the five LED bulbs, stuck into an old compact disc, which then immediately light up.

The main cost to Ko Pyone Cho in this procedure is the salt, which is normally about K300 a viss but has risen to K500. He must occasionally buy new LEDs, at K50 per bulb, and wiring. The batteries, water bottles and CD are items that he would normally throw away, but instead diverts to a good cause. Ko Pyone Cho says the lighting, which he judges quite sufficient for his purposes, will last for about six months even if used most evenings until midnight. "I usually have to sprinkle salt into the mixture once every 10 days. It's a kind of maintenance to enhance the energy. If I don't continue sprinkling, it doesn't light up as much as it should," said Ko Pyone Cho.

Ko Pyone Cho says the unusual device provides light to his noodle stall and saves him money that he would normally have to spend on candles. "I started using it as a substitute for candles, which normally cost about K500 for a packet of six. I view this as an unnecessary cost," he said. The price of candles has now stabilised after rising sharply in the wake of Cyclone Nargis.

Ko Pyone Cho, who lives with his mother, says the lighting is sufficient for the two of them. Though it is not strong enough to read by, it is safer, cheaper and, he feels, more pleasing than candlelight. He learned about biomass technology in Twante township, a rural part of the Ayeyarwady Division, where it is widely used. "The biomass lighting really helps me prepare noodles for the next day from 6 to around 9pm, and the next morning from 4am until sunrise" said Ko Pyone Cho, who sells around seven viss of noodles on weekdays and 10 viss on Saturdays. A noodle seller for 20 years, he estimates that biomass lighting saves him about K200 a day.

The idea to use biomass came after a visit to his relatives in Aut Su village in Patheingyi town, where he studied the fixing procedure and demonstrated it back in his house. He said that fishery sectors, biomass is used more seriously for a wider variety of purposes. "Even within our quarter, there is only one person who uses biomass. Maybe most people don't know the procedure. But the light is so satisfying I think it's worth the little extra effort involved in preparing the mixture" said Ko Pyone Cho.

[Photo of Pyone Cho enjoying tea beside the ingenious LED lighting system in his shack in Insein township.]

Additional references

See below ['Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)
['Private operators](#) meet consumer need for alternative power service' (MT: 03/02/02)

RICE HUSK [GASIFIERS TO SPUR RURAL ELECTRIFICATION](#)

Than Htike Oo, Energy Supplement, Myanmar Times, 21/07/08.

<http://www.mmtimes.com/feature/energy08/eng007.htm>

Rice husk power plants should play a larger role in the development of rural areas in Myanmar and can at the same time reduce greenhouse gas emissions, according to industry experts. "As our country is an agricultural country, we have an abundance of rice husks. If we can use them in producing electricity, it will be very fruitful for the country," said U Zar Ni Aung, managing director of Hein Engineering, which produces rice husk gasifiers. "The technology is not new but it became more widely available about 10 years ago as world oil prices began to increase," he said.

Rice husk power plants have the potential to reduce Myanmar's dependence on oil – at least to some degree – but U Zar Ni Aung said their major selling point was the possibility of getting electricity supply into rural areas and foster development. "We need to increase the use of the technology so that more people have the opportunity to take advantage of it. While the initial cost is a little bit expensive, if a person or organisation invests in providing the village with electricity, it will be very beneficial for both sides," U Zar Ni Aung said, adding that 50-kW gasifier cost about K6 million and a 150-kW gasifier approximately K12 million.

In 2007, a 50-kW rice husk gasifier was installed in Tagoondaing Village in Yangon Division, with some help from Thailand. The gasifier now provides electricity for 304 houses in two villages, Tagoondaing and Alesu. The village electricity supply board charges a monthly fee of K1500 to power a fluorescent lamp, K1500 for a black and white TV and K2000 for a colour TV. The money is used for the maintenance of the gasifier and to hire the gasifier operator.

Villagers in Tagoondaing said that they believed the new electricity supply would speed up development in the region. U San Oo, 45, said: "I am very happy to get electricity in our village, particularly for lighting. Now children in the village can study their school lessons late at night and we are safe when we come back from our farms because the streets are lit up."

But rice husk gasifiers are used not only to provide domestic electricity in Myanmar's rural areas but also in the country's small rural industries. "We generally use rice husk gasifiers for village electrification but now some rice mills and ice factories have begun to use them," said Col Thoungh Win, chairman of Yangon Division Renewable Energy R&D Committee.

He agreed with U Zar Ni Aung that rice husk gasifiers should be more widely used, saying the power plants were more economical and environmentally-friendly than using diesel or petrol generators. "According to our research, the energy efficiency of rice husk gasifiers is far better than diesel engines. The energy produced from four baskets of rice husks is equal to the energy produced from one gallon of diesel," he said. "One basket of rice husk is K150. One gallon of diesel is around K5500. Therefore the cost is eight times less using rice husks than diesel," he said. Rice husk gasifiers also produces less carbon dioxide – the main greenhouse gas that causes global warming and climate change – than diesel engines. [Photo of a rice husk gasifier in Twante.]

Website information:

<http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>

Information presented by the Energy Planning Dept of the Myanmar Ministry of Energy at the Second subregional energy forum in Ho Chi Minh city on 22/11/08 indicates that the installed electrification capacity of renewable energy sources at the end of 2008 was as follows: Solar power: 0.1157 MW, Wind power: 0.5194 MW, Mini hydro power: 8.3530 MW, Bio-mass power: 18.1942 MW; Biogas power 1.5993 MW.

Additional references

See above: '[Natchaung model village](#) well supplied with electric power' (NLM: 15/09/08)

See below: 'Village rice husk power plant will serve as [research centre](#)' (MT: 24/09/07)
 'Plans for [\\$7-million-dollar](#) rice husk power plant edge forward' (MT: 27/08/07)
 '[Inventor co-op](#) society exports first rice-husk generators' (MT: 21/08/06)
 '[Interest growing](#) in rice-husk generation' (MT: 10/07/06)
 'Paddy husk power plant tested to cut rice [milling costs](#)' (MT: 19/12/05)
 '[Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)
 'Biomass gasifier used for [tobacco curing](#) in Myingyan' (TERI: 08/04)

Than Htike Oo, Myanmar Times, 14/01/08. <http://www.mmtimes.com/no401/n013.htm>

The villages of Tagoondaing and Alesu, about 8 kms south of Twante in Yangon Division, began receiving electricity last month supplied by a rice husk power plant, said U San Thaung, a member of the village electricity supply committee. The power plant, which is fuelled by burning rice husks, was installed in Tagoondaing late last year with financial support from the government of Thailand and technical support from Chiang Mai University. "The gasifier engine generator is run by rice husks and can produce 50 kilowatts. We're supplying electricity to 304 homes in Tagoondaing and Alesu," Dr Chatchawan Chaichana from Chiang Mai University said last month. "This is the first time in my life that I've had electricity," said 45-year-old Tagoondaing resident U San Oo. "I'm very happy and grateful to those who were involved in the project. We get electricity from 6pm to 11pm. Now that the roads are lit it is easier to come back from our farms at night. We feel safer from dangers like snake bites when we walk around after dark," he said, adding that schoolchildren have also benefited by being able to read and study later at night.

Before the completion of the power plant villagers had to rely on batteries, candles and kerosene lamps for light. U San Thaung said the village electricity supply committee will collect K1500 a month from households using a fluorescent lamp, K1500 for a black and white television and K2000 for a colour TV. "We have expenses to operate and maintain the generator including buying diesel and providing salaries for four engineers. Right now we're getting rice husks for free from three rice mills in the area but later we'll need to buy more from other rice mills," he said. "The price will decrease if more houses use the electricity. We are planning to provide electricity to Innmagyi and Sarphyusu villages, which are not far from Tagoondaing," he said. [A photo accompanying the article gives a partial view of the gasifier.]

NATIONAL HYDROPOWER PROJECT SCHEDULE UPDATED

Juliet Shwe Gaung, Energy Supplement, Myanmar Times, 21/07/08.

<http://www.mmtimes.com/feature/energy08/eng005.htm>

Hydropower projects are widely considered to be a path of sustainable economic development while meeting the demands of electricity. The Myanmar government has set a target to meet all its power demands through hydropower. Accordingly, a number of small, medium- and large-size hydropower projects have been completed, are being constructed or are in planning. The first of six "five year plans" was introduced in 2001 with the aim of meeting both local electricity demand and export electricity to neighbouring countries.

Joint-venture hydropower projects are attractive because not only do they earn foreign exchange revenue annually over the concession period but also increase local power capacity. All the joint-venture agreements entitle Myanmar to 10-15pc of annual electricity generation from the power stations free of charge.

Sixteen hydropower projects are planned as part of the second five-year stage (2006-2010). Five of these were completed by 2007, with the remaining 11 projects still under construction. EPM No 1 figures show that 10 hydropower projects with capacities ranging from 30 to 790 megawatts (MW) are expected to be completed in the next three years.

The total capacity of hydropower projects in Myanmar is currently about 1457MW, while an additional 245MW will be available by the end of 2008 when four more hydropower projects come online. Figures show that Myanmar will get an additional 1103MW in 2009 and 340MW in 2010. The four hydropower projects that are expected to finish by the end of 2008 are Kun (60MW), Phyu (40MW), Shwekyin (75MW) and Kyee-on Kyee-wa (70MW). By the beginning of 2010, five more hydropower projects are expected to be completed, including Yeywa (790MW), Thahtay (102 MW), Upper Paunglaung (140MW), Buywa (41MW) and Myo Gyi (30MW). In 2010 the Manipur project will come online, improving the nation's electricity capacity by 340MW.

In addition to the implemented projects, the government plans to build 11 additional medium and large hydropower projects, some of which will be used to export electricity to neighbouring countries. The 11 hydropower projects will generate 3120MW and will be completed between 2011 and 2015.

According to estimates made by the World Bank in 1995, Myanmar possesses theoretical power potential of 108,000MW. The ministry has so far identified and surveyed 266 potential hydropower sites in 12 states and divisions with an estimated output of 39,720MW. As Myanmar does not possess the capabilities to exploit all the identified hydropower resources, the government has signed joint-venture agreements with neighbouring countries like Thailand, China and Bangladesh for the harnessing and exporting of hydroelectricity.

In July 1997, a Memorandum of Understanding (MOU) was signed between Thailand and Myanmar for the purchase of 1500MW of electricity from Myanmar by 2010. In May 2005, another MOU was signed for the development of hydropower projects in Thanlwin and the Tanintharyi River basin. Agreements were also signed with the Chinese State Power Corporation to develop two hydropower stations located near the China-Myanmar border. Apart from China and Thailand, Myanmar and Bangladesh signed an MOU in July 2007 to build hydropower projects in Rakhine State and subsequently export electricity to Bangladesh.

[Compiler's note: The article above is mostly a rehash of information available from previous editions of the Myanmar Times and other national publications. It omits any mention of the Kengtawng Falls hydropower project which is expected to come on-line in 2008. It wrongly states that the current capacity of hydropower is 1457 MW. The twelve medium and large hydropower plants operated by the state-owned utility have a capacity of about 767 MW. Isolated smaller hydropower stations have a capacity of approximately 25 MW. Many of the hydropower stations large and small operate at less than maximum levels during the dry season from December to May. Rather surprisingly, the article fails to mention Indian interest in developing the large Htamanthi hydropower facility on the Chindwin and recent contracts to Indian companies for the Thahtay dam and hydropower plant in Arakan state.]

Additional references

See below: 'Completion of hydropower plants assigned [highest priority](#)' (MT: 12/02/07)
 'Government will [prioritize hydropower](#) projects over gas' (MT: 10/07/06)
 'Generation facilities scheduled for [commissioning in 2002-2004](#)' (MT 07/01/02)
 'More inputs needed to power a [hydro future](#)' (MT: 04/06/01)

 Kyaw Ye Min, NLM, 20/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-20.pdf>

In 1988, there were 14 hydropower plants, two of which could generate more than 10 megawatts each: Baluchaung 2 (Lawpita) and Kinda. Since then, 36 more hydropower plants have been constructed, including 13 large ones. Currently, Myanmar has 50 hydropower plants of which 15 are large facilities: Baluchaung 1 & 2, Kinda, Hsedawgyi, Zawgyi 1 & 2, Zaungtu, Thaphanseik, Monchaung, Paunglaung, Yenwe, Khabaung, Shweli 1, Kengtawng and Tikyit (sic). Work is ongoing on 23 other hydropower projects that will meet the increasing domestic demand for electricity. Six of them — Uppper Paunglaung, Nancho, Yeywa, Kunchaung, Pyuchaung and Shwekyin hydropower projects are due to be completed in 2009-2010. Two others will be completed in 2010-2011: Thaukyaykhat 2 and An. Thahtay hydropower project is to be finished in 2011-12; and Upper Kengtawng hydropower project by 2012-2013. By then, Myanmar's electric

power supply [capacity] will hit 2999.5 MW. That will exceed the demand and no region of the nation will face shortage of electricity.

Currently, thirteen hydropower projects, namely, Shweli 2, Htamanthi, Tahsan [Tasang], Hatkyi [Hutgyi], Chibwe, Chibwenge, Tapein 1 & 2, Upper Thanlwin, Taninthayi, Baluchaung 3 and Sai Tin are being implemented jointly with foreign investors. Upon completion, these projects will be able to produce over 21,000 MW. megawatts. Thirteen hydropower projects which will be able generate 11,850 MW will be implemented in the near future. Some are to be undertaken by related ministries, while other will be undertaken as joint ventures (JV) or under the system known as 'Build, Operate and Transfer (BOT). Therefore, local electric power demand will be fulfilled soon, and the surplus will be exported to neighbouring countries. In reality, those projects are very heartening.

Compiler's note: Several dam construction projects west of the Irrawaddy that are well underway have been omitted from the lists in this article, including the Kyee-ohn Kyee-wa and Myittha projects in Magwe division and the Manipura project in Sagaing division. This is probably because work on these and others not mentioned here is being carried out by the Dept of Irrigation of the A&I Ministry, whereas the writer appears to have used sources in the two electric power ministries for the information he presents. The Tikiyt power station depends on coal and not hydropower to generate electricity, as the writer claims. Besides the updated schedule for the completion of several of the projects mentioned, it is to be noted that mention is made for the first time that the Balunchaung 3 ([B3](#)) and Sai Tin (Saingdin) ([SD](#)) projects are being undertaken with the collaboration of *foreign investors*.

NLM, 29/11/08. <http://www.burmalibrary.org/docs6/NLM2008-11-29.pdf>

Excerpt from an keynote address delivered on 29/11/08 by General Than Shwe to the Annual General Meeting of the USDA, the mass organization patronized by Myanmar's military government: "As for the electricity sector, there was only 228 megawatts in the past. But there have now been 977 megawatts thanks to the Yenwe, Shweli and Kengtawng hydropower plants. Efforts are being made to complete 14 projects as soon as possible in order to produce more than 10000 megawatts of electricity. For fulfilling the electricity need of the people, national grids are being built."

NLM, 19/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-19.pdf>

Thanks to the implementation of hydel power projects which underpin the development of the country, the amount of power output has increased from 200 megawatts to about 900 megawatts.

RESTORATION OF ELECTRIC POWER TO IRRAWADDY DELTA GIVEN PRIORITY

Hla Hla Htay, AFP, 01/07/08. http://news.yahoo.com/s/afp/20080702/wl_asia_afp/myanmarcyclonecapital

Two months after deadly Cyclone Nargis struck Myanmar, the military regime's new capital is suffering the economic ripple effects, as construction crews leave to rebuild devastated towns. The cyclone ripped across the Irrawaddy delta, 270 miles (435 km) south of Naypyidaw, wiping away entire villages and seriously damaging important trading towns, including Myanmar's main city Yangon. More than 138,000 people are dead or missing, while homes, roads, bridges and schools have been destroyed.

Before the storm, Naypyidaw was filled with construction crews as the military embarked on ambitious building projects for their new capital, which they call "the abode of kings." Now, many of the workers have left to take new jobs in the Irrawaddy -- a swampy region a world away from the scrubby highlands where they had been working. "The construction workers from Naypyidaw sites will work at tower foundations for electricity projects, as the Irrawaddy delta needs electricity first," said Moe Moe, a 32-year-old manager for a construction firm based in Yangon. "Later, the workers will also work on renovating schools and building projects," she told AFP. "Meanwhile, some construction is also continuing in Naypyidaw."

Naypyidaw was built in secret, known only through rumours until the military regime abruptly ordered the government to move here at the crack of dawn on November 7, 2005, a moment deemed auspicious by the generals' top astrologers. At the time, construction crews were everywhere. The city had no schools, no clinics, few phone lines -- not even a grocery store. In the years since, neatly organised hotels, apartment blocks, and government offices have sprung up. A new six-lane highway to link the country's main cities of Yangon and Mandalay is more than half finished. It will slash the travelling time to Naypyidaw, which lies roughly between the two.

Electricity here runs 24 hours a day -- an unthinkable luxury elsewhere in Myanmar -- and the generals have even opened a sprawling new zoo, although tourists are not allowed to visit the city. Construction workers have been the backbone of the rapidly evolving city. Now that many of them are in the delta, residents say business is sagging and the remaining building sites sit idle.

Compiler's note: Only the major towns in the lower delta area of the Irrawaddy most impacted by Cyclone Nargis have had public electric power service up to now. Public power supply in the township centres of Labutta, Bogalay and Mawlamyaing-gyun has been through isolated diesel-fuelled generators, available for one or two hours a day. Other township centres in the area impacted by the cyclone have been served through extended service from the main sub-station in the Yangon suburb of Hlaingthaya.

Additional references:

For a complete listing of articles on the impact of Cyclone Nargis, see: '[Impact of Cyclone Nargis](#) on Myanmar's electricity sector'.

NLM, 24/06/09. <http://www.burmalibrary.org/docs07/NLM2009-06-24.pdf>

At the 66-kV Power Station under construction near the 3rd Mile Housing Project in Labutta, Deputy Chief Engineer Thein Hlaing reports to the PM on the installation of cables to Myaungmya Power Station.

NLM, 06/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-06.pdf>

EPM No 2 Khin Maung Myint reports to the Special Projects Committee (SPIC) that among the ongoing grid projects being carried by the ministry are one to relocate the Hlinethaya- Athoke 230-kV (Gazindaw) lines across the Ayeyawady river and a grid project to install a 36.34-mile-long, 66-kV transmission line between Myaungmya and Labutta. The ongoing sub-power station projects include a project to install a 66-kV switch bay at the 66-kV Myaungmya subpower station and [to construct and equip] a 66/11-kV, 10-MVA subpower station at Labutta.

Washington Post, 06 /07/08.

http://www.washingtonpost.com/wp-dyn/content/article/2008/07/05/AR2008070501923_pf.html

Two months after a cyclone ravaged the fertile Irrawaddy Delta, in Burma's southwest, the bones of drowning victims still clutter the muddy banks of waterways. To reach the village [where we were headed in the Meinmahla-gyun forest reserve] required a seven-hour drive along a potholed, tire-shredding road from Rangoon to the rural hub of Bogalay, past four police checkpoints where documents were rigorously scanned. Against a backdrop of peaceful rice paddies, strange touches stood out: a patchwork of blue and red tarpaulins stretched across delicate palm-thatched huts; decapitated golden pagodas; and peaked iron roofs blown like dead leaves onto the roadside. From Bogalay, where electricity has barely crackled back to life, the journey continued aboard a motorized boat loaded with supplies. The riverbanks form a cemetery for cyclone victims whose bodies floated for weeks along the waterways and whose remains, at low tide, now whiten in the mud.

NLM, 02/07/08. <http://mission.itu.int/MISSIONS/Myanmar/08nlm/n080702.htm>

EPM No 2 Khin Maung Myint, Deputy Minister Win Myint and officials inspected the construction of the 230-kV (Hlinethaya-Athoke) tension tower (T-147) across the Ayeyawady River, the laying of bored pile, pile cap and pile cap footing near Kazindaw Village in Pantanaw township, the arrival of related materials and the construction of the tower by Golden Tri Star Co Ltd on 30 June. V-C Aung Than and MD Myo Naung of Golden Tri Star reported on progress of their company's work while officials the Dept of Water Resources and Improvement of River Systems reported on work undertaken by their [field units]. The minister gave

instructions on durability of the towers, systematic survey of waterway in the river, timely installation of the new towers and preventive measures against erosion and the rising tides in the Ayeyawady river.

NLM, 13/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-13.pdf>

When the [Myanmar] media group arrived at Mawlamyinegyun, . . . the urban area was being supplied with electricity by generator. Telephones were in use. It could be witnessed that some rice mills had resumed work as usual around areas of Mawlamyinegyun. [Translation of article from Myanmar Alin: 08/06/08];

NLM, 12/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-12.pdf>

The erection of lamp-posts and installation of electric power lines in Mawlamyinegyun township is being carried out by personnel of the EPM No 2. Ninety percent of the work has been completed. According to the [engineer] in charge of electric power in the township the power line across the Ma Hninzi river has been re-installed and the work of setting up poles is in progress. Electricity will be supplied soon, he said.

NLM, 11/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-11.pdf>

PM Thein Sein and party inspect the erection of lamp-posts [poles] and installation of 33-kV power lines along the Kawhmu-Kungyangon road. At the [MEPE] control camp EPM No 2 Khin Maung Myint reports on the installation of 33-kV power lines linking Kawhmu, Kungyangon and Dedaye townships. [The article in the print edition of NLM includes photos on page 8 of the positioning of the poles.]

NLM, 10/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-10.pdf>

Fallen trees have been cleared in Dedaye from religious buildings, offices, schools, the hospital and roads in Dedaye and 176 employees of MEPE have repaired the 33-kV cable linking Kungyangon and Dedaye. They have re-erected 20 pylons that connect the 11-kV cables between the two towns. 100-kV generators are being used to supply power to religious buildings, offices and hospitals.

NLM, 08/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-08.pdf>

EPM No 2 Khin Maung Myint and officials inspected repairs of damaged power lines and maintenance of power lines in Kawhmu township yesterday. The minister and party also inspected the repairs of power lines along Kawhmu-Kungyangon motor road and gave instructions to the officials. At the Township Electric Engineer's Office in Kungyangon, the minister inspected the 33/11-kV (2.5 MVA) and 300 kVA transformers office building and construction of new staff quarters and attended to their needs.

NLM, 30/05/08. <http://myanmargeneva.org/NLM2008/eng/5May/n080530.pdf>

Twelve concrete lamp-posts, an iron lamp-post and 130 wood lamp-posts fell down and 43 iron lamp-posts were bent over in Labutta during Cyclone Nargis. Due to the efforts of the township electric power supply board, a total of 100 lamp-posts — 44 new wood lamp-posts, 10 old lamp-posts, three old concrete lamp-posts and 43 old iron lamp-posts — have been set up in the town and electricity is being supplied to departmental offices, relief camps and street lights. Arrangements are under way to supply power to the town wards.

NLM, 18/05/08. <http://burmalibrary.org/docs4/NLM2008-05-18.pdf>

EPM No 2 Khin Maung Myint inspected production and distribution of lamp posts at the YESB [factory] in Hlinethaya Township on 16/05/08. While he was there, the minister looked into the production of a "steel fix and steel sieve" to be used in construction of the concrete lamp posts. From there, he went on to inspect the work of skilled technicians erecting pylons and the installation of 33-kV, double circuit power lines linking the [main] sub-power station and the IZs along the Hlinethaya-Nyaungdon motorway. In the afternoon, the minister and Deputy Minister Win Myint oversaw the installation of power lines, connections and the supply of power at the district electrical engineer's office in Ma-ubin.

NLM, 17/05/08. <http://burmalibrary.org/docs4/NLM2008-05-17.pdf>

EPM No 2 Khin Maung Myint inspected the repair of 33-kV pylons along the Hlinethaya-Nyaungdon power line. 16 of the pylons were damaged by Cyclone Nargis at the beginning of May. Arrangements are being made to supply power to Nyaungdon and Ma-ubin townships in Ayeyawady Division on 14 May. The minister also looked into reconstruction of pylons used to supply power from the [main] Hlinethaya subpower station to Shwelinban IZ and sub-power stations No 1 and 2, as well as the installation of power lines and

repair works. [Article in the print edition of NLM is accompanied by a photo of the interior of the [main] sub-power station in Hlinethaya.

NLM, 10/05/08. <http://burmalibrary.org/docs4/NLM2008-05-10.pdf>

On 7 May, EPM No 2 Khin Maung Myint inspected the supply of power at Hlinethaya 100-MVA main power station and the rebuilding of No 31 pylon of the Hlinethaya - Athok 230-kV national grid. The minister also supervised preparations for re-erecting of pylons along the Yangon-Hlinethaya road.

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YESB: FIVE BILLION KYAT SPENT ON POWER LINE REPAIR IN YANGON

Myo Myo, Myanmar Times, 16/06/08. <http://www.mmimes.com/no423/n002.htm>

The Yangon City Electricity Supply Board (YESB) has nearly finished repairing power lines destroyed by cyclone Nargis, at a total cost of Ks 5 billion, said an official from the Ministry of Electric Power No 2. "We started installing new power lines to provide electricity in Yangon from May 3. Now about 92 percent of the city is receiving electricity and we are trying to reach 100pc," said U Maung Maung Latt, the secretary of YESB under the ministry.

A total of 8966 lamp posts, 8642 bulbs and 217,170 feet of electricity cable were damaged by the cyclone. "We repaired the power lines, and the other materials we needed, especially lamp posts, were brought in from other divisions and states, like Mandalay, Bago, Sagaing, Nay Pyi Taw and Aye Thar Yar in Shan State, where the factories are located," U Maung Maung Latt said. "The damage in Yangon was worst in the eastern and southern districts, where most of the lamp posts were down. In the eastern district the level of supply is now 96.22pc, the western district has 100pc, the southern 76.6pc and the northern district 94.85pc," U Maung Maung Latt said.

He added that some areas of Yangon that were only getting six or 12 hours of electricity a day are now getting 24-hour supplies. "Before the cyclone, Yangon Division was getting a supply of 270MW of power a day, mostly from natural gas supplied by Myanma Oil and Gas Enterprise. But now we're getting 533 MW daily so we can provide 24-hour electricity," he said.

Daw Aye Aye Myint, a housewife who lives in North Okkalapa township, said she was very happy with the increase in electricity supplies. "Before the cyclone, we alternated between six and 12 hours of electricity a day. We often had to cook meals using wood and charcoal, which added to our expenses. But now we have electricity all the time," she said.

U Nay Zaw, a shopkeeper from Hlaing Tharyar township, also said he was pleased about the increase in electricity supplies. "We used to have limited power but now we have electricity almost all the time, except for occasion brief blackouts. We're praying that our power supplies stay consistent," he said.

Additional references:

For a complete listing of articles on the impact of Cyclone Nargis, see: '[Impact of Cyclone Nargis](#) on Myanmar's electricity sector'.

Agreement signed during visit of General Than Shwe to India, 29/07/10.

<http://www.burmanet.org/news/2010/07/29/mea-government-of-india-joint-statement-during-the-visit-of-chairman-state-peace-and-development-council-of-myanmar/>

Official assistance from India included the supply of 16 electricity transformers and 20 biomass gasifiers.

NLM, 17/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-17.pdf>

EGAT under the Ministry of Energy of Thailand and its partner company Ratchaburi Electricity Generating Holding Public Co Ltd donated 1,800 sets of lamp-posts worth B6.5 million for rehabilitation in storm-hit areas. Governor of EGAT Sornbut Sarntijaree explained the purpose of the donation. Among those accepting

the donation at the Sedona Hotel was the Chairman Khin Maung Soe of the Yangon City Electricity Supply Board.

NLM, 02/07/08. <http://mission.itu.int/MISSIONS/Myanmar/08nlm/n080702.htm>

When Lt-Gen Myint Swe of the MoD visited Kamanat main subpower station of MEPE in Bago on 01/07/08, he was welcomed by EPM No 2 Khin Maung Myint, D-G Tin Aung of the EPSE, Ch of YEPSB Khin Maung Soe and officials. Lt-Gen Myint Swe was briefed on the erection of concrete towers along the 61-mi-long, 230-kV Kamanat -Thanlyin main power line project and the 40-mile-long, 230-kV Kamanat – Myaungtaga power line. Pointing out that these lines were required to supply the electric power demand in Yangon, he called for speedy completion of the tasks in building them. This was necessary, he said, so that more power could be supplied to the industrial zones including Myaungtaga IZ.

NLM, 22/06/08. <http://myanmargeneva.org/NLM2008/eng/6June/n080622.pdf>

The Korea International Cooperation Agency (KOICA) and the Korean Electric Power Corporation (KEPCO) donated electrical wire 60-mm² cables to be used in the repair and reconstruction of power lines which were damaged by Cyclone Nargis to the Yangon City Electricity Supply Board.

PHARMA FACTORY NOMINATED FOR ENERGY AWARD

Htar Htar Khin, Myanmar Times, 16/06/08. <http://www.mmmtimes.com/no423/b006.htm>

Myanmar Engineering Society (MES) and the Ministry of Energy have chosen three entrants for ASEAN energy management awards, which will be handed out in August. Fame Pharmaceutical's factory in Hlaing Tharyar Industrial Zone (3) was nominated for the Energy Management in Buildings and Industries (factory) energy management award.

The building's chief engineer, U Naing Lin Aung, said the factory has been running since 1999 and employs 280 workers. However, despite the factory's 'established' status, several recent innovations encouraged the MES to choose it as an entrant. "In March 2007 we implemented a series of energy saving measures – including a strong reliance on recycling and the use of solar energy," he said. "To save energy, we're now using a 'natural sun drying room' that relies on solar power, a 'natural air drying room' that uses ambient heat from the building, and the recycling of waste materials through our 'forced fire block machine'," he said.

U Naing Lin Aung explained the solar-powered drying room as an example of the energy saving methods the factory employs. He said the room was built using an "all glass frame", which allows the room to reach 60 degrees Celsius. This heat is used to refine 250 litres of pharmaceutical extract in three days – a process that normally takes a 2000-watt oven five days. This, he said, saved the company 200 kilowatt hours every day. And he said that processing and pressing hot waste products into blocks allowed the company to reduce its reliance on charcoal. "The use of forced fire blocks allows us to reduce our methane gas emissions by 31 percent," he said.

With all three measures combined, U Naing Lin Aung said the factory's energy consumption had dropped by 24pc since they were introduced. "For the 2006 year our energy efficiency index was 11,600 kilojoules per kilogram. In 2007 we reduced that figure to 8790, meaning we've improved our efficiency by nearly one quarter. We're aiming to reduce that figure to 30pc by 2010," he added.

Additional references:

See below: [‘Solar power](#) seen as solution for remote villages’ (MT: 06/10/03)

MYANMAR TO BUILD FIRST [STORM-RESISTANT MODEL VILLAGE](#)

Bernama, 12/06/08. http://www.bernama.com/bernama/v3/news_lite.php?id=338911

Myanmar will build its first-ever storm-resistant model village in co-operation with international experts, said Xinhua news agency quoting a report in the leading local weekly Yangon Times. With the assistance of experts from Tokyo University of Japan using the technical know-how applied in cyclone-prone Bangladesh, Pakistan and India, and local regions of Myanmar, a cyclone-resistant model village will be constructed, the report said, quoting Myanmar Engineers' Association.

The first model village will be built in a suitable location in Yangon division, one of the two areas hardest hit by Cyclone Nargis at the beginning of May this year. It is targeted for completion by February 2010, the report said. The project will be under the joint co-ordination of Tokyo University and the Myanmar Engineers' Association.

The 40-house model village will comprise a storm shelter, a water distribution system using natural gravity, a solar-energy power supply system and cyclone-resistant apartments.

Additional references

For a complete listing of articles on the impact of Cyclone Nargis, see: '[Impact of Cyclone Nargis](#) on Myanmar's electricity sector'.

See above: 'PM calls for [bio-batteries](#) in every cyclone-hit household' (NLM: 07/04/09)
'Indian [solar lanterns](#) to light up Myanmar huts' (PTI: 07/02/09)

Cape Negrais Relief and Recovery Committee

http://www.spa-myanmar.com/index.php?option=com_content&view=article&id=13&Itemid=155

This report on a website maintained by Serge Pun & Associates (Myanmar) Ltd describes a project to rebuild the village of Auk Pyun in the Cape Negrais area of the Ayeyawaddy delta following its destruction by Cyclone Nargis in May 2008. Included in the project was the construction of 125 single family homes, installation of a solar system to power electric lights and water pumps, a village office, health clinic, market, jetty, primary school, and a storm shelter cum community centre. The solar power system was installed by United Engineers and won an award in the Off-Grid Category of the ASEAN Renewable Energy Projects Competition in 2010.

UN Relief Web, 02/05/09. <http://www.reliefweb.int/rw/rwb.nsf/db900SID/MYAI-7RP3GO?OpenDocument>

In a visit to the Ayeyarwady delta today, and in observance of the one-year remembrance of Cyclone Nargis, a high-level delegation representing the Tripartite Core Group (TCG) visited . . . Kunchaung in Kungyangon township, where the TCG brought contributions to provide electricity to the village.

NLM, 07/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-07.pdf>

A ceremony to open Myaingthaya village was held at the village in Kungyangon township. The cost of reconstructing the village that was totally destroyed by Cyclone Nargis was donated by Petronas Petroleum Co of Malaysia. Malaysian Ambassador Mazlan Bin Muhammad and Muhammad Zaini Muhammad Yunas, general manager of Petronas, cut a ribbon to open the ceremony and Abu Bakr, Myanmar manager of Petronas, handed over related documents to the chairman of the Kungyangon township council. Houses for 39 households were donated by Petronas. They were constructed by Asia World Co along with supply of electricity to every household in the village.

NLM, 06/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-06.pdf>

Prime Minister Thein Sein and party arrived by helicopter at Theikpan-gongyi village in Labutta township where they met with departmental officials and local people and explained the use of bio-batteries in combination with cow dung and salt to produce electricity for lighting their homes. The PM urged the people to grow coconut, areca palm and vegetables on a commercial scale and to undertake a system of integrated farming. Professor Saw Simon Tha reported in the Myanmar and Kayin languages on efforts to be made for development of the village based on the assistance provided by the State and called on the villagers to join hands with the government without regionalism and racism. CPT Minister Thein Zaw explained how a telephone communication network would be set up to enable the villagers to make business and social calls. Then the PM and other visitors presented generators, fluorescent lamps, solar lanterns, blankets, agricultural

implements, foodstuffs and vegetable seeds to the villagers. Afterwards the visitors inspected the construction of the CDMA-450 radio station project of Myanma Posts and Telecommunications, as well as the rural health center, the systematic construction of housing estates, the planting of trees around village homes on a manageable scale, the supply of water and the functions of the public telephone connection. **[Compiler's note:** Photos of Theikpan-gongyi village (15° 57' N, 94° 36' E) near the mouth of the Ywe river and one of the villages hardest hit by Cyclone Nargis, accompany the article in the print edition of NLM. This is the first mention of the use of bio-batteries in Myanmar. See the articles on "solar lanterns" and "bio-batteries" noted above for further details.]

NLM, 30/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-30.pdf>

A photo of a solar-powered tube well in the village of Hlaingphone in Mawlamyaing-gyun township is included in the print edition of NLM. In the accompanying article Hlaingphone is described as a model village reconstructed following Cyclone Nargis. A list of Myanmar companies involved in reconstruction activities is included, but it is not clear which one provided the equipment for the solar-powered pump. [Most of the villages in the area flooded by the cyclone depend on communal ponds for their water supply. Of these about 1,500 ponds – 13pc of those in Yangon Division and 43pc percent of ponds in the delta of Ayeyawaddy division were contaminated by sea water and debris. Although many have been cleaned since, it was not in time to be filled during the rainy season and water levels are dropping fast. As a result, thousands of survivors of the cyclone face water shortages, as the dry season begins to bite. (IRIN: 29/12/08)] <http://www.irinnews.org/report.aspx?ReportId=82129>

NLM, 27/11/08. <http://www.burmalibrary.org/docs6/NLM2008-11-27.pdf>

Energy Minister Lun Thi on 23 November inspected progress in construction of houses in Htinponseik village in Kungyangon township which was hit by Cyclone Nargis. Funded by Petronas Co, Malaysia, the houses are under construction by Asia World Co Ltd. During the tour, the minister inspected the digging of drains and erection of lamp posts in the village. He also visited the thriving vegetation, sports grounds, clinic and library in the village. Petronas Co based in Malaysia has funded the project to reconstruct Htinponseik model village in Sukalat village-tract. The project includes 40ftx60ft houses, clinic, library, sports grounds and water and power supply facilities. The project also includes agriculture and livestock breeding to improve the living standards of the local people.

Moe Moe Yu, AFP, 28/07/08. <http://www.mmtimes.com/no430/b007.html>

Three months after a cyclone devastated Burma's southern Irrawaddy delta, a local firm is helping survivors replace their makeshift shelters in Auk Pyon Wa with eco-friendly modern homes. Cyclone Nargis swept away every home in the village near the mouth of the Irrawaddy, leaving the survivors with only driftwood and donated plastic sheets for shelter. The village lost 221 of its people when the storm hit, flattening it and surrounding it by water on all sides. Since then, the survivors -- 380 by official count -- have been living together in temporary shelters donated by monks. Now they finally face the prospect of having a home again as dozens of construction firms arrive in the region to take on government-subsidized projects. The Pun Hlaing Construction Group is building 125 wooden homes with solar lighting and solar-powered water pumps in Auk Pyon Wa in an effort to harness the elements to help -- rather than destroy -- residents' lives. "The government provides the timber, zinc for the roof and iron, while our group provides technicians and skilled labourers as a donation," Ohn Myint, the company's construction manager, told AFP. In return, the villagers help build their new homes. "It's like they are building their own house but combining our skills with their labour," Ohn Myint said. Ohn Myint hopes the homes will be ready in three months. "But we are facing delays in transporting material and getting the right labour," he said.

Xinhua, 13/06/08. http://news.xinhuanet.com/english/2008-06/13/content_8362873.htm

Myanmar has sent an engineering delegation to neighboring Thailand to study resettled villages destroyed by the tsunami in 2004 as a reference to build more storm-resistant model village, the local-language Myanmar Times reported Friday. It will be another endeavor of Myanmar to seek technical know-how to build such model village in cooperation with international experts after the Japanese. The model village, to be constructed by the Myanmar Engineers' Association with technical guidance of the Asia Institute of Technology of Thailand. It will consist of water and electricity supply systems, roads, buildings, schools and hospitals, the report said.

Additional references:

See below: [‘Solar power](#) seen as solution for remote villages’ (MT: 06/10/03)

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[INDUSTRIAL ZONES RECOVERING FROM CYCLONE](#)

Ye Lwin, Myanmar Times, 26/05/08. <http://mmtimes.com/no420/b005.htm>

Myanmar's industrial capacity was dealt a heavy blow by cyclone Nargis, which inflicted total or partial destruction on 70 percent of Yangon's 2500 factories, depriving most of them of electrical power. More than 60pc of the 496 factories, including power stations, operating in Hlaing Tharyar Industrial Zone, Myanmar's biggest, suffered damage, and more than 150 lamp posts were felled.

But reconstruction is now under way in all industrial zones in Yangon, and an official from the management committee said on May 20 that most are expected to resume operations, with electricity, before the end of the month. All the lamp posts destroyed in the zone had already been repaired two weeks after the cyclone struck, U Myat Thin Aung, president of the Hlaing Tharyar Industrial Zone management committee told The Myanmar Times. "Almost every factory halted operations for a week for repairs after the cyclone. Right now, all but 28 of our 496 factories are operating.

There are about 120,000 workers employed in all Yangon's industrial zones, including 39,000 workers in Hlaing Tharyar Industrial zone. Though most factories suspended operations while undergoing repairs, workers are still being paid in every factory, U Myat Thin Aung said.

U Thant Zin Tun, managing director of MGS Beverages Co Ltd, said his factory in Shwe Pyi Thar Industrial Zone was running non-stop to produce urgently needed purified drinking water. "We are running our own generator, so production costs are very high due to the current price of fuel. The cost will fall if we get regular electricity," U Thant Zin Tun said.

Yangon, which consumes nearly half the country's electricity, uses 530 megawatts (MW). Of this, 400MW is for domestic consumption and 120MW for industry. The management committee is still assessing storm damage, but it is feared that losses in the industrial zone are severe, and some factories do not carry insurance.

Additional references:

For a complete listing of articles on the impact of Cyclone Nargis, see: [‘Impact of Cyclone Nargis](#) on Myanmar's electricity sector’.

Han Oo Khin, MT, 17/11/08. <http://mmtimes.com/no445/b004.htm>

Nail producers in Hlaing Tharyar IZ report that Myanmar nails now beat [the prices] of those produced in China. They expect to maintain their lead until at least the end of the year, says the manager of Myanmar Region Industries, U Moe Hein. "Now we are making a profit because raw materials prices are 45pc lower than in August. The selling price has also dropped by 18pc from last year". Last year Chinese nails held down 80pc of the market because they were cheaper – and shinier – than Myanmar nails. But now, Myanmar is clawing back its share. In Yangon this week, Chinese nails costs K1700 per viss, while Myanmar nails were K1680 (1 viss equals 1.6 kilograms or 3.6 pounds). The main reason for the price increase in the Chinese product are transportation costs, which have risen by 25pc since Cyclone Nargis, U Moe Hein said, adding: "After Cyclone Nargis, we got 20 hours of electricity, instead of the eight hours we used to get before that. So we could save the cost of generator fuel, which also helped to bring our prices down." Late last year, Myanmar Region Industries stopped production when the price of iron topped U\$1000 per tonne. But when prices almost halved to \$550 per tonne in July, the company resumed production.

NLM, 03/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080803.htm>

Lt-Gen Myint Swe of MoD attended the co-ordination meeting of the management committee for industrial zones in Yangon Division held at the hall of Yangon Command HQ. . . . He said remarkable progress has been achieved in reconstruction tasks in the storm-hit areas. Arrangements are being made for supplying of power to industrial entrepreneurs of Yangon Division to carry out production at full capacity,

Ye Lwin, Myanmar Times, 14/07/08. <http://www.mmtimes.com/no427/b004.htm>

U Myat Thin Aung, patron of the Myanmar Industrial Association (MIA), told The Myanmar Times last week that damage to Yangon's industrial sector is estimated at about \$800 million. Of the more than 5380 factories in all of Yangon's industrial zones, about 4,000 were destroyed or damaged by Nargis. Hlaing Tharyar IZ, the biggest in terms of foreign direct investment and workforce, was hit hard: 340 of its 800 factories were damaged. Domestic economists, led by Dr Maung Aung, a senior economist and researcher at the Economic Studies and Research Institute, suggested that special low interest loans should be provided to affected companies to aid their speedy recovery. "If financial resources are provided by international or domestic financial institutions, they will continue to run their business and rebuild productivity on their own," said U Myat Thin Aung. A particularly hard-hit sector was rice milling: About 95pc of mills within the affected areas were damaged or destroyed, said Dr Maung Aung. "People in the delta depend on rice milling and finding the funding to rebuild the sector should be considered urgent," he said. Rice milling in Myanmar is the preserve of small and medium enterprises and provides a critical bridge between rice farmers, traders and consumers, he said. "If we're unable to get this industry back on its feet there's a possibility that distribution will stall. "One rice mill supports an average of 50 farmers in rural areas, so it's crucial to get this up and running again," he said.

NLM, 06/07/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080706.htm>

PM Thein Sein, accompanied by the director-general of the Government Office and dept heads visits the factory of the Myanmar Lighting Manufacturing Co Ltd in the Shwepyitha IZ. They are welcomed there by Lt-Gen Myint Swe of the MoD, Chairman of Yangon DPDC Win Myint, Yangon Mayor Aung Thein Lin and officials, Chairman Sein Wam of Myanmar Lighting and responsible persons. The PM is briefed on production at the factory by U Sein Wan, on the supply of electricity by U Khin Maung Soe of the YESB and on arrangements for the factory building by D-G Aung Win of DHSDD. In response to the reports, the PM explains that power generated by hydropower projects will be supplied to the factories in the IZs. Industrialists are to strive to develop sound agrobased industries that will foster the the economic growth of the State.

NLM, 02/07/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080702.htm>

When Lt-Gen Myint Swe of the MoD visited Kamanat main subpower station of MEPE in Bago on 01/07/08. he was welcomed by EPM No 2 Khin Maung Myint, D-G Tin Aung of the EPSE, Ch of YEPSB Khin Maung Soe and officials. Lt-Gen Myint Swe was briefed on the erection of concrete towers along the 61-mi-long, 230-kV Kamanat -Thanlyin main power line project and the 40-mile-long, 230-kV Kamanat – Myaungtaga power line. Pointing out that these lines were required to supply the electric power demand in Yangon, he called for speedy completion of the tasks in building them. This was necessary, he said, so that more power could be supplied to the industrial zones including Myaungtaga IZ.

NLM, 27/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-27.pdf>

EPM No 2 Khin Maung Myint checks on the supply of electricity at Mawtin (Seikkan) sub-power station in Yangon and urges officials to carry out the installation of power lines systematically. He and his party go on to Thitdaw computerized sub-power station on Bayintnaung Road in Insein township where they inspect transformers, the supply of electricity and the condition of the high-tension tower of the Hlawga-Hlinethaya-Seikkyi-khanaungto 33-kV Hline river crossing power line in Shwelinban IZ in Hlinethaya township and give instructions on the durability of towers, installation of power lines and matters related to the supply of electricity. A 33-kV power line is being installed between the main power station in Hlinethaya and Seikkyi-Khanaungto and work is continuing on the installation of power lines in Shwelinban IZ and the erection of powerline posts in No 4 IZ in Hlinethaya. Work is also continuing on the 33-kV power line from Hlinethaya main power station to Khanaungto, Kawhmu and Kungyangon. At the Mingaldon Airport sub-power station, the minister inspects the condition of the transformers. At Sule Centre Point sub-power station in Pabedan township, the Minister and party check on the installation of dry type transformers and the installation of transformers at sub-power station in Dagon township.

Sann Oo, Myanmar Times, 16/06/08. <http://www.mmtimes.com/no423/b002.htm>

Officials from the Department of Fisheries say the export of fisheries products during the past two months of the current fiscal year has earned the country about US\$72 million. Though exports fell during May, officials claimed they were slowly reviving to normal levels. "After Cyclone Nargis hit, normal trade had resumed by May 9, and border trade by May 5," said one department official." An official from the Myanmar Fisheries Products Processors and Exporters Association said processing factories were running normally, thanks to regular electricity supply.

Xinhua, 12/06/08. http://news.xinhuanet.com/english/2008-06/12/content_8353914.htm

About 95pc of the 800 factories in industrial zone of Hlaingtharya have resumed operations after being seriously damaged in Cyclone Nargis. 156 power poles in the zone which supply electricity had to be replaced, according to a report from the administrative committee. During the storm, most of the roofs of the factories were blown to pieces and operations had to be suspended. The industrial zone sustained property losses of K 3 billion (US\$ 2.7 million).

NLM, 10/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-10.pdf>

At a meeting organized by Yangon Division Industrial Zones Management Committee Lt-Gen Myint Swe of the MoD thanked entrepreneurs and companies for contributing much towards the speedy restoration of business following Cyclone Nargis. He said factories should boost production of construction materials to assist reconstruction efforts. Officials were to co-ordinate in order to fulfill the requirements of the entrepreneurs. Private entrepreneurs were to improve their production. Lt-Gen Myint Swe was then briefed on the assistance being provided to develop the industrial sector and on the requirements of the industrial zones.

NLM, 28/05/08. <http://www.foreverspace.com.mm/newspapers%5C08%5C5%5C28508newsn2.pdf>

EPM No 2 Khin Maung Myint meets with members of the supervisory committees and businessmen from IZ Nos 1, 2 and 3 [in South Dagon township] and signs off on a plan for the reconstruction of cable connection and supply of power to the zones. At the sub-power station in Dagon South the minister checks on power supply from the station and the condition of the transformers there.

NLM, 24/05/08. <http://burmalibrary.org/docs4/NLM2008-05-24.pdf>

Labour Minister Aung Kyi visited Hlinethaya and Shwepyitha industrial zones and inspected the running of factories which were damaged by the cyclone. Of 2,830 factories in industrial zones in Yangon, 550 were damaged by the storm. Thanks to the co-operative efforts of the factory owners and workers and employees of the ministries, 2,757 factories can run at full capacity to date. Almost cent per cent of the labourers are working at the factories to boost productivity. Efforts are being made to re-open the other seventy-three factories which were damaged by the storm.

Xinhua, 24/05/08. http://news.xinhuanet.com/english/2008-05/24/content_8244033.htm

Yangon's biggest industrial zone, which was seriously destroyed in a recent severe cyclone storm, has partly resumed operation with half of the 800 factories going into production again, the local weekly Voice reported. Quoting the industrial zone administration authorities, the report said the zone has started to produce food, construction materials and plastic. Half of the 157 collapsed lampposts which carry electricity had been rapidly repaired and re-installed. During the storm, most of the roofs of the factories in the industrial zone were blown to pieces, it said. The industrial zone sustained a property loss of 3 billion Kyats (2.7 million U.S. dollars), the report added.

NLM, 20/05/08. <http://burmalibrary.org/docs4/NLM2008-05-20.pdf>

Industry Minister No 1 Aung Thaung inspects damage caused by Cyclone Nargis to No 2 Soap Factory on 17/05/08. The damage has been repaired and the factory has restarted operations and is producing at 60pc of capacity. He goes on to other factories in Yangon operated by his ministry and instructs officials to increase production.

NLM, 21/05/08. <http://burmalibrary.org/docs4/NLM2008-05-21.pdf>

EPM No 2 Khin Maung Myint met with industrialists of IZ No 1 in Shwepyitha township on 20/05/08 and checked on the control and supply of electric power. At Hlawgar sub-power station in Mingaladon township, the minister heard reports by officials on the construction of power lines and distribution of electricity. He then looked into the replacement of nine pylons at the Pyinmabin IZ sub-power station in Mingaladon township. The minister and party also inspected the setting up of 33-kV pylons along the Hlinethaya-Nyaungdon road in Hlinethaya township and on Sethmu-1 street in Yankin township and KabaAye Pagoda road.

NLM, 18/05/08. <http://burmalibrary.org/docs4/NLM2008-05-18.pdf>

At a joint meeting of the YPDC, the YCEPSB, chairmen of the IZs and entrepreneurs on 16/05/08, Yangon Commander Hla Htay Win said that arrangements are being made for factories and workshops in the industrial zones of Yangon to resume commercial operations. These establishments need to restore their power lines, he said. At present 175 MW of electricity is being distributed to downtown Yangon. Next, chairmen of the IZs and officials reported to the commander on work being carried out to resume normal operations at the factories and workshops, the renovation of transformers and return to work by employees. Afterwards, the chairman of the YCEPSB explained measures being taken by the Electricity Supply Board, the Soe Electric Co, the Yangon Transformer Co and the IZs to restore the power supply as soon as possible.

NLM, 18/05/08. <http://burmalibrary.org/docs4/NLM2008-05-18.pdf>

EPM No 2 Khin Maung Myint inspected production and distribution of lamp posts at the YCEPSB [factory] in Hlinethaya Township on 16/05/08. While he was there, the minister looked into the production of a "steel fix and steel sieve" to be used in construction of the concrete lamp posts. From there, he went on to inspect the work of skilled technicians erecting pylons and the installation of 33-kV, double circuit power lines linking the [main] sub-power station and the IZs along the Hlinethaya-Nyaungdon motorway. In the afternoon, the minister and Deputy Minister Win Myint oversaw the installation of power lines, connections and the supply of power at the district electrical engineer's office in Ma-ubin.

NLM, 09/05/08. <http://burmalibrary.org/docs4/NLM2008-05-09.pdf>

EPM No 2 Khin Maung Myint inspected reconstruction of suspension pylon No 57 of Thakayta-Hlawga 230-kV national grid and preparations for supply of power from the power station of No 2 IZ in South Dagon township. He viewed supply of power from Thakayta Natural Gas Turbine and damages to the lamp-post of 66-kV national grid and power lines in South Dagon IZ caused by the storm Nargis.

NLM, 09/05/08. <http://burmalibrary.org/docs4/NLM2008-05-09.pdf>

Access to electricity has been restored to some wards in South Dagon township. Of the 49 transformers in the township, 24 have been repaired and are in use. Areas which have access to power are along Sipinhaya and Ayeyawun streets and in Industrial Zones 1 and 2. No efforts are being spared to return electricity supply to the remaining wards. Experts from the Ministry of Electric Power are seeking to restore power phase by phase. Power consumption in Yangon before cyclonic storm 'Nargis' was in excess of 200 MW. As a result of efforts made by EPM staff over 40 MW is now being supplied.

MYANMAR'S BIGGEST CITY STILL PARALYZED FIVE DAYS AFTER CYCLONE

New York Times, 08/05/08. <http://www.burmanet.org/news/2008/05/08/>

Five days after the powerful cyclone struck Yangon, Myanmar's commercial capital and until Saturday a verdant oasis of wide avenues, is far from back to normal. Thousands of trees lie where they fell, jetties on the Yangon River are collapsed into the water and only a few traffic lights are working across the city of 5 million people. Most of Yangon remains without electricity and even the local branch of the Ministry of Energy has no power.

The death toll in Yangon has been small compared with the devastation in the delta of the Irrawaddy River. The government counts fewer than 400 people killed here compared with the more than 22,000, and by some unofficial estimates possibly tens of thousands more, dead over all in Myanmar since the huge cyclone

hit on Saturday. But the inability of the government to clear debris and restore basic utilities like water and power in what is the country's wealthiest city are a measure of how difficult Myanmar's overall disaster recovery could be.

Essential equipment — chainsaws, machines capable of lifting heavy debris and helicopters, among many other necessary items — are in short supply or absent altogether. The government has 12 helicopters, but only five of them are operational and can transport supplies to far-flung locations, diplomats here say. In neighborhoods here where soldiers are clearing trees, they are often using small machetes and axes to hack away at thick branches. Others, where workers have chainsaws, look and smell like lumberyards. Basic construction materials are unavailable.

The damage to buildings, many already decrepit, is extensive. The city's largest hospital, a majestic red-brick building built by the British, lost large portions of its roof during the storm. Crumbling colonial mansions are newly ravaged by wind and rain. Reams of fabric at the neighboring Bogyok Aung San market were soaked by the cyclone and were rolled out onto balconies to dry.

In the wealthy neighborhoods where the generals and diplomats live, groups of soldiers are clearing away debris and workers are perched on rooftops replacing tiles. But in the poorer neighborhoods, "there are no soldiers at all," said one resident.

Drivers spend three or four hours at gasoline stations to buy two gallons of fuel, the daily allowance by the government. The fuel costs just \$2.50 a gallon but on the black market, where many drivers are forced to buy their fuel, the price is four times that. Soldiers sitting under tarps along the side of the road sell the illegal fuel.

Local residents, especially the poor, are struggling to keep up with soaring food costs. There have been scattered reports of looting and if the city remains without power for much longer, diplomats fear that violence could break out. "No power!" said Kyaw, a taxi driver, as he passed the Ministry of Energy building, which serves only as a branch office after the military government moved the capital to a faraway city in the jungle, Naypyidaw.

Compiler's Note: The articles in this section have been included because of references to the impact of the loss and restoration of electric power in Yangon and surrounding townships following Cyclone Nargis on 2 May 2008. Articles with references to restoration of electric power service in the Irrawaddy delta area will be found under the key article titled, '[Delta given priority](#)'. For a complete listing of articles on the impact of Cyclone Nargis, see: '[Impact of Cyclone Nargis](#) on Myanmar's electricity sector'.

Additional references:

IMNA, 27/06/08. <http://www.monnews-imna.com/newsupdate.php?ID=1064>

Shop owners in Nandawun market, South Okkalapa township, complained after power supply to the market was disrupted following the cyclone but the Rangoon electricity department did not repair transmission lines. "If the shop owners do not pay we will not repair it," a shop owner told IMNA quoting a civil servant from the electric power department. "We collected a thousand Kyat from each small shop and 3,000-5,000 Kyat from the bigger shops and paid the department on June 24. The next day the power supply was back," the shop owner said. The market has about 5,000 shops and the power and telephone lines snapped after cyclone. North Okkalapa township residents also paid 5000 Kyat for reinstalling power connection after the cyclone.

NLM, 07/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-07.pdf>

Lt-Gen Myint Swe of the MoD and party inspect the installation of telephone cables, the cleaning of debris, repairs to power lines and the dredging of drains in downtown Yangon. On Thaton Street in Yangon University, they look into substitution of new lamp-posts to replace damaged ones and in Dagon East township the installation of 6.6-kV power lines along No. 2 Hwy.

AP, 06/06/08. http://www.irrawaddy.org/highlight.php?art_id=12537

Crowds throng Rangoon's markets and street-side stalls, taxis ply the streets with policemen directing cars at intersections where traffic lights are still broken. Electricity has been restored in the more affluent city center, though some residents still lack telephone service.

AFP, 02/06/08. <http://afp.google.com/article/ALEqM5i-tS851hTARRN0W7CAWegywymubw>

Interview with a teacher in Rangoon a month after Cyclone Nargis ripped through the city damaging her family's home and leaving them without running water since. She still has her job teaching English, but her middle-class family is worried about how they will survive the months to come. "My father spent all of his money on repairs," said the 29-year-old, who lives with her parents. Much of the city's water system was damaged by the storm, and without electricity to power the pumps, there's no way to get water into the building where they live. They can rent a generator, but this costs nearly \$8 an hour. Pumping water into the building takes about five hours, and the \$40 it would cost is more than what some families pay in rent each month. "We'd need to buy fuel on the black market to make the generator work, because fuel is rationed," she said. Fuel prices more than doubled after the storm, though the price has eased a little as supplies have resumed again. For families in top-floor apartments, their bigger priority has been shelter, because many of their roofs were blown away by the storm. The price of corrugated metal has doubled, but people have been forced to buy it because of the daily monsoon rains. "Those who could not afford metal bought tarpaulins. Those who don't have enough money have gone to live somewhere else, and their apartments have been flooded by rain," she added.

NLM, 02/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-02.pdf>

Lt-Gen Myint Swe of the MoD and party inspect the repair and installation of power lines and clearing of debris along the Yangon-Nyaungdon Road. At the power station in Hlinethaya Township, they hear reports on the availability and supply of electricity. .

NLM, 30/05/08. <http://myanmargeneva.org/NLM2008/eng/5May/n080530.pdf>

Lt-Gen Myint Swe of the MoD inspects repair of power lines, reconstruction of damaged buildings and the clearing of the fallen trees in downtown Yangon. New power lines donated by the Republic of Korea are being installed along the Kandawgyi Lake ring road and Natmauk street.

Anglican Diocese of Lichfield, 30/05/08. <http://www.lichfield.anglican.org/news&newsID=524>

Myanmar Archbishop Stephen Than Myint Oo said: "In Yangon, even after 14 days, many parts remain without electricity. Those who are able have resorted to generators; those who cannot have to rely on candlelight in the night. While most major roads have been cleared, debris and detritus have yet to be completely removed. The work is tedious and labour-intensive. Without electricity supply, piped water supply has been disrupted. Telecommunications have yet to be fully restored.

NLM, 29/05/08. <http://www.burmalibrary.org/docs5/NLM2008-05-29.pdf>

Lt-Gen Myint Swe of the MoD supervises repair of power lines, reconstruction of damaged buildings and clearing of debris and trees uprooted by the storm in downtown Yangon. Lamp-posts are being replaced along Parami, Yangon-Insein and Mindhamma roads and 33-kV lines re-installed.

NLM, 19/05/08. <http://burmalibrary.org/docs4/NLM2008-05-19.pdf>

At a meeting in the hall of YCESB on 18/05/08, Deputy EPM No 2 Win Myint reports on priorities being given to the supply of power in Yangon and the installation of power lines in Ayeyawady division. Later EPM No 2 Khin Maung Myint inspects the repair of the power lines along Bayintnaung road in Insein township and the installation of a power line to CNG filling station No 012 in Ywama. The minister also views substitution of pylons and lamp-posts in Mayangon and Bahan townships, and the supply of power from the main Hlinethaya power station to sub-stations No 1 and No 2 in the township. [Photos on p 10 of the print edition of NLM taken inside and outside sub-station No 2.]

Cherry Thein, Myanmar Times, 19/05/08. <http://mmtimes.com/no419/b001.htm>

Bronze and copper irons are selling like "hot cakes" in Yangon in the past two weeks as people attempt to overcome the lack of electricity and maintain their appearance, say sellers at Shwedagon Pagoda. Bronze irons are filled with charcoal and are a traditional way to iron clothes.

CCTV, 17/05/08. <http://www.cctv.com/english/20080517/102148.shtml>

Two weeks after the powerful cyclone Nargis swept through Yangon, reconstruction work to repair damage in the city from the disaster is underway, and transport and water supplies have been restored. But it's taking longer for electricity to be reconnected. The reports say prices are rising. However, the government says social order is stable.

NLM, 17/05/08. <http://burmalibrary.org/docs4/NLM2008-05-17.pdf>

EPM No 2 Khin Maung Myint inspected the repair of 33-kV pylons along the Hlinethaya-Nyaungdon power line. 16 of the pylons were damaged by Cyclone Nargis at the beginning of May. Arrangements are being made to supply power to Nyaungdon and Ma-ubin townships in Ayeyawady Division on 14 May. The minister also looked into reconstruction of pylons used to supply power from the [main] Hlinethaya subpower station to Shwelinban IZ and sub-power stations No 1 and 2, as well as the installation of power lines and repair works. [Article in the print edition of NLM is accompanied by a photo of the interior of the [main] sub-power station in Hlinethaya.]

Staff writer, Los Angeles Times, 16/05/08.

<http://www.latimes.com/news/printedition/asection/la-fg-ratified16-2008may16.0,84112.story>

Many of Yangon's 7 million people still don't have electricity and running water 13 days after the storm struck. The price of rice has shot up by 50%, the cost of fuel has more than doubled, and other basic needs are sapping meager savings.

NLM, 14/05/08. <http://burmalibrary.org/docs4/NLM2008-05-14.pdf>

At the meeting hall of Hlinethaya TPDC Office, Information Minister Kyaw Hsan met with the chairman and officials and discussed clearing of debris, tasks for electricity, water and communication, health care services and measures for the speedy delivery of relief supplies to the cyclone victims.

NLM, 14/05/08. <http://burmalibrary.org/docs4/NLM2008-05-14.pdf>

Caption of a picture on page 7 of the print edition: Service personnel of Hline electrical engineer's office install power lines for resuming power.

NLM, 13/05/08. <http://burmalibrary.org/docs4/NLM2008-05-13.pdf>

A meeting about the rehabilitation of storm-hit areas in Yangon and Ayeyawady Divisions was held at the meeting hall of Yangon Command this morning, with an address by Chairman of National Disaster Preparedness Central Committee Prime Minister General Thein Sein. . . . The PM said that in Yangon, commuter service has resumed as usual and power and water supply operates to some extent due to the measures taken by the government.

Irrawaddy On-line, 12/05/08. http://www.irrawaddy.org/article.php?art_id=11979

More than a week after the powerful cyclone Nargis struck Burma, Rangoon—once proudly called “green city”—is still struggling to survive. Most parts of Burma's old capital remain without electricity, although residents told The Irrawaddy that power could be obtained by bribing the authorities.

NLM, 12/05/08. <http://burmalibrary.org/docs4/NLM2008-05-12.pdf>

At the relief camp opened at Dhammapiti Monastery in Seikkyi-Khanaungto township [across the Hlaing river from Yangon], the Yangon division commander presents K 2 million, 1000 bags of rice and 3,000 bottles of drinking water to storm victims. Yangon DPDC also donated a 5-KVA generator, wires, bulbs and fluorescent lamps worth K 2.6 million to the victims.

Xinhua, 11/05/08.

http://news.xinhuanet.com/english/2008-05/11/content_8146462.htm

http://news.xinhuanet.com/english/2008-05/11/content_8146462_1.htm

Two photos of the destruction caused to the rural electricity distribution system in Kyauktan, south of Thanlyin in Yangon division. The first shows survivors camped next to a fallen electrical pole near Kyauktan more than a week after the cyclone hit the delta area. The surrounding landscape is almost completely denuded of trees. The second shows an electrical pylon lying on top of the Mid-river Pagoda in the town itself. (Xinhua/Reuters Photo)

Australian News Net, 11/05/08. <http://www.australiannews.net/story/358217>

According to government officials, some electricity supplies have been fixed in parts of Rangoon. More than 4,000 electric workers were mobilised over the weekend to repair the power lines which were downed by falling lamp-posts or trees. Electricity has mostly been restored at the airport, government radio and television stations, hospitals, banks and key factories as well as some residential communities. The electricity authorities claim that 95pc of the city now has access to water supplies.

NLM, 10/05/08. <http://burmalibrary.org/docs4/NLM2008-05-10.pdf>

On 7 May, EPM No 2 Khin Maung Myint inspected supply of power at Hlinethaya 100-MVA main power station and rebuilding of No 31 pylon of Hlinethaya- Athok 230-kV national grid. The minister also supervised preparations for re-erecting of pylons along Yangon-Hlinethaya road and functions of Hsinmalaik 66-kV power station. The station is supplying power to Hsinmalaik, the Orthopaedic Hospital and the Myanma Shipyards. He also inspected supply of electricity from Thakayta Power Station to Pazundaung, Botahtaung, Kyauktada, Tamway and Mingala Taungnyunt townships through Thida 66-kV subpower station of Pazundaung township.

NLM, 10/05/08. <http://burmalibrary.org/docs4/NLM2008-05-10.pdf>

Yangon City Electricity Supply Board has been restoring power service to areas of the city where it was knocked out during Cyclone Nargis. A total of 4,247 employees under the ministry together with the chairman and workers of YESB are making concerted efforts for supply of power to the people. [The rest of the article consists of the names of places and buildings in Yangon to which electric power has been restored and the dates between the 3rd and 8th of May when service was resumed.

NLM, 09/05/08. <http://burmalibrary.org/docs4/NLM2008-05-09.pdf>

The National Disaster Preparedness Central Committee held a coordination meeting at the hall of Yangon Command Headquarters on 08/05/08 attended by Chairman of the NDPCC Prime Minister Thein Sein. Maj-Gen Hla Htay Win of the Yangon DPDC reported on the resumption of local trains and bus lines, sales of fuel for vehicles, the rerunning of factories at Hlinethaya IZ after electricity supply [was restored], opening of rice shops, provision of rice and aids to relief camps and arrangements for the reconstruction of schools, hospitals and dispensaries.

NLM, 09/05/08. <http://burmalibrary.org/docs4/NLM2008-05-09.pdf>

EPM No 2 Khin Maung Myint inspected reconstruction of suspension pylon No 57 of Thakayta-Hlawga 230-kV national grid and preparations for supply of power from the power station of No 2 IZ in South Dagon township. He viewed supply of power from Thakayta Natural Gas Turbine and damages to the lamp-post of 66-kV national grid and power lines in South Dagon IZ caused by the storm Nargis.

NLM, 09/05/08. <http://burmalibrary.org/docs4/NLM2008-05-09.pdf>

Access to electricity has been restored to some wards in South Dagon township. Of the 49 transformers in the township, 24 have been repaired and are in use. Areas which have access to power are along Sipinhaya and Ayeyawun streets and in Industrial Zones 1 and 2. No efforts are being spared to return electricity supply to the remaining wards. Experts from the Ministry of Electric Power are seeking to restore power phase by phase. Power consumption in Yangon before cyclonic storm 'Nargis' was in excess of 200 MW. As a result of efforts made by EPM staff over 40 MW is now being supplied.

NLM, 09/05/08. <http://burmalibrary.org/docs4/NLM2008-05-09.pdf>

In Thanlyin township, EPM No 2 Khin Maung Myint supervised the repair of power lines and lamp-posts and efforts to restore electricity. At Kyaikkasan Power Station in Tamway Township, the minister inspected the supply of electricity to urban areas, Yankin Centre and the Central Bank of Myanmar. The minister and party also viewed replacement of power lines and lamp-posts along Saya San Road.

Aung Hla Tun, Reuters, 08/05/08. <http://www.news.com.au/story/0,23599,23664830-23109,00.html>

Sporadic power and water supplies returned to parts of Rangoon and the prices of basic food dropped, signals of a gradual recovery from the onslaught of Cyclone Nargis. Fuel prices also fell after the junta relaxed its ban on private companies importing fuel to try to alleviate a chronic energy shortage. The staple rice remains costly, but prices have stabilised with roads into the city from the north remaining open despite

destruction of homes and other buildings in and around the former capital during the weekend cyclone. About 23,000 people were killed, including nearly 700 in Rangoon, the Government said. More than 42,000 were missing in the worst cyclone to hit Asia since 1991, when 143,000 people were killed in neighbouring Bangladesh. Thailand's largest oil company said it was preparing to send a tanker with \$400,000 of fuel for the stricken city, where queues at filling stations stretched several kilometres. Electricity supplies are sporadic at the best of times, making many of Rangoon's five million residents reliant on diesel-powered generators. However, United Nations aid experts said much repair work still needed to be done at Rangoon's port before any tanker can dock and start unloading fuel. The power shortage is making water scarce in higher buildings because pumps are not working.

NLM, 08/05/08. <http://myanmargeneva.org/NLM2008/eng/5May/n080508.pdf>

EPM No 2 Khin Maung Myint together with officials arrived at Nyaunghnapin Water Purifying Plant in Hmawby township on 07/05/08. At the sub-power station, the minister heard reports on conditions of the plant and station, arrangements for clean water supply to Yangon, installation of power lines from Hlawga sub-power station to the plant, and condition of power cables and station. The minister also looked into repair works along Yangon-Pyay road and No 3 highway junction. Afterward he went to the sub-power station of Myawady Television and gave instructions on repair of the power lines. Next, he looked into the connections of the power line that transports electricity from Ywama sub-power station to Bayinthaung sub-power station, the conditions of transformers, switch yard and power lines at Ywama sub-power station

NLM, 08/05/08. <http://myanmargeneva.org/NLM2008/eng/5May/n080508.pdf>

Yangon City Mayor Aung Thein Lin checked into the functioning of two 710-HP water pumps and three 280-HP water pumps at Yayku water pumping station in Mayangon township on 07/05/08. The Yayku station distributes water to the townships in Yangon. It had stopped functioning because of the power failure caused by the storm 'Nargis'. On 5 May, a 1375-KVA generator was installed to operate the station. It is now getting back to its normal function and operation as electricity is available.

Nem Davies, Mizzima, 07/05/08.

http://bnionline.net/index.php?option=com_content&task=view&id=4077&Itemid=6

Only a few news journals with generators have published in the week after Cyclone Nargis swept through Rangoon. "At least 20 sport papers were closed due to the electricity shortage downtown and because they could not afford to run generators," said the editor of a news journal who did not want to be named. Hein Latt, editor of the Popular Journal, said, "Six to seven papers, including Popular, Weekly Eleven and Flower News, were released today, but I do not remember which journals are closed because there are more than 100 papers here." Journals that hit the news-stands this week covered the cyclone and featured photos of the devastation in Rangoon. The price of diesel has gone up to K 18,000 (US\$ 15.72) per gallon from 4,500 kyats per gallon before the cyclone. "Journals that are not good at sales and could not afford to buy oil and diesel must be closed," Hein Latt said. "But journals with good sales will try to publish and raise the paper's cost a little bit to cover their expenses from buying diesel."

NLM, 07/05/08. <http://burmalibrary.org/docs4/NLM2008-05-07.pdf>

Steps to restore the supply of electricity are being taken in two phases. Priority in the first phase is to ensure the services to No 2 Defence Services General Hospital, the Children's Hospital, Central Women's Hospital, Yangon General Hospital, Western General Hospital, Insein Communication Station, Insein GSM Station, Mayangon Overseas Communication Station, five natural gas filling stations, Yangon International Airport, the University of Computer Studies, Phugyi Water Works, Yayku Water works and Shwedagon Pagoda. In the second phase, 4,000 employees are working on repairs to the power supply system and power distribution to the complete power supply network. Of the five main stations that supply water in Yangon, Gyobyu station is operating under regular conditions, while Phugyi, Hlawga and Yayku are ready to re-start operations as they have been repaired. Nyaunghnapin station is still under repair but it is expected to supply water within one or two days. Seven generators — two 100-kV generators in Hlinethaya Township, two generators in Thingangyun Township, two generators in Thakeyta township and one generator in Latha Township — are being used to supply water to residents in Yangon. Arrangements have been made to bring 35-KVA, 360 KVA and 500- KVA generators to Yangon to be used in water supply tasks in Yangon. Water supply stations on Maha Bandoola Street, at City Hall, in Thakeyta, Yeku and Ahlon townships are currently supplying water to residents in Yangon. The connection of mobile phone system is restored to its good

condition, and 100 CDMA phones have been installed in Yangon for public use and more CDMA phones will be installed in Yangon.

NLM, 07/05/08. <http://burmalibrary.org/docs4/NLM2008-05-07.pdf>

EPM Minister No 2 Khin Maung Myint went to the main sub-power station in Hlinethaya township on 05/05/08 and inspected preparations [to restore] the power supply. The minister also inspected production of concrete posts at the Yangon Concrete Posts factory there. Afterwards, the minister and party went to Mingaladon township to check on the repairing and installation of cables. Then they proceeded to the Phugyi water purifying plant in Hlawga and gave instructions on power supply from the plant. During his tour of Mingaladon township, the minister inspected the CNG refilling station and gave instructions on power supply to the station. He also inspected the reconstruction of the power supply system to the Pale IZ. Afterwards, he looked into the connecting of cables at Kyatphyukan sub-power station and Myawady TV station in Hmawby township. While visiting the Ngamoeyeik water purifying plant and the Hlawga sub-power station, the minister checked on the condition of the transformers and preparations for power supply tasks. Later he met with officials at the office of the Yangon Power Supply Board and gave instructions on the supply of power to the four districts of Yangon.

Aung Hla Tun, Reuters, 06/05/08 http://www.irrawaddy.org/highlight.php?art_id=11779

At least 15,000 people died in the Burma cyclone and the toll is likely to rise rapidly as officials make contact with the worst-hit Irrawaddy delta areas, the military government's foreign minister said on Tuesday. Nyan Win said on state television that 10,000 people had died in just one town, Bogalay, as he gave the first detailed account of what is emerging as the worst cyclone to hit Asia since 1991, when 143,000 people died in Bangladesh. The town-by-town list of dead and missing announced by Nyan Win showed 14,859 deaths in the Irrawaddy Division and 59 in Rangoon, the largest city of 5 million. In Rangoon, people were queuing up for bottled water and there was still no electricity four days after Cyclone Nargis struck. "Generators are selling very well under the generals," said one man waiting outside a shop, reflecting some of the resentment on the streets to what many described as a slow warning and response.

AP, Reuters: 05/05/08. http://www.irrawaddy.org/highlight.php?art_id=11757

Cyclone Nargis, which had been gathering steam in the Bay of Bengal for several days, devastated Rangoon Burma's leafy main city, littering the streets with overturned cars, fallen trees and debris from battered buildings. "Utter war zone," one diplomat said in an email. "Trees across all streets. Utility poles down. Hospitals devastated. Clean water scarce." Older citizens said they had never seen Rangoon, a city of some 6.5 million, so devastated in their lifetimes. In the city residents lined up on Monday to buy water as widespread power cuts left most households unable to use electricity-driven pumps. With the city's already unstable electricity supply virtually nonfunctional, citizens also lined up to buy candles, which doubled in price along with water. Hotels and richer families were using private generators but only sparingly, given the soaring price of fuel. An Electricity Board official said it was impossible to know when the power supply -- hit-and-miss at the best of times in one of Asia's poorest countries -- would be restored. "We still have to clear the mess," said the official, who did not want to be named.

Mizzima News, 03/05/08. <http://www.burmanet.org/news/2008/05/03/>

The Burmese government has announced a 'State of Emergency' in many parts of the country after Cyclone Nagirs lashed Burma late on Friday night. The state-owned media declared that Rangoon Division, Pegu Division, Mon State, Karen State and Irrawaddy Division have been brought under a 'state of emergency'. The announcement was made by the SPDC Secretary No 1 Tin Aung Myint Oo a few minutes ago. Strong winds continue to sweep the city and the window panes of apartments have cracked or broken. The electricity supply has been cut off, a resident of Hle Dan in Rangoon told Mizzima. Another resident that Mizzima was able to contact said he thinks this is the severest cyclone in the country's history. There have been loud noises in the city and zinc roof tiles crisscrossed the city and trees have been uprooted, he added.

IRRAWADDY DELTA REGION SUBMERGED BY FLOODWATERS

AFP: 06/05/08. <http://www.burmanet.org/news/2008/05/06/>

More than 22,000 people were killed in Myanmar's devastating cyclone and 41,000 are still missing four days after the storm slammed into the country's southern coast, the government said Tuesday. Aid workers were racing to deliver food and water to the worst-hit Irrawaddy delta region, which was submerged by floodwaters, leaving scenes of utter devastation with homeless survivors running low on food and water.

Witnesses described horrific images of rice fields littered with corpses, and there were fears the death toll from tropical cyclone Nargis could rise much further. Save the Children, one of the few relief agencies allowed to operate in the secretive and impoverished Southeast Asian country, said the toll would rise sharply in the coming days as more victims were found in hard-to-reach areas.

In the government's first news conference since Nargis barrelled into the Irrawaddy region early Saturday, it said 95 percent of the homes in the delta town of Bogalay had been washed away. "Many people were killed in a 12-foot (3.5-metre) tidal wave," Social Welfare Minister Maung Maung Swe told reporters. State television said 21,793 people were killed and 40,695 were missing in Irrawaddy division, while 671 were killed and 359 people were missing in Yangon, Myanmar's biggest city and the former capital.

Satellite images from US space agency NASA showed virtually the entire coastal plain of the country, one of the world's poorest nations, under water. Christian relief organisation World Vision said its teams had witnessed horrific scenes. "They saw the dead bodies from the helicopters, so it's quite overwhelming," said Kyi Minn, an adviser to World Vision's office in Yangon. Video footage of the disaster zone showed flattened villages, smashed bridges, and survivors forced to live out in the open.

Aid groups were rushing to bring food, water, clothing and shelter into the country, whose military rulers have long turned their back on the outside world — and prevented many aid charities from operating here. "Getting it out to the affected populations will be a major challenge, given that there is widespread flooding," said Richard Horsey, a spokesman for the UN Office for the Coordination of Humanitarian Affairs in Bangkok. "The urgent need is for shelter and for water. Without clean drinking water, the risk of disease spreading is the most serious concern."

Compiler's Note: The articles in this section have been included because of references to the role of electric power generation in the relief operations in the Irrawaddy delta following Cyclone Nargis on 2 May 2008. Articles with references to the loss and restoration of electric power in Yangon will be found in the preceding section. For a complete listing of articles on the impact of Cyclone Nargis, see: [Impact of Cyclone Nargis](#) on Myanmar's electricity sector.

Additional references:

Saudi Press Agency, 11/08/08. <http://www.spa.gov.sa/English/details.php?id=581260>
Provision of the Saudi humanitarian aid to victims of the recent tornados and floods in Myanmar continued here today with the delivery of additional quantities of tents, food stuffs, blankets, medicines, ambulances, rescue tools and other aid. The shipment also included 110 electric generators of various kinds.

Aye Sapay Phyu, Myanmar Times, 09/06/08. http://www.mmtimes.com/no422/b_brief.htm
The Supreme Group of companies have donated water treatment systems worth about K 38.5 million to Nargis relief efforts, said U Aung Soe Oo, operation director of the Supreme Water Doctor Group. U Aung Soe Oo said the company donated one water treatment system with a 5000-litre-an-hour capacity to Hainggyi Island and another with a 10,000-litre capacity to the Yangon City Development Committee (YCDC). He said that the cost for the water treatment system, set up in Hainggyi Island was K 13.5 million, while the system given to the YCDC is worth K 25 million. U Aung Soe Oo said the company has also been setting up water treatment systems bought from them by donor groups since May 7.

Myanmar Times, 09/06/08. <http://www.mmtimes.com/no422/n014.htm>
A survey of cleanliness standards among purified drinking water companies conducted by the Ministry of Health following cyclone Nargis revealed that a number of local brands were failing to meet minimum safety criteria set by the government. The survey was conducted by the Department of Health under the ministry to determine whether purified drinking water factories in Yangon Division had been damaged by the storm, and

were manufacturing according to good practices recommended by the department. Dr Thein Myint, MD of the Oasis drinking water company, said the criteria for purified water can be divided into three categories of cleanliness – physical, chemical and microbiological. “Some drinking water companies couldn’t meet the safety criteria last month because of lack of proper purifying technology, and also because demand for drinking water exceeded supply in the wake of the cyclone,” he said. “The quality of water depends on technology. Most companies in Yangon use an ultraviolet system to treat the water. But because of lack of electricity and other problems caused by Nargis, some companies might have skipped some of the steps during the manufacturing process,” U Thein Myint said.

Chris Epplett, Grand Haven Tribune, 07/06/08.

<http://www.grandhaventribune.com/paid/308987758282104.bsp>

Enriquez was able to carry four versions of IA's Lab-in-a-Suitcase portable laboratories into Yangon. International Aid has provided three Lab-in-a-Suitcase portable laboratories to rural clinics, one serving 5,000 people without access to electricity, two to other rural clinics without electricity which serve 10,000 people and one to a town clinic which is hooked up to the electrical system and will serve an additional 100,000 people, he said.

NLM, 08/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-08.pdf>

Four C-130 flights carrying 28.02 tons of candles, spoons, curry-pots, blankets, mosquito nets, soaps, fiber cups, plastic buckets, fiber water-bags, two water purifiers and two 10,000-litre water tanks donated by USA, arrived at Yangon International Airport on 07/06/08. The relief supplies donated from abroad have been sent to storm-hit regions by helicopter, car and ship.

NLM, 03/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-03.pdf>

[On a visit to Irrawaddy delta area], Gen Maung Aye is briefed on the loss of lives and property in Kyaiklat township, the repair of houses, offices, hospitals and schools, arrangements for the timely cultivation of monsoon paddy, the distribution of relief supplies to storm victims, the supply of water, disease control, arrangements for telecommunications, power supply and smooth transportation to Yangon along the [delta] waterway and the Kyaiklat - Maubin - Yangon highway. In Pyapon he hears of plans for the cultivation of monsoon paddy, cash donations for the stormhit victims, distribution of relief supplies, contributions of various private enterprise and their participation in reconstruction tasks, supply of drinking water, progress in telephone reinstallation, power supply, rerunning of rice mills and resumption of road and water transport.

Htin Kyaw, Myanmar Times, 02/06/08. <http://www.mmtimes.com/no421/n003.htm>

Saudi Arabia has donated five planeloads of relief items, plus heavy equipment and vehicles for rebuilding cyclone-hit areas. The air shipments, totalling 365 tons, include canned foods, medicines, clothing, blankets, plastic sheets and tents. The Saudi government is also sending a ship containing 100 tons of rice, pesticides, tents and water purifiers. But the main cargo of the ship is machinery such as bulldozers, excavators, cranes, ambulances, generators and Toyota Land Cruisers needed for clearance and rehabilitation operations. The ship is expected in the port of Yangon this week, the Saudi ambassador said.

NLM, 31/05/08. <http://www.burmalibrary.org/docs5/NLM2008-05-31.pdf>

An IL-67 flight carrying 34.69 tons of office equipment, tarpaulins, two generators, three 1000-litre oil barrels, four 1000-litre water tanks, eight oil pumps, eight extinguishers and toilet equipment donated by Cambodia-based World Food Program arrived at Yangon International Airport today.

NLM, 25/05/08. <http://burmalibrary.org/docs4/NLM2008-05-25.pdf>

Energy Minister Lun Thi discussed rehabilitation tasks at the relief camp opened in Aung San Thuriya Hla Thaung Sports Ground in Kungyangon township on 21 May. At the relief camp of East Kyaunggyi Monastery, the minister accepted US\$ 50,000 donated by Malaysia-based Rinbunam Petrogas Oil Gas, K 50 million by UNOG Co, K 1 million and relief supplies by Myanmar Engineering Society, one Solar Power Supply System worth K 5 million, K 200,000, food and medicines by UE Group and donations from other wellwishers. The minister viewed supply of relief goods to the victims at Kyaunggyitaik relief camp in Kungyangon.

NLM, 24/05/08. <http://burmalibrary.org/docs4/NLM2008-05-24.pdf>

The vessel Shwe Pyi Aung carrying supplies left No 1 jetty on Phonegyi Street for Bogale and Mawlamyinegyun townships on 22/05/08. Supplies weighing 128.52 tons included foodstuff, clothes, CI-sheets and construction materials, drinking water bottles, generators and water purifying machines donated by international and local wellwishers. The supplies were loaded onto the ships today for delivery of the supplies to the storm-affected areas in Ayeyawady Division.

Marshall, IRROL, 23/05/08. http://www.irrawaddy.org/article.php?art_id=12226

I drove to Dedaye in the Irrawaddy delta this week with a team of Burmese citizens who work for an international NGO to offer food, water, clothes and medicine to survivors. Altogether, our team numbered about two dozen people, including one doctor, a professor and teachers. The road to Dedaye, the nearest of the Delta towns to Rangoon, was a terrifying sight. Miserable, desperate, hopeless people lined the road. The people who survived Cyclone Nargis are going to die if sustained aid doesn't reach them soon. With no shelter, people stood or sat in heavy rain from dawn to dusk, waiting for help from volunteer donors. These survivors said they have received nothing from the government. Police were deployed in the area last week, but they appear to do nothing but check on people entering the area. The police are fully equipped with food and other supplies. For the people living along the road, the conditions are conducive to various diseases, especially diarrhea and pneumonia. Many elderly people and children were sick. They had no source of sanitary drinking water. We gave what food, water, medicine and clothes we had. When we reached Dedaye, we saw the town had been devastated by the storm. There was no sign of any government aid effort in the town. We were all in tears as we returned home. I now feel like a sort of helpless victim myself. I wish I had more power to help the people who are living in utter despair and hopelessness. [The writer is a Burmese citizen who works for an international aid organization.]

NLM, 23/05/08. <http://burmalibrary.org/docs4/NLM2008-05-23.pdf>

A briefing on relief and rehabilitation efforts was held at Sedona Hotel in Yangon on 22/05/08. National Planning and Economic Development Minister Soe Tha told officials, diplomats, representatives of 39 donor countries and officials of 12 INGOs that 419 relief camps have been set up. Approximately 60pc of the normal power consumption rate is now being supplied in Yangon and 76pc of 150,000 communication lines are now in good condition. Water supply to Yangon by the YCDC has reached 98.5pc, he said. Also present on the occasion were 158 representatives from UN agencies, donor countries and ASEAN nations. Afterwards, representatives of UN agencies, donor countries and ASEAN nations visited Atwinpadan relief camp in Hlinethaya township and a relief camp in Dagon Myothit (North).

NLM, 23/05/08. <http://burmalibrary.org/docs4/NLM2008-05-23.pdf>

UN Secretary-General Ban Ki-moon and party went by helicopter to Kyonda village relief camp in Dedaye township where they were welcomed by Energy Minister Lun Thi and officials. Minister Lun Thi briefed them on damages caused by the cyclone in Dedaye township and the accomplishment of relief tasks by the National Disaster Preparedness Central Committee through the close supervision of Prime Minister Thein Sein. Next, S-G Ban Kimoon and party observed communication links, the supply of power through a solar system, accommodation of families and consoled the storm victims. Afterwards, S-G Ban Ki-moon, Minister Lun Thi and officials concerned flew to Mawlamyinekyun by helicopter.

AP: 23/05/08. <http://ap.google.com/article/ALeqM5iy-MfhLN9Q7MwtQ1VlrveXLjr2dAD90QUB9G1>

U.N. chief Ban Ki-moon flew over the flooded Irrawaddy delta on 22/05/08, where the ravages of a cyclone stretched as far as the eye could see: Villages were empty of life, flattened huts dissolved into vast areas of water and people perched on rooftops. The four-hour tour included two stops — one at Mawlamyinegyun, an aid distribution point stocked with bags of rice and cartons of bottled drinking water and the other at a makeshift camp where 500 people huddled in tents in the village of Kyondah, 45 miles SW of Rangoon. Kyondah — which has electricity and clean water — is somewhat of a showcase and was selected for visits by senior junta members, foreign embassy officials and international aid organizations last week. At the camp, the secretary-general was given a detailed explanation by [Energy Minister] Lun Thi of how Kyondah, formerly a cluster of seven villages with a population of 5,228, has expertly handled relief efforts. The village had 122 dead and missing, he said. He displayed charts saying the camp had 300 bags of rice, 64 boxes of instant noodles, 1,500 eggs, 12,000 bottles of drinking water and 1,240 pieces of preserved meat. Also listed were napkins, steel bowls, blankets, T-shirts, tarps and men's and ladies' underwear. While Lun Thi spoke,

Ban sat in the front row of an elaborately constructed sitting room where bowls of fruit and soda were served. Ban ate and drank nothing.

NLM, 22/05/08. <http://burmalibrary.org/docs4/NLM2008-05-22.pdf>

A ship carrying over 100 tons of relief aids and specialists stopped at Ngwezinyaw Village and Ngatantayar villages in Shaukchaung Village-tract in Mawlamyinegyun Township on 18 May and officials distributed relief aids to over 4000 storm victims and two 1000-kW generators to monasteries. Specialists provided treatment to over 100 patients on the ship. Similarly, Shwemyineaw Ship carrying over 100 tons of relief aids arrived at Myattha Ywama and Myattha Ywawa villages in the delta region. Officials distributed relief aids to over 5000 storm victims and specialists provided medical treatment to over 100 patients on the ship. They also donated one 1000 kW-generator to the monastery in the village of Myattha Ywawa. [Photo on p 11 of the print edition of NLM of workmen carrying out repairs on an electricity distribution pole in Bogale.]

NLM, 21/05/08. <http://burmalibrary.org/docs4/NLM2008-05-21.pdf>

A Labutta-based military vessel loaded with 25 tons of rice, palm oil, tarpaulin, rubber sheet, purified water, clothes, pipe, pumps, soap, tents, dry noodles, dry fish, generators, snacks, salt, potato, gram and diesel transported them to Polaungyi rehabilitation camp in the township.

NLM, 20/05/08. <http://burmalibrary.org/docs4/NLM2008-05-20.pdf>

General Than Shwe and party visit the relief camp in Kyonda Village in Dedaye township where they view medical treatment being given to storm victims. They also look into measures taken to set up a solar-powered electrical system in the camp and open a CDMA station, as well as to supply drinking water and electricity with generators and to cook using gas stoves. [Photo on p 8 of the print edition of NLM showing Gen Than Shwe looking at the solar panel in the camp.]

NLM, 19/05/08. <http://burmalibrary.org/docs4/NLM2008-05-19.pdf>

Photo on p 2 of portable generators at a relief camp in Kyondah Village in Dedaye township.

Moe Aung Tin, IRROL, 19/05/08. http://www.irrawaddy.org/article.php?art_id=12119

Despite all the aid pledged to Burma's cyclone victims, many supplies dispatched to Laputta are still not being delivered to those in need, according to residents in areas where refugees are sheltering. "We passed by a convoy from the Max Myanmar company, which was carrying assistance to Laputta Township," said a private donor from Rangoon, who volunteered to distribute emergency aid in Laputta on May 14. "I asked the drivers what they were carrying and they told me sacks of rice, generators and batteries donated from Japan. When I arrived in Laputta and went to the monasteries, they said they hadn't received any batteries or generators." Nonetheless, some volunteers, monks and refugees in Laputta—one of the areas most devastated by the cyclone—said they had received some international assistance from the United Nations Development Project (UNDP), the World Food Programme (WFP) and other international NGOs, in the form of food, shelter, water purification equipment and free medical services.

Thet Khaing, Myanmar Times, 19/05/08. <http://mmtimes.com/no419/n001.htm>

"The government is making its best efforts to clear debris [and provide] access to safe drinking water, electricity, communication services and smooth transportation," Myanmar's ambassador to the UN in Geneva, U Wunna Maung Lwin, said on May 16. He was quoted as saying in a statement released by his office that "1700 UN personnel from 10 UN agencies, the UN country team, 10,000 volunteers from the national Red Cross network and national and international NGOs are actively working together with the government in the relief efforts". He added that six military divisions had also been deployed to help with relief efforts. U Wunna Maung Lwin said the government has provided K20 billion for relief, with another K5.5 billion contributed by local businesses. "But we are still struggling with a shortage of clean water, electricity outages and telecommunications break-downs," he said.

Rebecca Palmstrom and Thomas Kean, Myanmar Times, 19/05/08. <http://mmtimes.com/no419/n002.htm>

Merlin, a UK-based medical NGO, is seeking medically trained volunteers, including doctors, nurses, midwives and community health workers, for relief efforts in the Labutta area. Five doctors from Yangon were sent to the delta on May 12 and Dr Sean Keogh from the organisation said Merlin would like more volunteers to come forward. Merlin, with the help of local company Pandal Cruises, has found a unique way

to overcome the problem of transporting staff and goods to the delta while providing shelter and a clean surgical environment. Pandal Cruises has provided Merlin with the use of an 80-foot boat, which they will transform into a floating hospital for use in the badly hit area of Labutta. "Once we get the boat to Labutta we'll turn it into a medical clinic," said Merlin's maritime operation coordinator, Mark Howard. "On this boat we've got access to clean water and adequate power supply, which means the doctors can do minor surgical operations in ideal clinical conditions. The boat will also serve as a bit of a base. For the moment, it will become a sort of operational headquarters for Merlin." But diesel supply is also an issue for INGOs. "Everything is dependent on us getting adequate diesel supplies," Dr Keogh said. "If anyone can help us out with that it would also make a difference."

NLM, 18/05/08. <http://burmalibrary.org/docs4/NLM2008-05-18.pdf>

PM Thein Sein and members of the National Disaster Preparedness Central Committee party visited Labutta and greeted diplomats from Yangon and abroad who were there to observe cyclone relief operations. The PM presented CDMA-450 telephones to be used in reconstructing the township and prizes to MPT engineers who have performed smooth and speedy communications. At Labutta Port, they viewed the unloading of relief supplies including construction materials from vessels. On arrival at Pyapon, Hotels and Tourism Minister Soe Naing who is supervising rehabilitation tasks in Pyapon township, reported on efforts to return the township to normalcy and participation of companies. At both Labutta and Pyapon, the PM met with officials, saying that relief works have been completed and enough work has been done to look after the victims. Now, priority is to be given to resettlement. Arrangements are to be made for those who are at nearby relief camps to return to their places of their own volition. He said that as the monsoon is setting in, arrangements will be made for farmers to carry out their farm work by opening tractor camps under the leadership of Agricultural Mechanization Department. Necessary farm equipment will also be provided for people who earn their living by engaging in farming or fishery.

NLM, 18/05/08. <http://burmalibrary.org/docs4/NLM2008-05-18.pdf>

Led by Energy Minister Lun Thi, a group diplomats and resident representatives of the ASEAN Secretariat and UN agencies visited Kyondah village relief camp in Dedaye township on 17/05/08. At the camp officials showed them the solar energy system, accommodation of victims in tents, distribution of relief items, supply of electric power with the use of a generator, clinic, water purifying machine, supply of drinking water from tube-wells, mess, kitchen, and latrines. On arrival at Dedaye, they were briefed on conditions in the township, and progress in relief, supply and rehabilitation tasks and they observed the accommodation of the victims family-wise, supply of electricity and drinking water, storage of supplies, and the clinic. Another group of diplomats viewed conditions in Orelief camp in Pyapon and Setsan village in Bogale township where they observed supply of electricity, phone lines installed, dispensary, medical store, mess, kitchen, latrines and supply of purified water.

NLM, 17/05/08. <http://burmalibrary.org/docs4/NLM2008-05-17.pdf>

Officials of several companies including Htoo Trading and Air Bagan, Eya Shwewah, FMI, Shwe Thanlwin, Tetlan, AyonU, handed over shelter boxes that will be supplied to storm-hit regions of Ayeyawady Division. In addition, the companies donated rice, edible oil, medicines, purified drinking water, clothes, tents, generators, pumps and other things to the victims of Bogale township.

Ed Cropley, Reuters, 16/05/08. <http://www.reuters.com/article/featuredCrisis/idUSBKK219409>

In the storm-struck town of Kunyangon, about 60 miles southwest of Yangon, Burma's military rulers have started distributing small amounts of emergency food there. "I am one of the few survivors," said one lady in her 60s, who did not want to be named. "I came here to ask for some rice." Her clothes -- a grubby grey top and faded black longgyi, or sarong -- are the same she wearing when the May 2 storm struck, sweeping away her home and possessions. "I only survived by climbing a tree," she said. Around the town, the countryside remains a mess of half-submerged trees, snapped electricity pylons or bamboo poles -- the skeletal remains of a house -- leaning at crazy angles. Villagers say they are slowly burying the bloated corpses of friends and relatives that have littered the rice fields for the last two weeks. But the stench of death remains.

IRROL, 16/05/08. http://www.irrawaddy.org/article.php?art_id=12055

International aid groups have sent hundreds of tons of emergency supplies to Burma's cyclone victims, but local aid workers say no aid is reaching huge numbers of homeless in the Irrawaddy delta, 13 days after the devastation. According to the UN World Food Programme (WFP), it has dispatched more than 700 tons of rice, high-energy biscuits and beans to nearly 100,000 people (about 7 kg per person) in cyclone-affected areas in Burma. However, there are at least 1.5 million homeless, say officials. A worker at Rangoon airport told an Irrawaddy correspondent that generators and water-treatment equipment unloaded from a foreign aircraft had been sent to Naypyidaw, seat of the Burmese military regime. Richard Horsey, a spokesman for UN humanitarian operations in Bangkok, said investigations into cases of misappropriated aid are now underway. Because of geographical and logistical difficulties, he said supplies are not reaching survivors quickly enough, but "the ability to deliver aid is increasing everyday."

NLM, 13/05/08. <http://burmalibrary.org/docs4/NLM2008-05-13.pdf>

An A-6 MX-A flight carrying 34.5 tons of medicines, blankets, mosquito nets, clothes, generators and water purifiers donated by World Doctors Group in France and the French Red Cross Society arrived at Yangon International Airport today.

BKK Post, 11/05/08. http://www.bangkokpost.net/News/11May2008_news00.php

Former prime minister Surayud Chulanont and a six-member entourage will fly to Naypyidaw today in an effort to convince the ruling junta to accept humanitarian aid for cyclone victims. Princess Maha Chakri Sirindhorn ordered three electricity generators along with a second package of disaster relief aid to be sent to Burma. The relief packages include 20 water purifiers and six boxes of water purifying tablets, 500 packs of basic commodities, 120 boxes of chocolate-malt powder, 63 large tents, 34 small tents and 300 pieces of plastic clothes. The packages, prepared in cooperation between the air force, the Thai Red Cross and the Puen Pung (Pha) Yam Yak Volunteer Foundation, arrived in Rangoon yesterday.

AP, 10/05/08. <http://www.ihf.com/articles/ap/2008/05/10/europe/EU-GEN-Red-Cross-Myanmar-Aid.php>

The international Red Cross has sent its first flight to Myanmar following Cyclone Nargis. The IFRC plane with 35 MT of relief goods left Geneva on Friday evening, said spokesman Marcal Izard. The cargo contains pumps, generators, water tanks and other water treatment equipment, as well as basic health care for about 10,000 people and surgery material. Izard told AP that the relief goods are "destined in first place to cater for those in labor camps and prisons."

Aung Hla Tun, Reuters, 09/05/08. <http://news.uk.msn.com/Article.aspx?cp-documentid=8276110>

The United Nations said it would resume aid flights to cyclone-struck Burma despite the military government's seizure of food supplies on Friday, and Burma has approved one U.S. aid flight. The U.N. World Food Programme initially said it was suspending flights after Burma impounded food shipments for survivors of Cyclone Nargis, which killed tens of thousands of people and left an estimated 1.5 million needing food, water and shelter. Speaking to U.N. ambassadors after the launch of a U.N. appeal for \$187 million for cyclone aid, Burma's ambassador, Kyaw Tint Swe, said a deputy minister had met the U.S. chargé d'affaires in Rangoon and said U.S. aid was welcome. He said he understood the first U.S. C-130 cargo flight would arrive as soon as Monday. "What we urgently need are medical supplies, food, clothing, electricity generators, material for emergency shelter as well as financial assistance," he said, welcoming the U.N. appeal.

NLM, 08/05/08. <http://myanmargeneva.org/NLM2008/eng/5May/n080508.pdf>

The Republic of India donated medicines and medical equipment, foodstuff, general products and three 3-KVA generators to cyclonic storm Nargis-hit regions of Myanmar at the jetty of the Ayeyawady Naval Region Command at Thilawa Port here this afternoon. the Indian ambassador to Myanmar, Mr Bhaskar said that the donation was only the first and that more would follow. The supplies and the three 3-KVA generators have already been distributed to the storm-hit areas.

NLM, 08/05/08. <http://myanmargeneva.org/NLM2008/eng/5May/n080508.pdf>

A total of 330 6-person-capacity tarpaulin tents and 50 generators from Japan arrived at Yangon International Airport, here, by TG-303 flight today

NLM, 07/05/08. <http://burmalibrary.org/docs4/NLM2008-05-07.pdf>

Maj-Gen Tha Aye of the MoD and party went to Hpa-an where they met with the Disaster Preparedness Committee of Kayin State and were briefed on the preparations taken to prepare for [Cyclone Nargis] and the measures taken since the storm. Afterwards, they went to Myainggalay [across the river from Hpa-an] where they looked into the resumption of operations at the 4000-ton and 800-ton cement plants. At Thaton in [Mon state] they observed the repair of power lines by the staff of EPM No 2. Upon arrival at sub-power station, Maj-Gen Tha Aye gave instructions to officials there to focus on power supply tasks and to avoid causing power outages.

NLM, 07/05/08. <http://burmalibrary.org/docs4/NLM2008-05-07.pdf>

A press conference on conditions in regions of Myanmar struck by the cyclonic storm 'Nargis' and relief measures being taken was held at the Myanmar Radio and Television Hall on Pyay Road on 06/05/08. Information Minister Kyaw Hsan said the National Disaster Preparedness Central Committee was informed of the cyclone. The NDPCC was formed in 2005 to take necessary measures in case of disaster drawing lessons from the incident of Tsunami that occurred in SE Asian region in December 2005. The Government has earmarked K 5 billion to be spent on relief work and aids, and assistance from the people and businessmen are required to normalize the situation as the storm caused heavy loss and damages. Relief aids from local as well as foreign countries are needed to help victims.

NLM, 06/05/08. <http://burmalibrary.org/docs4/NLM2008-05-06.pdf>

Diplomats and representatives of UN Agencies were briefed on the situation of the areas hit by the cyclonic storm Nargis at the Ministry of Foreign Affairs here on 05/05/08. Minister U Nyan Win explained loss of lives and destruction caused by Nargis that occurred in Myanmar beginning 2 May. According to information so far received, there were over 10,000 deaths in Ayeyawady Div, 59 in Yangon Div and about 3,000 people missing. The severe storm caused the temporary cut of power supply and telephone communications. IDD calls were cut off during Nargis on 3 May but MPT has repaired the connection and IDD calls resumed operation at noon on 4 May. iPstar satellite phone lines can also be used. Twenty five mobile radio stations in Yangon resumed operation on 05/05/08.

AP, Reuters: 05/05/08. http://www.irrawaddy.org/highlight.php?art_id=11757

At least 351 people were killed and nearly 100,000 left homeless when tropical cyclone Nargis tore through the delta area of southern Burma, razing thousands of buildings and knocking out power lines, state media said. On Hainggyi island off the country's southwest coast 162 were killed, military-run Myaddy television station reported on Monday while many others died in the low-lying Irrawaddy delta. "The Irrawaddy delta was hit extremely hard not only because of the wind and rain but because of the storm surge," said Chris Kaye, the UN's acting humanitarian coordinator in Rangoon. "The villages there have reportedly been completely flattened." State television reported that in the Irrawaddy's Labutta township, 75 percent of the buildings had collapsed. The UN planned to send teams on Monday to assess the damage, Kaye said. Initial assessment efforts had been hampered by roads clogged with debris and downed phone lines, he added.

CHIPWI CREEK PLANT TO POWER HUGE HYDEL PROJECT IN KACHIN STATE

Kyaw Thu, Myanmar Times, 24/03/08. Rewritten. <http://mmtimes.com/no411/b002.htm>

On 27/02/08, the Dept of Hydropower Implementation (HPID) under the Electric Power Ministry No 1 and China Power Investment Corp (CPIC) signed a contract to build the Chipwi Nge hydropower project in Kachin State. The power plant at the dam will supply the electricity required to build seven other dams that CPIC plans to build [in the upper part of Kachin state].

The installed capacity of Chipwi Nge hydropower project will be 99 MW with costs estimated at more than US\$ 50 million. The Chinese firm will foot the bill to build this plant. "Once the other seven projects have been completed, the Chipwi Nge dam will be given to Myanmar," said an energy expert close to EPM-1.

According to the same source, a feasibility study that will pave the way for the construction of the seven mega-hydropower projects is expected to be finished by the end of 2008. The planned projects will

theoretically produce a total of 16,500 megawatts of electricity and are expected to take 15 years to build. Experts from both countries have been conducting surveys to produce the feasibility report for the projects. The reports will likely determine whether Myanmar's government gives the projects a green light.

Compiler's note: The CPIC construction projects referred to under this key article are the Chipwenge (Chip Nge) project and six megaprojects in the N'maikha and Malikha valleys. For information related to CPIC's Ayeyawady confluence project (often referred to as the Myitsone dam project), see: 'Agreement signed for Upper Kachin hydropower projects ([Myitson](#))' (NLM: 02/01/07). Some items are included under both key articles owing to common sponsorship of the projects by CPIC. Power from the Chipwenge station will also be used in the construction of the Myitson dam and power station. For information on transmission of the power generated by these projects see [Chinese engineers planning](#) grid connection (IRROL: 23/01/10).

Map references:

A good set of maps for understanding the context in which the Maykha-Malikha valleys series of dams will be built is to be found in *Damming the Irrawaddy*. The locations of the major dams are tentatively pinpointed on doc p 17. Note that some of these locations have changed since publication of the report.

<http://www.burmariversnetwork.org/images/stories/publications/english/dammingtheirrawaddy.pdf>

The Burma Rivers Network also has a map its main page showing the locations of the dams in the Maykha – Malikha valleys with the project sites hyperlinked to information about each of the dam components of the larger project. Note that the information on the location and potential megawatt capacity of the dams pinpointed on this map has not been updated in line with recently announced changes.

<http://www.burmariversnetwork.org/>

The older U.S. Army maps below provide detailed information about the topography of the areas in which the dams on the N'mai Hka and Mali Hka will be located.

China 1:250,000: Series L 500, NG 47-10: T'eng Ch'ung

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-10.jpg>

Lawngkyaw (25° 48' N, 98° 12' E), near the site of the Chipwenge dam, can be found in grid square 38\09, 10\00. Mangtong (25°57' N, 98° 10' E), near the site of the Chipwi dam, can be found in grid square 38\09 10\02,

China 1:250,000: Series L 500, NG 47-06: Fu Kung

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-6.jpg>

The Wuhsauk dam (1800 MW) will likely be located near the village of Wutsok (26°19' N, 98°16' E) on the west bank of the N'mai Hka, close to the mouth of the Ngaw Chang Hka on the east bank. Yunnan Power Investment, a subsidiary of China Power Investment, signed an MoU with EPM-1 to construct a four-dam cascade ([nc](#)) on the Ngaw Chang on 26/02/09. These smaller dams will probably be in place before the Wusauk dam is built. Wutsok can be found on the Fu Kung topo map in grid square, 39\00 10\06.

Another dam, the Yinan (sometimes referred to as the Yelan), with an estimated generating capacity of 1200 MW, has been identified in recent reports of the hydropower minister. Yinan is said to be located in Tsawlaw township but it has not been possible to pinpoint the site more exactly. The Yinan dam may replace the now cancelled Pashe (26°29' N, 98°19' E) and Lakin (26°37' N, 98°22' E) dams on the N'mai Hka.

<http://www.burmalibrary.org/docs08/NLM2010-02-05.pdf>

The Phizaw dam (2000 MW) will apparently be located near the village of Hpizaw (26°57' N, 98° 24' E) on the east side of the N'mai Hka. See grid square 39\1, 11\4 on the Fu Kung topo map.

The Laikzar dam (1900 MW) on the Mali Hka appears to be planned for a site east of the village of Laza (26°30'N, 97°38'E) on the Fu Kung topo map. A possible location could be south of the point where the Sinan Hka enters the Mali Hka. See grid square 38\4, 10\7.

China 1:250,000: Series L 500, NG 47-02: Kung Shan

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-2.jpg>

The presumed location of the Phizaw dam noted above seems surprisingly close to the next dam upriver which takes its name from Khawnglanhpu (27°04' N, 98°21' E), a market town near the junction of the N'mai Hka and the Aukyang. The Khawnglanhpu power station is projected to have a capacity of 2700 MW.

Description of the N'mai Kha (Maykha) river valley <http://www.ultimatedescents.com/Mayhka.htm>
<http://www.intraffed.com/mediamarketing/files/RAW2007June.pdf>

In February and March of 2003 a team of kayakers and rafters were invited to explore the rivers of Kachin State. These rivers are fed by the eastern-most Himalayan peaks high up near the isolated border between Myanmar, India and Tibet. The team was searching for potential commercial river trips and completed the first descent of the Mayhka (N'maihka) river and tributaries by raft and kayak. In the process we discovered what is probably the most challenging wilderness rafting trip on the planet. This is the Mayhka (N'mai Hka), basically the "Everest of Rivers", one of the planet's great unexplored rivers. The expedition is extreme: the water is challenging and powerful and the area is totally isolated.

Mayhka [N'mai Hka] means 'mother river', but the local Rawang people call it the 'impossible river', because the terrain is so steep and convoluted that it is difficult to farm and damn hard to get anywhere. The easier rapids on the Mayhka hold Zambezi style whitewater with some premiere play waves and holes. The harder rapids are not unlike the Yarlung Tsangpo in Tibet, Biblical in size and closely resembling a toilet flushing into an industrial rototiller. The only consolation is that everything finishes in a pool, so you can actually get out amongst it all and run meaty lines. Sheer granite walls are polished 60 feet above the river indicating the height of the monsoon flows and it is intimidating to even consider being here when the river is running high. Our trips will run the river in late winter to take advantage of the lowest water flows possible and settled weather.

Starting point for the trip on the Maykha is Bang Nam Dhim (aka in English as Pannadin or Panandin). It is reached from road's end at Ratbo by a four day trek through dense sub-tropical forest where lush vines and creepers entwine sculptured trees in a living paradise of old-growth climax forest. Legendary British botanist Frank Kingdon-Ward passed through this area in the 1920's and described it as one of the most beautiful places he had ever been. On the last day, leaving Gawle village behind, we climb steeply all day to the pass that separates the Malikha watershed from the Mayhka river valley. Upon cresting the top of the hill we catch our first glimpse of the Mayhka river snaking below. After an extremely steep descent through thick forest we reach Bhang Nam Dhim where the Nam Tamai, the main source of the Maykha, flows beneath a suspension bridge of bamboo and rattan that crosses to the village.

Thirty kilometers above Bhang Nam Dhim is the small Rawang village of Tazungdam where the Seinhkuwang and Adungwang join forces to become the Nam Tamai. Here, at its starting point the river flows at at 1500 cubic feet per second (cfs) of champagne blue. The first rapids are a maze of boulders ending in steep chutes, not too powerful just real quality whitewater and extremely fun. The villagers are amazed at the kayaker's skills and run down the river trying to see every move, cheering and clapping every time they surface from a drop. The rest of the day is liquid bliss; cataracts mile after mile with lush jungle clinging precariously to canyon walls and surreal mountains suspended high above the forested ridges. In our descent back down to Bang Nam Dhim we cover in seven hours what had taken four days to trek. It rains all day and the main tributaries coming in are running really high, huge boulders tumbling along the river bottom sound like giant billiard balls colliding and rain is bouncing off the river in globes of water. Every valley brings in a powerful stream and there are countless valleys. By late afternoon when we arrive again at Bhang Nam Dhim, the river is flowing at about 4,000 cfs.

Eighteen km below Bhang Nam Dhim the Tamai collects first the Dabluwang, then the Taronwang (Dulong) which rises in Tibet. Here the Tamai officially becomes the Mayhka (N'maihka), flowing brown at about 12,000 cfs -- roughly the volume of the Grand Canyon of the Colorado. From the Taron junction to the mouth of the Chipwi Nge near Laukhaung, a distance of a little over 160 km, the Mayhka is joined by four other large rivers all flowing down from the snow-capped Gaoligong range along the Yunnan – Kachin border. Near Khaunglanhpu (27°04' N, 98°21' E), the Aukyang enters, then the Mekh near Shikya (26°44' N, 98° 24' E), the Lakin just west of Welatam (26°37' N, 98°22' E), the Ngaw Chang Hka near Wutsok (26°19'

N, 98°16' E) and the Chipwi Nge at Chipwi (25°53' N, 98°08' E); By the time we get to Lauhkang the river is flowing an extremely powerful 30,000 cfs.

The Mayhka River gorge is one of the most heavily forested and pristine areas in the world. Wildlife is abundant, as the steep canyon walls make access impossible in many parts except by the river. After Bang Nam Dhim, the only village of any size along the upper part of the Maykha is Ridam, a Rawang tribal village. Staying overnight at Ridam is a highlight of the trip and an amazing chance to experience a totally different way of life. Far away from heavily trodden trails and towns, the people along the Mayhka are remarkably friendly and curious. In the upper stretches of the river the campsites are few and far between while camping on the lower Mayhka is awesome. The massive floods of the monsoon deposit huge tracks of pure white sand along the river that are ideal to camp on. If you're into fishing, the Mayhka offers the best fishing in Myanmar. Some of the masheer and catfish get big enough to scare you.

When initially researching the river from maps we estimated that we had about 85 miles between Bhang Nam Dim and Lauhkang with an average gradient of 12 ft/mile, and 60 miles at 25 ft/mile. With these gradients we had been concerned that there wouldn't be too many extreme rapids but the river consistently manages to store gradient for one to two miles then let it all go at once with impressive results. Frequent scouting is mandatory, and portaging very difficult due to the constricted river channel and conglomeration of house sized boulders. It is only in the last few days above Laungkhang that the river eases and spreads, and it is possible to paddle without so much scouting. After days of continuous hard rapids It's a novelty to be able to see the bottom of a rapid from the top. There are still huge hydraulics but also space to move around. On the last day as we drifted downstream in 2003, we came across Chinese loggers blasting a road and trucking all the timber out, it is a shocking reintroduction to civilization. This area is on the cusp of change as roads are pushed upstream. The Mayhka valley has gold, gems and pristine forests and there are Chinese businessmen filtering across the border for these very reasons. Environmentally, the clock is ticking for one of the last true wilderness areas left in Southeast Asia. From our last campsite nestled in the rock formations of the lower canyon we drift down to Lauhkang, the first town we've seen for 15 days. Lauhkang isn't much of a town, but even so it's hard to get re-accustomed to the sounds of civilization. Even a little town like Lauhkang serves to remind us just how quiet the last 15 days have been. Having successfully completed the first commercial raft descent of the Mayhka River we should all be ready for a celebration.

The impact of logging by Chinese and Kachin companies in the area of east of the N'mai Hka along the western slopes of Gaoligang range is dealt with in Global Witness publication, *A Conflict of Interests*, issued in October 2005, several years before China Power Investment Corp went public with its proposal to develop the hydropower potential of the northern Kachin rivers. The five pages of the report dealing with the so-called 'N'Mai Hku Project' (Mayhka Headwaters project) are a must-read for anyone interested in this little known region of Burma/Myanmar (pp 104-8). The project it describes is a "combined logging and mining operation" that would exploit the exceptionally rich untapped gold, lead, zinc and silver resources of the area, as well extracting up to 150,000 cubic metres of hard and coniferous wood annually for 15 years from an area virtually unlogged before. A road network into the area from the Chinese side of the border is described as being rapidly developed. Two maps and a number of photos accompany the text. A follow-up report by Global Witness, *A Choice for China*, outlines further developments in the headwaters region up to 2005. (pp 66-7). Contrary to the suggestion presented in the account of the rafting group of a great empty land around them as they plunged down the N'maihka, the logging watchdog group quotes a survey that found that there are 16 large villages and 49 smaller ones of Lisu and Rawang groups in the headwaters area. These villages would be the smaller rivers and streams away from the main river itself.

http://www.globalwitness.org/media_library_detail.php/113/en/a_conflict_of_interest_english

http://www.globalwitness.org/media_library_detail.php/492/en/a_choice_for_china_ending_the_destruction_of_burma

Data summary: [Chipwenge](#) [Chipwi](#) [Wusauk](#) [Yinan](#) [Phizaw](#) [Khaunglanhpu](#) [Laikzar](#)

For information on the dam and power plant under construction at the confluence of N'mai Hka and Mali Hka rivers see 'Agreement signed for Upper Kachin hydel projects' ([Myitson](#)). Recent information on the Myitson project and relocation sites is also available at [ELEP035](#).

NLM, 22/03/11. Edited and condensed. <http://www.burmalibrary.org/docs11/NLM2011-03-22.pdf>

Replying to a question in Parliament from Kachin State representative Zakhun Ting Ring as to what arrangements are being made for the people who live in the area where the Maykha-Malikha hydropower projects are under construction, EPM-1 Zaw Min said that the seven hydropower projects to be implemented in Maykha-Malikha river valleys include the Chepwe, Chepwenge, Wusauk, Khaunglanphu, Yinan, Phizaw and Laiza dams and power stations. Together they will have a generating capacity of 12499 megawatts. It will take 15 years to complete all of them. Currently there are opportunities for locals to work on stone and sand production, building and road construction, civil engineering works in the projects and supplying food for the tens of thousands of workers on the projects. An all-weather 261-mile motorway is to be built from Myitsone to the Yinan dam site and a 170-mile motorway from Myitsone to Laiza.

NLM, 26/12/10. <http://www.burmalibrary.org/docs11/NLM2010-12-26.pdf>

The Chipwe [Creek] Hydropower [Station] was opened at the project site on 22/12/10 with the attendance of government ministers and representatives of the China Power Investment Corporation (CPI) and Asia World Co Ltd as well as people from the area. The project is being implemented by CPI Yunnan International Power Investment Co Ltd. Work continues on the power station, and installation of the machinery there. [Photos of the opening ceremony, as well as the dam and the power station are included in the print edition of NLM. The dam and the power station appear to be in separate locations. The photo of the dam shows it be surrounded by steep hills. It would appear to be a file photo as the reservoir area behind the dam has no water in it. The power station where the launching ceremony took place is in a relatively level area where there was seating for a crowd of several thousand people.]

NLM, 30/11/10. <http://www.burmalibrary.org/docs09/NLM2010-11-30.pdf>

Lt-Gen Min Aung Hlaing of the MoD visits the Chiphwenge hydropower plant and is briefed by U Maw Win of the Hydropower Implementation Dept of EPM-1 and Project Director Wejie of CPI Yunnan International Power Investment Co Ltd. He is given a tour of the power house and water outlet channel. [Accompanied by a photo of the partially completed base of one of the the turbines.]

NLM: 17/10/10. Edited. <http://www.burmalibrary.org/docs09/NLM2010-10-17.pdf>

The Chipwenge hydropower project is located on the Chipwe River, 11 miles from Chipwe. The main embankment will be of concrete, 722 feet long and 156 feet high. The water tunnel is 6.9 miles long and the water diversion tunnel, 898 feet long. The water storage area is 0.129 square mile. The watershed area is 213.24 square miles. The power house [downstream from the dam site] is of re-inforced concrete, 200 feet long and 93 feet wide. Three 33-MW generators will be installed which are expected to generate 599 million kWh yearly. Engineers and workers are making strenuous efforts for operating the power plant in June 2011. The government is building the hydropower plant by spending a large sum of money. [A good photo shows the partially completed sluice gate of the dam.]

NLM, 24/09/10. <http://www.burmalibrary.org/docs09/NLM2010-09-24.pdf>

EPM-1 Zaw Min meets with V-P Zhang Xiaolu and Chief Engineer Xia Zhong of China Power Investment Corp (CPI) and GM Li Guanghua and party of CPI Yunnan International Power Investment Co Ltd (YPIC) of the PRC. They focus on joint implementation of hydropower projects.

International Crisis Group, *China's Myanmar Strategy: Elections, Ethnic Politics and Economics*, p. 8 (Beijing, 21/09/10). <http://www.crisisgroup.org/~media/Files/asia/north-east-asia/B112%20Chinas%20Myanmar%20Strategy%20%20Elections%20Ethnic%20Groups%20and%20Economics.ashx>

Footnote 88: "China Power Investment Corporation is investing \$30 billion in the Shweli-2 hydropower facility." [In support of this statement the footnote cites 于洪海 [Yu Honghai], 《开发东南亚水电，助力西电东送》， ["Develop Southeast Asian hydropower, support transferring power from Western China to Eastern China"], in 《中国能源报》 [China Energy], 12 May 2010.] **Compiler's note:** The reference to CPIC investing in the Shweli-2 hydropower project is an error. The citation almost certainly refers to the network of dams and power plants that China Power Investment Corp is developing on the main rivers in northeastern part of Kachin state. According to published reports, the total megawatt capacity of the eight projects including the Myitson confluence project would total 18,500 MW. At a total of \$ 30 billion for the entire program this would work out to approximately \$ 1.6 million per megawatt.

KNG, 23/07/10. <http://www.kachinnews.com/News/Landslides-hit-Chipwi-dam-site-in-northern-Burma.html>
Incessant heavy rain has triggered landslides which hit the Chipwe dam construction site along the N'Mai Hka river on 21/07/10. Local sources said the landslides occurred in two places where Chinese workers are constructing underground tunnels through mountainous terrain along the riverbank. It is not yet known whether there were casualties. As soon as the landslides began, workers at the site ran to safer places, sources said. Landslides have also blocked the highway between Kambaiti, Sadung and Waingmaw. They remain blocked according to residents. [The article is accompanied by a photo of workers in one of the tunnels.]

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>
EPM-1 Zaw Min reports to the Special Projects Implementation Committee that (among others) his ministry currently has the following hydro electric generation projects involving foreign investment under planning and development: Ayeyawady Myitson - 4100 megawatts; Yinan - 1200 megawatts; Khaunglanphu - 2700 megawatts; Phizaw 2000 – megawatts; (6) Wuhsauk -1800 megawatts; (7) Chipwe - 2800 megawatts; (8) Chipwenge - 99 megawatts; (9) Laikzar - 1900 megawatts. (Compiler's note: this list repeats the same information that EPM-1 Zaw Min reported to a SPIC meeting in November 2008. See below: NLM 16/11/08));

NLM, 01/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-01.pdf>
At the Chipwenge hydropower project near MP 12/4 on Chipwe-Panwa Road 11-miles southeast of Chipwe, Lt-Gen Tha Aye of the MoD looks into construction work and the installation of the penstock pipeline.

NLM, 31/12/09. http://www.burmalibrary.org/docs08/Electricity_article-NLM2009-12-31.pdf
Completion of the 99-MW Chephwenge hydropower project is targeted for 2011.

Kachin Development Networking Group, *Resisting the Flood*, October 2009.
<http://www.burmariversnetwork.org/images/stories/publications/english/ResistingtheFlood-1.pdf>
Work is moving ahead at the Chibwe dam site on the N'mai Hka near Mandung (Mangtung: 25°57' N, 98° 10' E) village, ten miles above the town of Chibwe. Buildings for staff, labourers and government officials and two helipads were built in Mandung in mid-2008. Beginning in late 2008, technicians conducted surveys and collected core samples. Now, work on the main dam is underway. Photos on pp 14 & 15 of the report show evidence of land clearing operations at the dam site and a tiered stone wall near Nan Oo village as well as an artist's 'airscape' of the finished Chibwe dam looking upstream. The millrace and powerhouse are shown on the west bank of the river. The main control gate and spillway are shown on the east bank.

China Gezhouba Group, 02/09/09. <http://stock.sohu.com/20090902/n266393997.shtml>
On 30 August, workers of the Gezhouba Group poured concrete for the first warehouse at the Chibwe dam site in Myitsone, Myanmar. This symbolized the second stage of Chibwe dam's construction, which includes earth excavation and concrete pouring. Chibwe hydropower station is located on the Chibwe river, a tributary of the N'Mai Hka river. The Gezhouba Group has been awarded the contract for construction of the concrete gravity dam which will 47.5m high and 220m long.

NLM, 21/06/09. <http://www.burmalibrary.org/docs07/NLM2009-06-21.pdf>
[During a visit to the PRC by SPDC Vice-Chairman Gen Maung Aye, . . . Myanmar Ambassador U Thein Lwin and President of China Power Investment Corporation Lu Qizhou signed an MoA between the Dept of Hydropower Implementation and China Power Investment Corp for the development, operation and transfer of the hydropower projects in the Maykha, Malikha and Upstream of the Ayeyawady-Myitsone river basins and exchanged notes" on 16/06/09.

NLM, 02/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-02.pdf>
Officials of China Power Investment Co Ltd (CPIC) led by PRC Minister of Energy Zhang Guobao together with Deputy EPM-1 Myo Myint visited the Ayeyawady confluence hydropower on 29/03/09. They were briefed on the implementation of the Ayeyawady Confluence and the Chibwaynge hydropower projects by Engineer Shi Su Byan of CPIC.

NLM, 28/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-28.pdf>

Maj-Gen Ohn Myint of the MoD visits Chipwenge hydropower project near Lankyaw village (25° 48' N, 98° 12' E) in Chipwe township and views work on the embankment and intake channel. [A photo of trucks hauling earth is included in the print edition of NLM.]

NLM, 27/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-27.pdf>

Maj-Gen Ohn Myint of the MoD visits the worksite of the Chiphwenge hydropower project being implemented by HPID of EPM-1 near MP 82 on the Chiphwe-Panwah road, 11 miles south of Chiphwe, where he inspects No 6 approach tunnel. [A photo of the tunnel entrance is included in the print edition of NLM.]

KNG, 13/01/09. http://www.kachinnews.com/index.php?option=com_content&view=article&id=699:over-1000-chinese-workers-in-burmas-chibwe-hydropower-project&catid=1:latest-news&Itemid=50

To expedite hydropower projects near Chibwe, about 1,000 Chinese workers have been brought to the project site since late December, 2008, acdg to local sources. The Chinese workers are employed by [companies contracted by] China's China Power Investment Corporation (CPI) together with about 300 Burmese workers of the Asia World Co. The number of Chinese workers has increased significantly from about 300 in early December, 2008. The workers are engaged in survey work along the N'Mai river near Chibwe as well as in preparations for construction of a smaller hydropower plant on Chibwe creek. The Asia World Company is also working on a building -- 300 x 50 feet -- on the Chibwe football ground which will be used [as the centre of operations] for the hydropower projects. Awng Wa of the Kachin Development Networking Group (KDNG) based on the Sino-Burma border told KNG that the Chinese companies under the CPIC were also taking out valuable minerals from the project areas to China while working on the hydropower project.

KNG, 05/12/08.

http://www.kachinnews.com/index.php?option=com_content&view=article&id=664:junta-kick-starts-construction-of-chibwe-hydropower-project-special&catid=1:latest-news&Itemid=50

Since October, three helipads have been built on the public football ground in the mountainous town of Chibwe near the N'mai river in northeastern Kachin state. They will be used for official visits to the town in connection with hydropower projects in the area. At the moment, over 200 Chinese workers and approximately 300 Asia World Co workers are employed at the site of a project on Chibwe creek. Eye witness reports say they are drilling tunnels through the mountains using power shovels, drilling machines and trucks. The power plant on Chibwe creek is expected to produce electricity that will be used in the construction of much larger dams and power stations on the N'mai hka. Survey work for one of the large projects on the N'maikha near Chibwe town is continuing. Local farmers said they have not been able to work their farms properly since the project started in early 2007. Much of their farmland is in the survey area and some farms have been dug up by power shovels or converted into roads. They have not been compensated for their losses. Moreover, Asia World Co has delayed paying the monthly salaries of local employees for two or more months. Local workers cannot leave the company because their National Registration Cards (NRCs) are kept by the company, added a local worker.

Mizzima, 02/12/08. http://bnionline.net/index.php?option=com_content&task=view&id=5499&Itemid=1

Work has begun on a small hydroelectric project on the Chiphwi river, about 70 miles northeast of Myitkyina. An official with Asia World Company who is working at the construction site said, "This dam is a small one that will produce electricity to be used in building dams along the Nmai Hka and Mali Hka rivers, including the Myintsone dam at the confluence of the two rivers."

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

At a co-ordination meeting (1/2008) of the Special Projects Implementation Committee in the office of the Commander-in-Chief (Army), EPM-1 Zaw Min gave a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the Committee. [Among the the fifteen are] the Yi Nan (1200 megawatts), Khaung-lanphu (2700 megawatts), Phizaw (2000 megawatts), Wuhsauk (1800 megawatts), Chiphwe (2800 megawatts), Chiphwenge (99 megawatts), and Laikzar (1900 megawatts) hydropower projects in Kachin state.

[Compiler's note: There are significant differences in the project list above and those published in NLM on 02/01/07 and 05/05/07. The current list obviously reflects the results of two years of research by field teams

financed by the China Power Investment Corp. As indicated in a news report of the Myanmar Times (24/03/08), a feasibility study of the massive project was expected to be delivered by the end of 2008, and the list provided by EPM-1 to the SPIC meeting appears to be in line with the recommendations of that report. Notably, the proposed outputs of several power plants including those at Khaunglanhpu, at Phizaw, at Chiphwe, at Chiphwenge and at Laikzar have been increased. The projects at Pashe and Lakin creek have disappeared. Note the addition of the 1200-MW Yi Nan project and the omission of the Myitsone dam project.

Khin Hnin Htet, DVB, 29/07/08. <http://english.dvb.no/news.php?id=1576>

Christian leaders in Chibwe have been questioned by local authorities about a poster campaign against the ongoing Chibwe dam project. Kachin Development Network chairman Aung Wah said pastors had been summoned for interrogation by local authorities after anti-dam posters appeared in the town on 13 July. They were called up again on 24 July and pressured to find out who was behind the poster movement. They were called to the police station one at a time and pressured to find out who was behind the posters – the officials insisted that they knew there was a link between the pastors and the poster campaign," said U Aung Wah. "They were forced to sign an agreement saying that they would find out who the culprits were." The dam project was started on the Chibwe river early this year as a joint project between a Chinese company and the Myanmar-Asia World Co. The project had led to forced seizures of land from farmers in the region and also destruction of the local environment, U Aung Wah said. "They have seized gardens and farmland from the locals and the project has destroyed all the roads in the area," he said. "Their main intention is to find gold and other minerals under the river bed while they are building dams across the rivers."

NLM, 28/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080228.htm>

Chinese delegation led by D-G Kong Ling Long of the National Development and Reform Commission (NDRC) of the PRC witnesses signing of the contract for the Chipwi Nge hydropower project by D-G Aung Koe Shwe of the Hydropower Department of EPM No 1 and V-P Zhang Xiaolu of China Power Investment Corp (CPI).

NLM, 20/03/08. <http://myanmargeneva.org/NLM2008/eng/3mar/n080320.pdf>

Northern Commander Ohn Myint visits the Chipwe hydro-power station project in Chipwe township where he is briefed on project data by Engineer Sai Ohn Myint.

KNG, 22/01/08. http://www.kachinnews.com/index.php?option=com_content&view=article&id=68:kachin-villages-told-to-relocate-for-chibwe-hydropower-project&catid=7:news&Itemid=11

Chinese engineers working for the Asia World Company have opened their main office in Mandung, 10 miles north of Chibwe. Locals report that hectic "inspection" activities are underway at three different places along the N'mai Hka watercourse between Chibwe and Sawlaw towns with the use of modern equipment. The company is also constructing roads using several bulldozers and excavators. It has hired thousands of local villagers as general workers at the construction site. A worker earns a minimum of K 5,000 (US \$ 4) per day. Pressure is being exerted on villages in the Washapa and upper Nyawngmawpa valleys near the site of the 2,000-MW Chibwe hydroelectric power project site on the N'mai Hka to relocate away from the project site by the Asia World Co since December. Thousands of Kachins live in the Washapa and Nyawngmawpa valleys which are in the area controlled by the Kachin Independence Organization (KIO) west of the N'mai Hka in the Triangle Area. No village has moved yet. A smaller hydroelectric power project is under construction along the Chibwe Hka near Chibwe town. It will generate 65 MW of electricity that will be used to supply power for the seven other hydropower projects to be built on the Maykha and Malikha.

KNG, 14/12/07. http://www.bnionline.net/index.php?option=com_content&task=view&id=3197&Itemid=6

Eyewitnesses report they have seen excavators and bulldozers and hundreds of hired workers at more than 15 camps of Chinese contractors around the site of the Chipwe (Chahpwi) hydroelectric power project. About 100 villagers from Mangdung, Hpala, Kawngla and five other villages in the area have been taken on working as general workers at the project site. 10 Peking jeeps and four wheeled cars pick take the local workers to and from the construction site. Both young and elderly villagers from the Chipwe and Sawlaw areas are being paid over K 4,000 (US \$ 3.1) per day which is much higher than the regular wage. The construction site is seven miles north of Chipwe and the Chinese inspectors are conducting tests in ten sites on both sides of the river banks by drilling stones, workers said. Inspectors are carrying stones from the

project site to Tengchong in China's Yunnan Province. The black-coloured stones from the testing site along the river banks are cylindrical, a foot in diameter and three feet long.

NLM, 13/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070613.htm>

While in Beijing, EPM-1 Zaw Min met with V-Cs Deng Zon Zi and Jin Shoar Lu of China Power Investment Corp at the hall of Grand Hotel Beijing on 07/06/07. They discussed work on the hydropower projects at the Ayeyawady confluence and Chibwe creek and future tasks to be carried out in those places.

NLM, 07/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070507.htm>

Opening of a project office for the Maykha and Malikha Valley and Confluence Region and Chibwe Creek hydropower projects, in Sitapu ward of Myitkyina. EPM No 1 Zaw Min, V-P Shi Chengliang of CPI, Project Manager Niu Xinqiang of Chiangjiang Design Institute (CISPDR), MD Tun Myint Naing of Asia World Co and an official of CPI Southern Branch participated.

KNG, 07/05/07. http://www.bnionline.net/index.php?option=com_content&task=view&id=1651&Itemid=6

A Kachin Anti-Dam Committee (KADC) has been formed by four Kachin organizations -- Kachin Labour Union (KLU), All Kachin Students and Youth Union (AKSYU), Kachin Development Networking Group (KDNG) and the Kachin Environment Organization (KEO). KADC was formed after work started on a 65-MW hydroelectric power project on Chibwi creek in Kachin state on April 30. KADC aims to raise awareness both in Kachin state and internationally that will bring a halt to the project. It will have branch offices in Thailand and India.

NLM, 05/05/07 <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070505.htm> (CB)

HPID and the China Power Investment Corp (CPI) of the PRC started construction of a hydropower plant on Chibwe Creek in Kachin State on 30 April. The project, which is expected to generate 65 MW is being built to supply power for seven other hydropower projects to be built on the Maykha and Malikha (rivers) and at the confluence of the Ayeyawady. The seven other projects include the dam at the Ayeyawady confluence (3,600 MW), a 2000-MW project in the Chibwe area, a 1,600-MW-project at Pashe, a 1,400-MW project at Lakin, a 1,500-MW project at Phizaw, a 1,700-MW project at Khaunglanphu and a 1,560-MW project at Laiza, all in Kachin state. Together the projects are expected to generate 13,360 MW. Participants in the ground breaking ceremony included Maj-Gen Ohn Myint, EPM Zaw Min and CPI V-P Shi Chengliang.

NLM, 02/01/07 <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070102.htm>

EPM-1 Zaw Min met with V-P Shi Chongliang of the China Power Investment Corp (CPIC) at his office here on 28 December. Also present at the call were Dep EPM No 1 Myo Myint, directors-general of enterprises under the the ministry, V-P of the Dept of Planning and Development Wang Xian Chun and responsible persons of CPI Corp, and MD Tun Myint Naing of Asia World Co Ltd. They discussed matters related to the implementation of the Maykha-Malikha valley region hydel power project and the Ayeyawady confluence hydel power project. Next, officials of HPID and personnel of CPI Corp signed an MoU for the Maykha-Malikha Water Resources and Ayeyawady Confluence Hydel Power Project. HPID and CPI will build the 2000-MW Chibwe hydel power project on the Maykha river and the 3,600-megawatt Ayeyawady Hydel Power Project at the confluence of the Maykha and Malikha.

KHABAUNG RESERVOIR AND HYDEL STATION INAUGURATED IN OTTWIN TOWNSHIP

NLM, 24/03/08. Edited and rewritten. <http://burmalibrary.org/docs4/NLM2008-03-24.pdf>

Khabaung reservoir, built by Construction Group 5 of the Agriculture and Irrigation Ministry, was opened in Ottwin township on 23/03/08. On the same occasion a ceremony to launch the Khabaung hydropower plant was held. The events were attended by military and civil officials, local people and technicians of the China National Heavy Machinery Corp (CHMC) and the China National Electric Equipment Corp (CNEEC).

The reservoir is on Khabaung creek, 15 miles west of Ottwin. It has an earth embankment measuring 200 feet by 920 feet. It will [eventually] be able to irrigate 100,000 acres of farmlands. Generators in the power plant at the reservoir can produce about 120 million kWh annually.

In an address SPDC Secretary-1 Tin Aung Myint Oo said that although Bago division experienced floods in the rainy season, it was unable to grow crops in the summer due to scarcity of water. Khabaung Reservoir had been designed as a multi-purpose project to prevent floods in the monsoon season, to supply irrigation water and clean drinking water in summer and to fulfill electricity needs, if possible. As a result of the dams, small-scale river-water pump projects and embankments built on both sides of the Bago *yoma*, cropped acreage in the division had been extended from 1.1 million acres to three million acres, including 350,000 million acres of paddy grown in the summer and 1.3 million acres of edible oil crops.

Afterwards, separate ceremonies were held to officially open the reservoir and launch the power station. The official party then viewed the operation of the turbines and generators and functions of the radiator and control room. Later, Secretary-1 Tin Aung Myint Oo presented a flower basket to technicians of CHMC and CNEEC of the PRC [who were responsible for the installation of the machinery at the plant].

[A good photo of the exterior of the power station and the dam embankment is included in the print edition of NLM.]

Map references

Topographical map reference: Burma 1:250,000: Series U542, U.S. Army Map: NE 47-05: Toungoo Khabaung, 15 mi north-west of Oktwin [18° 49' N, 96° 26' E], grid square reference: 9\9, 25\6
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-5.jpg>

A map showing the location of the Khabaung dam and reservoir and the irrigation weir and proposed canal system can be found along with a description of the project proposal for OPEC funding on the website of the A&IM: <http://www.irrigation.gov.mm/ofid/default.html>

Additional references

Data summary [Khabaung](#)

See below 'Multi-purpose [Khabaung project long overdue](#)' (NLM: 13/09/03)

Ko Tin Hlaing, NLM, 26/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-26.pdf>

U Naing Win Zae, chairman of Ottwin TPDC said that due to irrigation canals built below the Khabaung dam the number of acres on which summer paddy in the township could be grown had tripled from 6805 to 21084 acres in 2009-10. The water is being supplied to the fields through a diversion weir near Shwelaung village. The concrete weir is 150 feet wide and 25 feet high. There are retaining dykes on the right and left sides measuring 2350 feet and 5300 feet respectively. The canal system on the right side has been in operation since 2008-09. [Photos of the dyke at the dam are included in the print edition.]

Kyaw Sein, photos by Aung Than, NLM, 04/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-04.pdf>

Khabaung diversion weir is built five miles downstream of Khabaung dam near Shwelaung Village. The reservoir at the dam stores water from the middle range of the Bago *yoma* in the rainy season and supplies it to a 30-megawatt hydropower plant. Afterwards, the water from the hydropower plant flows along Khabaung creek and is stored at the diversion weir to irrigate farmlands through left and right canals. According to Assistant Director U Tin Aung of Construction Group 5 of the ID, the 920-foot-long main embankment and 800-foot long saddle dike of the 200-foot-high dam is [still] under construction inclusive of the spillway, the water diversion tunnel and the power intake tunnel, but hydropower is being generated. Toungoo and Ottwin townships of Bago division have 90 inches of rainfalls on average annually. At times, the region faces difficulty in getting adequate rainwater for cultivation of paddy in the late monsoon. But farmers in the area have been growing summer paddy since 2009-10 thanks to water supplied from Khabaung Dam. The water comes along 29-mile left and right canals, each with five valves. [A photo of the weir is included in the print edition of NLM.]

NLM, 28/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-28.pdf>

Water that has been used to generate electricity at Khabaung Dam is channeled to a diversion weir, five miles downstream from the dam near Shwelaung Village. Currently, the left main canal of the diversion weir

can supply water to 10,000 acres of farmlands in Ottwin township and 8,500 acres of farmlands are being cultivated with the help of the irrigation facility. [Photos of the weir and one of the two main canals accompany the article in the print edition of NLM].

NLM, 05/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-05.pdf>

Construction work continues on the main right canal of Khabaung dam. The remaining systems are due to be constructed in the dry season. 7,000 acres of summer paddy are currently being cultivated in the fields of Ottwin township through the Khabaung diversion weir. [A photo of the earth work operations is included in the print edition of NLM.]

NLM, 12/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080212.htm>

Test-run of the first turbine and the installation of second turbine and the control panel are underway. The work is being carried out under the supervision of Chinese experts of CHMC Co and engineers of EPM No 1. The plant with a capacity of 30 MW will go into operation soon.

NLM, 27/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071227.htm>

Project Director Maw Tha Htwe and Mechanical and Electrical Installation Director Khin Maung Win brief EPM No 1 Zaw Min, Dep Min Myo Myint and D-G Hoke Kyi of the HPID on construction of the power plant and installation of machinery at the Khabaung hydropower project in Toungoo township. They check the power control rooms, laying of underground cables, work on the switchyard, installation of porcelain balls, placing of concrete on steel pipelines, digging of the outlet canal of the power plant and dredging of Khabaung creek. The project is 90pc complete.

NLM, 10/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071110.htm>

EPM No 1 Zaw Min briefed by Dir U Maw Tha Htwe of Construction Gp 3 and Dir of the Mechanical and Electric Installation Division Khin Maung Win. Construction of the power plant, installation of the generators, turbines and penstock, building of the switch yard and penstock pipes is ongoing. The power plant is expected to generate 120 million kWh yearly. The project is 88pc complete and will be finished in the 2007-08 financial year.

NLM, 28/09/07. <http://www.ibiblio.org/obl/docs4/NLM2007-09-28.pdf>

Khabaung creek hydropower project is more than 86pc complete. It will be able to generate 117 million kWh a year.

NLM, 10/09/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070910.htm>

U Soe Tha, Minister for National Planning and Economic Development, signed a loan agreement for agricultural development at the Thonze and Khabaung dam projects with the OPEC Fund for International (OFID) at Vienna on 06/09/07. In Vienna, the minister met with various officials of OFID on matters related to the development of the agriculture and electric sectors and co-operation with OPEC. **Compiler's note:** A description of the project proposal for the development of irrigation networks at the Thonze and Khabaung projects can be found on the website of the A&IM at <http://www.irrigation.gov.mm/ofid/default.html>. Most of the information on this page appears to date from 2004 when the proposal was first published, but it also includes revisions added in 2007. The proposals for both project areas cover the development of the irrigation canal network exclusive of the costs of dams, weirs and hydroelectric facilities. Technical data useful to the irrigation aspects of both projects is included. The cost estimate in kyats and the estimated rates of return appear to apply to the canal system only. A good frontal view of the Khabaung dam is available on this site.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%20Country%20Report%20Tin%20-%20Myanmar%20-%20Presentation.pdf

The Khabaung dam and power station with a planned capacity of 30 MW is under implementation by the ID and HPID. It will generate 120 million kWh annually when it comes on line in Dec 2007.

China Heavy Machinery Corp, 30/04/07. <http://www.chmc2003.net/news.do?cmd=show&id=1666>

A CHMC news release in Chinese about construction activities at the Khabaung hydropower plant. The initial phase of construction was completed in April 2007.

NLM, 14/02/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070214.htm>

Gen Soe Win visits the Khabaung project which is 80pc complete. Work continues on the embankment and spillway. Construction of the water tunnel and power plant is ongoing.

NLM, 04/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061204.htm>

EPM-1 Zaw Min is briefed on the construction of the water-intake and sluice gate, building of the hydel power plant and placing of the steel pipe lines. He meets with foreign experts and officials and gives instructions on the timely arrival of imported machinery. Work on the project is 73pc complete.

NLM, 06/11/06. www.myanmar-information.net/infosheet/2006/061106.htm

In Nanning in the PRC, EPM No 1 Zaw Min meets with Chairman Zhao Ruolin and party of China National Electric Equipment Corp (CNEEC)* about the timely arrival of electronic and mechanical equipment for Yenwe, Yeywa, Khabaung and Kengtawng hydel power projects. V-C Zhu Xu and party of China National Heavy Machinery Corp call on the minister and discussed timely sending of electronic and mechanical equipment and hydraulic steel structure for the Kun and Khabaung hydel power projects. **Compiler's note:** The Hunan Savoo Overseas Water and Engineering Co has also been among the PRC companies that have participated in the construction of the Yenwe dam and powerhouse, probably as a sub-contractor to CNEEC for hydraulic steel equipment. See pictures and text in Chinese on the Hunan Savoo website.

<http://www.hhpdi.com/hhpdi/ShowArticle.asp?ArticleID=113>

NLM, 27/05/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060527.htm>

EPM No 1 Zaw Min inspects construction of the power plant, water tunnel, sluice gate and embankment at the Khabaung hydel power project, 15 miles west of Ottwin. Two 15-MW generators will produce 120 million kWh yearly.

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SMALL BUSINESSES, [FACTORIES STRUGGLE](#) TO KEEP UP WITH RISING FUEL PRICES

Wai Moe and Kyi Wai, Irrawaddy On-line, 06/03/08

http://www.irrawaddy.org/article.php?art_id=10728&page=2

Fuel prices in Burma are rising again, as authorities try to reign in a black market that many rely on to meet their basic energy needs. According to business sources in Rangoon, prices have gone up by more than 13 percent since the beginning of a crackdown on illegal fuel trading that started on February 27. The sources said that many businesses, particularly factories which use heavy machinery, are struggling to keep up with the rising cost of fuel, which has gone from 4,400 kyat (US \$4) to 5,000 kyat (\$4.50) for a gallon of gasoline, and from 4,600 kyat (\$4.20) to 5,200 kyat (\$4.70) for a gallon of diesel.

Prices have also increased for trading companies, which must now pay the semi-official rate of \$4.00 a gallon for diesel, up from \$3.52 last Wednesday. This rate is only available to businesses which hold foreign currency accounts at the Myanmar Foreign Trading Bank. Although oil prices have been rising rapidly worldwide, the recent price hikes in Burma have been outstripping global price increases, mainly due to government efforts to control the sale of fuel. The world market price for oil hit a high of nearly \$105 per barrel today, up from around \$100 one week ago.

Businessmen in Rangoon say that the recent rise in fuel prices is hitting smaller businesses the hardest, since large companies—most of them owned by the military or by cronies of top generals—are able to stockpile supplies.

Last August, the regime raised official fuel prices from 1,500 kyat (then worth \$1.16) to 2,500 kyat (\$1.94) per gallon of gasoline, and from 1,500 kyat (\$1.16) to 3,000 kyat (\$2.33) per gallon of diesel. The sudden, unannounced skyrocketing of fuel prices ignited Burma's largest mass protests in nearly twenty years. Although official rates have remained unchanged since last August, quantities are strictly limited to

two gallons per day, and fuels purchased at these rates can only be used to operate privately owned vehicles.

The doubling of official diesel prices, which led to a dramatic rise in black market prices, was particularly hard on Burmese businesses and consumers. A lack of energy infrastructure in Burma, particularly a notoriously unreliable supply of electricity, forces many to use diesel generators to meet their everyday energy needs. "The government can't even manage to provide electricity for 24 hours, so we need to use a generator," complained the operator of a photocopy shop in Rangoon. "We need to buy fuel to run the generator, but now the government has cracked down on our energy sources. How are we supposed to survive?"

The rising cost of fuel is affecting a variety of businesses. The owner of an Internet café in Rangoon said he was forced to charge more for Internet access, because his business, like many others, relies on a diesel generator. "There's been a diesel price hike, so now we have to increase Internet user fees at our shop," he said. The owner of a small cooking-oil factory in Mandalay complained that the crackdown had completely cut off his normal supply of diesel, forcing him to travel outside the city to a government-run gas station. He noted that the gas station charged the black market price, not the cheaper official rate.

Another business owner in Mandalay said that the latest price hikes were putting severe pressure on her ability to do business. "Prices have gone up 400 or 500 kyat per gallon in the past week. To run my factory, I need about 200 gallon of diesel a day. So I'm not sure how much longer I can stay in business." Meanwhile, a police official in Mandalay, who asked to remain anonymous, said that the recent crackdown on illegal fuel trading was at least partly driven by concerns about safety. Several major fires have hit Rangoon and Mandalay in recent weeks, some of them possibly caused by privately owned generators.

Electricity shortages are expected to worsen in the coming months, as Burma enters the dry season and power from the country's aging hydroelectric plants becomes even more unreliable. Most factories in Burma's nineteen designated industrial zones use privately owned generators, and most are run on diesel bought on the black market, because supplies at government stations are strictly rationed. According to official data, there are 42,707 private factories, 8,500 home industrial businesses and 833 state-owned factories in Burma.

Additional references

See above: 'Chaungzon supplied with [electricity at a big loss](#)' (NLM: 29/03/11)
'[Power boost for Yangon](#) as rain falls' (MT: 21/06/10)

See below: 'Fuel [price increase](#) impacts industrial use of electricity' (IRROL: 15/08/07)

Kyaw Kha, Mizzima, 23/12/09. Edited and condensed

<http://www.mizzima.com/business/3199-financial-crisis-hurts-garment-industry-in-burma.html>

Burma's garment industry in industrial zones is on a downhill slide due to the global financial crisis, the Garment Industry Entrepreneurs Association said. Association Chairman Myint Soe said the industry has suffered a decline of 30pc since mid-November this year. "About 20pc of our industries have either suspended their business due to economic reasons or totally shut down," Myint Soe told Mizzima. There are 171 garment factories under the association of which 150 units are still running and over 20 factories have stopped business. Due to the closure of these factories, over 60,000 workers have been affected and will be laid off if the factories are totally shut down, Myint Soe said. Despite low wages in Burma, factory owners are facing shortage of electricity, high fuel and transportation costs, difficulty in accessing internet telephone and email, foreign currency exchange fluctuation and unavailability of business loans from the government. "We suspended business in this unprofitable situation. There's no electricity and the cost of alternate energy source such as diesel is too high," said an official from the Rangoon based 7 Star Co Ltd.

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[POWER HUNGRY MYAUNG DAGAR INDUSTRIAL ZONE](#) NEARLY READY

Htar Htar Khin, Myanmar Times, 25/02/08. http://www.mmtimes.com/no407/b_brief.htm

The Myaung Dagar Steel Industrial Zone in Hmawbi township is 80pc complete, said an official from the Department of Human Settlement and Housing Development (DHSHD) recently. "The aim of this project is to group all the steel factories in one place," he said, adding that it would also lead to better infrastructure in the area and create jobs.

The project, which began in 2006, covers an area of about 1016 acres and has been split into three phases. "Of the total area, infrastructure accounts for 395.19 acres, while the industrial sector itself is 620.38 acres. "We've already sold 37 of the 327 2-acre plots that make up the zone," the official said, adding that the plots were sold at a cost of K18.4 million an acre.

The DHSHD official said work on Phase One started in early 2006, Phase Two began about one year later, while the construction of Phase Three started early in 2008. "All the infrastructure – like the roads, electricity network and drainage – in Phases One and Two have been finished but Phase Three only has roughly built roads to date," he said.

Electricity to power what is likely to be an extremely power-hungry enterprise is already taken care of in the form of one 100MVA transformer linked to the Bago-Kamarnat substation in Bago Division, the official added.

Compiler's Note:

Plans to set up a "steel industrial zone" at Myaungdaga appear to have originated in conjunction with a mill and shop to fabricate steel plates and H-beams set up near the village by the Myanmar Economic Corporation (MEC) of the MoD. Little published information is available about the complex which is known as the MEC's Steel Mill No 2. Pictures of pipelines installed at the factory in 1999 can be found on a website of the United Engineering Group of Myanmar. <http://www.united-engineering.net/Engineering/project.htm> In 1998, the state electricity company, MEPE, investigated sites near the village where a gas-fired power plant might be set up (NLM: 24/06/98. <http://mission.itu.ch/MISSIONS/Myanmar/98nlm/n980624.htm>). In 1999, MEC's Iron and Steel Division put out tenders for the supply of a 100-150 MW combined cycle gas turbine generating station to be built at Myaundaga (on-line reference no longer available), but the plan was apparently scrapped in favour of providing power to the mill and "steel zone" through a power sub-station with connections to the generating plants at Shwedaung, Ahlon and Lawpita. By 2001, the plant was fully operational and being fed by imported billets from China, the Commonwealth of Independent States, and India. ("Imports set to dominate Myanmar construction sector", [Metal Bulletin, no. 8584, 18/06/01, p. 23]). H beams forged in the shop have been used in various bridge projects carried by military engineering corps (NLM: 29/12/01. [http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n011229.htm#\(1](http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n011229.htm#(1); NLM: 29/03/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040329.htm> The mill and adjacent steel zone are strategically located close to the main south-north gas pipeline that links Kanbaw in the south with the natural gas fields of Irrawaddy valley. A PRC company, CAMC Engineering, is currently building a urea fertilizer plant for the Myanmar government at Myaundaga that should benefit from the availability of natural gas and electric power facilities.

(NLM: 25/03/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040325.htm>)

(NLM: 12/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071112.htm>)

(NLM: 21/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080221.htm>)

Map references:

The Myaungdaga power station is to be a pivotal distribution point for the Yangon and the Irrawaddy delta areas of the country. When the 230-kV transmission line connecting it to the power station at Kamanat (near Bago) is completed it will have direct links with both the Sittaung and the Irrawaddy valley grids to the north and to Yangon through the Hlawga power station and to the Irrawaddy delta area through the main station in Hlaingthaya. Its present and future connections can best be seen by comparing the maps found on Slides 34 and 35 of the Myanmar presentation to an ASEAN policy seminar on regional power issues in Sept 2007. <http://burmalibrary.org/docs2/MMpresentation.pdf>

See below: 'Grid Map 4: Transmission System as it existed in mid-2007'

'Grid Map 5: Grid projects underway 2007 - 2009'

Additional references

See above: 'Local electricity plant powers [village metal workshops](#) in Thabyu' (NLM: 27/03/11)
 'Towers on [Hlinethaya-Ahlon power grid](#) under construction' (NLM: 31/01/11)
 'Risky job for line crew on [Bago river crossing pylons](#)' (NLM: 27/02/09)

Xinhua, 20/03/09. (edited and abridged)

http://news.xinhuanet.com/english/2009-03/20/content_11039486.htm

Presently, Yangon's electricity demands of over 500 MW daily have to be met by the city's four gas-run power plants which have a maximum capacity of only 300 MW, the local Biweekly Eleven reported on Friday (20/03/09). Low water levels at the country's hydropower generating facilities have reduced the supply of power otherwise available to Yangon. In order to supply electricity to homes and industrial zones for at least five hours day, authorities have temporarily suspended supply to high power-consuming heavy industries such as some steel plants in the Myaungtika Industrial Zone [in Hmawbi], the report said. About 450,000 workers are employed in the industrial zones of the former capital.

NLM, 21/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-21.pdf>

Head of Yangon Division WRUD Htay Lwin reports to Lt-Gen Myint Swe on Myaungdaga river pump station. Myint Swe and party go on to the Kangalay river pump station in Myogyong village where they inspect construction of the control room of a sub-power station, canal and laying of pipelines to pump water from Hlaing river and irrigated areas.

 Kayan Soe Myint, NLM, 19/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-19.pdf>

The 40-mile-long, 230-kV power grid between Kamanat and Myaungdagar has been completed. The opening took place at Myaungdagar power station on 12 November. The grid is designed to supply power to towns and villages in Yangon division and to steel factories in Myaungdagar as well as to Ayeyawady division. [In opening the station] Minister Khin Maung Myint said that in the past foundries in Yangon had to share electric power with local residents, and that, in consequence, both industries and people had often faced insufficient electric power supply. For instance, whenever the iron foundry in PyinOoLwin [in Mandalay division] operated at maximum capacity, the power supply to Yangon had to be reduced. This created disorder in the power supply pattern since overload conditions resulted at the Lawpita hydropower station. In compliance with guidance from the Head of State, the iron foundries in Yangon have been shifted to Myaungdagar, and electric power is now being supplied to the industrial zones and the public separately. Work on the 40-mile Kamanat – Myaungdagar grid has been carried out by the Parami Co, the Se Paing Co, and DEL Co Ltd.

The 230-kV twin bundle, single circuit, transmission line has a total of 186 towers and ACSR of 650-MCM has been installed. The project was launched on 27 January 2008, and completed on 12 November 2008. The Myaungdagar station has been supplied with power through the Shwedaung gas-fired power plant since 28 August 2005. It distributes power to Steel Factory No 1, Pharmaceutical Factory No 2 in Hmawby township, to Thayawady [in Bago West], to Ayeyawady division (through the Athok power Station), to Hlinethaya IZ, and and to Yangon through the Hlawga and Bayintnaung power stations.

So far, 41 industrialists have bought 140 of the 327 plots (400' x 200') in the Myaungdagar IZ. [Other] industries in Yangon have been allocated land in the Wahtayar zone in Shwepyitha township [which is for timber and furniture factories]. Forty industrialists have purchased lots and started to construct factories there. The Ministry of Electric Power No 2 plans to establish a power station in Wahtayar.

Compiler's Note: The paragraphs above form the main part of a feature article in the print edition of the New Light of Myanmar published on 19/11/08. The article also includes two photos of the Kamanat – Myaungdagar transmission grid and one of the switch yard in the main sub-station in Myaungdagar. Surprisingly, the article refers to the "opening" of the 230-kV grid by Minister Khin Maung Myint on 12

November. Nothing to this effect was reported in the account of the Minister's visit to the station in NLM on 14/11/08 (see below).

NLM, 14/11/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n081114.htm>

On 12/11/08, EPM No 2 Khin Maung Myint and officials of the YESB visited the main power station at Myaungdaga in Hmawby township and checked on the installation of pylons along the 230-kV Kamanat - Myaungdaga power line, the voltage at the switch yard, installation of the 230-kV power lines between Hlawga and Hlinethaya and the supply and distribution of power at the panel in the control room. Senior Engineer Saw Win Maung of MEPD reported to them on the 230-kV Kamanat- Myaungdaga power line, and arrangements for distribution of power and supply of power at the branch station in Myaungdaga. He also briefed them on the construction of pylons for the 230-kV Kamanat -Thanlyin power grid (61 miles) and the 230-kV Thanlyin -Thakayta power grid (7.5 miles).

NLM, 05/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-05.pdf>

Deputy Energy Minister visits the site of the No 4 Fertilizer Plant project in Myaungdaga in Hmawby township and gives instructions on the systematic spending of money in line with financial rules. During his visit he meets with technicians of the the HGCEC Co of the PRC and discusses matters regarding their qualifications, the need for constant supervision of the project and the timely arrival of machine parts for the plant.

NLM, 04/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-04.pdf>

Lt-Gen Myint Swe of MoD meets with industrialists at the Myaungdaga steel IZ and views a display of the products made there. EPM No 2 Khin Maung Myint reports on the 230-kV power grid between Kamanat and Myaungdaga and the construction of the sub-power stations for the grid. The transmission line is 40 miles long and altogether 186 pylons are being installed along it. The generals move on to Hlayhlaw-Inn Village where U Thein Hlaing, director of the project reports on connection of the Kamanat- Myaungdaga power grid across Yangon-Mandalay highway. [Photos of the transmission line are included in the print edition of NLM.]

NLM, 28/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-28.pdf>

EPM No 2 Khin Maung Myint visits the Myaungdaga main subpower station in Hmawby township and inspects the installation of the 230-kV twin-bundle, single-circuit, transmission line between Kamanat and Myaungdaga. The station is presently receiving electric power supply through the 230-kV transmission line from the Shwedaung generating plant. The Myaungdaga station is connected to the Hlawga power plant by a 230-kV transmission line. The minister checks the bus bar in the switch yard in the Myaungdaga station and local distribution of power using five 33-kV output feeders. Project Manager Saw Win Maung reports on the construction of the 186 towers along the transmission line between Kamanat and Myaungdaga, the 272 towers between Kamanat and Thanlyin and the 36 towers between Thakayta and Thanlyin. [A photo of the towers along the Kamanat - Myaungdaga transmission line is included in the print edition of NLM.]

NLM, 02/07/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080702.htm>

When Lt-Gen Myint Swe of the MoD visited Kamanat main subpower station of MEPE in Bago on 01/07/08. he was welcomed by EPM No 2 Khin Maung Myint, D-G Tin Aung of the EPSE, Ch of YEPSB Khin Maung Soe and officials. Lt-Gen Myint Swe was briefed on the erection of concrete towers along the 61-mi-long, 230-kV Kamanat -Thanlyin main power line project and the 40-mile-long, 230-kV Kamanat – Myaungtaga power line. Pointing out that these lines were required to supply the electric power demand in Yangon, he called for speedy completion of the tasks in building them. This was necessary, he said, so that more power could be supplied to the industrial zones including Myaungtaga IZ.

NLM, 30/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-30.pdf>

At a work coordination meeting organized by Yangon Division IZ Management Committee Lt-Gen Myint Swe of the MoD notes that electricity overload in Yangon city can be avoided by moving smelting plants in the city to the Myaungdaga IZ [in Hmawby township outside the city limits].

NLM, 01/05/08. <http://myanmargeneva.org/NLM2008/eng/5May/n080501.pdf>

Lt-Gen Myint Swe and party met with officials of the Myaungdaga IZ project in the management office of the zone in Hmawby township yesterday. At the meeting EPM No 2 Khin Maung Myint reported on the installation of three 100-MVA transformers, the connection of power lines in the switch yard and installation of the 230-kV power grid linking the main sub-power station at Myaungdaga with Kamanat (Bago). When the Myaungdaga Foundry IZ is finished, there will be additional power available for the people in Yangon.

Htar Htar Khin and Yi Yi Htwe, MT, 17/03/08. <http://www.mmtimes.com/no410/b008.htm>

A senior official of the Yangon DPDC said businesses that produce noxious fumes or excessive noise had been told to move to the Myaung Dagar Steel Industrial Zone outside the city. "We allow businesses and companies to operate by themselves but if their work negatively impacts on the public we will remove them," he said, adding that this would provide job opportunities in the areas where they are relocated. He said that businesses with smelting operations were first on the list. "We will be removing businesses that use smelters at the end of March because the risk that they will cause a fire during dry season is too high to have them within the city," he said. He added that there are about 50 smelters in Yangon and none of these businesses will have their operating licences renewed unless they move to Myaung Dagar. To house these operations, the DHSHD has 56 plots measuring 7200 square feet, and 85 at 4800 square feet, already prepared in the IZ.

NLM, 28/11/07. www.myanmargeneva.org/07nlm/n071128.htm

EPM No 2 Khin Maung Myint inspected the upgrading of the power station, the 230-kV input power feeder and the 33-KV output feeder at the switch yard and the distribution of power at 230/33/11-kV (60 MVA) at the main power station near the Yangon-Pyay road in Hmawby township. In the control room of the station, Manager Saw Win Maung and Director Thein Hlaing of the Power Supply (South) Project of MEPE, Chief Engineer U Tin Maung Tun, MD Tin Aung of EPSE and U Kyaw Myint, head of the main power station at Myaungdagar, reported on arrangements for upgrading the Myaungdagar station. The minister said that the Myaungdagar main power station was important in supplying power to the Myaungdagar Steel Industrial Zone.

NLM, 18/09/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070918.htm>

Lt-Gen Myint Swe of the MoD and senior military officers inspected Myaungdaga Steel Industrial Zone that is being developed by the DHSHD in Hmawby township. The 1,015.57-acre zone is being set up in three phases and will produce iron rods necessary for national development tasks. At the management office of the zone, DHSHD D-G Aung Win reported on construction of earth and concrete roads, arrangements for construction of sluice gates, installation of power lines, environmental conservation and communications measures as well as the sale of plots of land and payments for them. EPM No 2 Khin Maung Myint reported on power supply and installation of 230-kV power lines. Lt-Gen Myint Swe said the zone will supply ironware to meet local demand. In the long run import of other iron products will be cut. He spoke of the need for industrialists to invest in the industrial zone.

NLM, 25/07/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070725.htm>

At the main sub-power station in Kamanat, in East Bago, EPM No 2 Khin Maung Myint is briefed on arrangements to connect the main sub-power station in Kamanat to Myaungdaga sub-power station in Hmawby with 230-KV cables.

NLM, 19/02/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070219.htm>

Lt-Gen Myint Swe of the MoD and party visited the site of the Myaungdaga industrial zone where U Aung Win, director-general of the DHSHD reported on earth work, the construction of roads and two bridges, as well as arrangements for power supply, construction of sluice gates and the sale of plots in the zone. Project Director Thein Hlaing and Chief Engineer Tun Aye of Yangon City Power Supply Committee briefed them on electric power supplied by Myaungdaga sub-power station and EPM No 2 Khin Maung Myint on the laying of cables that will connect the Shwetaung and Myaungdaga sub-power stations. D-G Hla Myint Maung of the WRUD reported on the supply of water from Myaungdaga Kankalay river-water pumping station and Deputy Minister for Energy Than Htay on the implementation of No 4 Fertilizer Plant. Gen Myint Swe said that the industrial sector had contributed 18.9pc of the national GDP in 06-07 up from 17.5pc the year before. Myaungdaga IZ will give added impulse to the industrial sector, he said. The Myaungdaga zone has an area of 632.96 acres.

NLM, 22/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070122.htm>

MEPE and IGE Pte Ltd signed an agreement for the import of materials to build the Myaungdaga sub-power station at the office of EPM-2 in Nay Pyi Taw on 18/01/07.

Zaw Htet, Myanmar Times, 14/08/06. [Issue 329 of the MT is not available on-line.]

Prices for plots at the new Myaung Dagar Steel Industrial Zone have been approved and sales will commence August 20, the DHSHD announced. U Myint Swe, deputy director from the department said prices would be K16 million per acre. U Myint Swe last week said that 50 people had so far proposed to buy 80 acres at the zone which comprises 398 plots on 1092 acres. "The first ones in will get the chance to secure well-positioned plots, which are those that are more easily accessible and on higher land," he said. As the zone was developed on former paddy fields, lower plots flood easily and will require greater investment from buyers to raise surfaces. U Myint Swe added that the department would give priority in purchasing plots to companies currently involved in the steel industry, for whom the zone is designed. "There will be a regular electricity supply and both road and water transport options available," he said.

Zaw Htet, Myanmar Times, 24/07/06. [Issue 326 of the MT is not available on-line.]

U Myint Swe, a deputy director from the DHSHD under the Ministry of Construction, said infrastructure for the Myaung Dagar Steel Industrial Zone zone had been completed in June. The 1092-acre zone is located 58 kilometres (36 miles) north of Yangon next to the Yangon-Pyay highway and comprises 398 plots. "As the zone is completely focussed on steel production, we can meet its particular needs," U Myint Swe said. "For example, steel producing factories are high power consumers. So we have planned to install a good, regular electricity system that includes dual supplies – hydropower and gas turbine power. The factories in this zone won't need their own generators, which results in paying more (for electricity)," he said. "As the zone is located between the Yangon-Pyay highway and the Hlaing River, both cars and ships can be used to transport raw materials and products." Keeping steel-producing factories away from heavily populated areas was in the public's interest, U Myint Swe said. "They usually produce pollution. That's why we chose Myaung Dagar, away from populated areas, to build the steel production zone." There are currently steel plants in the Shwepyithar and Hlaing Tharyar industrial zones. "We won't force them to move to Myaung Dagar," U Myint Swe said. "However, I would like to encourage them to invest in the zone because I am sure it will develop quickly in the near future."

DVB, 13/07/06. <http://www.burmanet.org/news/2006/07/13/>

Nearly 200 farmers from Hmawbi township report that measures to confiscate 1700 acres of paddy fields in Myaungtaka, Kankalay and Kalakone hamlets in the township were initiated by Quarter Master Maj-Gen Tin Hla on 19/09/05. According to the farmers they have received no compensation for the land which was supposed to be needed for an extension to No 2 Steel Factory. Instead of addressing the grievances of the farmers, the local authorities and the factory officials confiscated another 500 acres of paddy fields from the farmers early in 2006 which they sold to property developers leaving the farmers jobless and homeless.

Maw Maw San and Ye Lwin, Myanmar Times, 20/03/06 [Issue 309 of the MT is not available on-line.]

Plots of land at the new ironworks-dedicated Myaungdakar Industrial Zone in Hmawbi township will go on sale at the end of March. The new industrial estate covers 1192 acres, of which 843 acres will be available once basic infrastructure such as roads and drains have been developed. 401 plots of 8000 square feet each will be put on offer. According to U Myint Swe, deputy director of the DHSHD, the first phase of construction of the industrial zone which started in mid-2005 is expected to be completed in May. "The factories built in this industrial zone will be provided with natural gas in addition to electricity for the full operation of the iron foundries," U Myint Swe said. The Myaungdakar zone is scheduled to be fully completed in 2007 and will be the fourth ironworks industrial zone in Myanmar.

Xinhua: 15/11/05. http://english.peopledaily.com.cn/200511/15/eng20051115_221349.html

Myanmar is planning to set up a new industrial zone for heavy industry production, according to the Flower News published in Yangon. Citing local entrepreneurs, the news journal reported that the IZ would be in Myaungdaka in Hmawby township near an area where a steel mill is already in place. A total of 405 hectares is being reclaimed which will be allotted to national business interests to set up factories. The

location was selected because the area has an abundance of electricity and the raw material produced in the steel mill already in operation can be easily utilized, the sources said.

NLM, 25/03/04. <http://www.myanmargeneva.org/04nln/n040325.htm>

Myanmar and the PRC signed a number of agreements today at the Zeyathiri Beikman in Yangon on 24/03/04 in the presence of PM Khin Nyunt and the Vice Premier of the State Council of the PRC Madam Wu Yi. . . . MD San Oo of MEPE and Vice-President Zheng Baosen of the State Grid Corp of China signed a commercial contract on the supply of 230-kV transmission lines and sub-stations for the Myaungtaka-Hlinethaya-Yekyi project.

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ADDITIONAL HYDROPOWER GENERATION PLANNED FOR PUTAO

NLM, 25/01/08. <http://burmalibrary.org/docs4/NLM2008-01-25.pdf>

During a visit to Putao in northern Kachin state, PM Thein Sein is informed by D-G Aung Koe Shwe of HPID that Namhtut hydropower station in Putao is currently generating 200 kW. However, on completion of a diversion dam on Nam Hkamti creek, three miles west of Putao, the station will be able to double its generating capacity to 400 kW.

Irrigation Dept D-G Khin Zaw reports that arrangements are being made to generate four megawatts of electricity at a dam that is planned three miles upstream from the Namhtut hydropower station. Diversion weirs on Nampalak and Mulashedi creeks and the Malikha river in the Putao district have already opened up an additional 1,800 acres for irrigated cultivation and there are plans for three more weirs that will be able to irrigate another 7,000 acres.

The Prime Minister says that ways and means must be found to encourage tourism in the scenic Putao area by building roads and bridges and developing communications services and the power supply. He and his party proceed to the recently opened Malikha tourist lodge near the Mulashedi suspension bridge across the Namlang river.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NG 47-01: This map is good for locating many of the place names mentioned in the Putao area. Note the Nam Hkamti and Nam Tungni creeks just to the west of town. Mulashidi creek on this map is the Nam Lang and the village of Mulashidi is identified as Man Namhoi.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ng47-1.jpg>

Additional references

NLM, 10/04/04. <http://burmalibrary.org/docs/NLM2004-04-10.pdf>

Northern Commander Maung Maung Swe attends the opening of the Namhton [Namhtut] hydroelectric power station in Tonlitu Village, Putao Township, on 02/04/04. After a report on the construction of the power station, it is formally opened the plant and the power line is launched. The next day, the Commander observes the milling of paddy with the use of hydel power and the generating of electricity at a paddy husk-fired power plant in Hokho ward of Putao. On 04/04/04, he inspects the Putao hydroelectric power plant and a lake in Duttan [Dohttan] village.

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Final Report: Volume 2: Appendix-A: Project Sheet*, pp 21,29, September 2003.

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5)

A Japanese team carrying out a rural electrification survey in Burma/Myanmar reports that there is one mini-hydro station in Putao that is supplying only the central part of the town of Putao. The team visited the Namhtun power station, seven miles from the town centre, on 12/03/01. At the time the station was

equipped with one 100-kW generator and one 60-kW generator. The 100-kW machine was procured for another site and was over-sized in its present setting, the survey team reported. There was also a rice husk gas engine that was powering the rice mill in Putao at the time the team visited. Other sources of electricity in the town were small diesel generators and batteries. However, batteries were rarely transported to the Putao area since they could not be air-cargoed due to safety restrictions. The team concluded that villages in the upper part of Kachin state would remain unelectrified for decades, unless strategic support was provided through the use of rice-husk gas engine and solar battery charging systems.

MORE GAS TO BE DIVERTED FROM YADANA FOR NATIONAL USE

Kyaw Thu, MT, 14/01/08. <http://www.mmtimes.com/no401/b002.htm>

The government is planning to increase natural gas production at the Yadana gas field, an energy specialist close to the Ministry of Energy said on January 7. The specialist said a new compressor has been installed at the site in a bid to increase production. "The Yadana gas project will produce an additional 90 million cu ft of gas a day (mmcf) for domestic production," he said. However, he refused to say when this increased production would begin and what industries in Yangon would receive the gas.

The Yadana project exports 600mmcf to Thailand and supplies about 100mmcf for domestic use. This will increase to 190mmcf when the increased supplies begin filtering through. State-run NLM reported on 28/12/07 that repair work on the project was underway – with increased production in mind. The report listed January 7 as the expected completion date.

Even though the government is building large numbers of hydropower electricity projects to meet domestic energy demands, gas still plays a crucial role in electricity supply. Yangon relies heavily on gas supplies for electricity generation during the summer as the power production from the hydropower plants declines by 30-40 percent. According to the New Light of Myanmar, the government planned the repairs to the Yadana project to avoid affecting Yangon's power supplies during the summer. EPM No 1 figures show that natural gas driven power stations contribute 40pc of the nation's electrical power.

Dr Maung Aung, an economist and researcher on Myanmar's economy, said the country should use natural gas to supply regular electricity, which will help to develop the industrial and production sectors. "Electricity plays a key role in a country's sustainable development. One of the main issues that delays our country's development is the shortage of electricity. We should use natural gas and the income earned from selling it, to set up power plants to supply regular electricity," he said.

In addition, much of Yangon's transport system – especially buses – runs on compressed natural gas. This gas comes from Myanmar's offshore gas fields, including the Yadana project. Several important industries also use natural gas to operate, including fertiliser plants and cement factories, both of which underpin important sectors of the economy.

Additional references

See above: 'Rangoon reels under [severe power cuts](#)' (Mizzima: 02/04/10)
 See below: 'Gas in [short supply](#) to meet demand for electricity' (MT: 17/09/07)
 'Ywama power station dependent on gas distribution system' (NLM, 01/02/07)
 'Pipeline to solve electricity shortages' (MT: 16/09/02)
 'Yadana gas will fire electric power plants in Myanmar' (MP: Sept 1995)
 'Use of [Yadana gas for power generation](#) and industry: Chronology' (Appendix 6)

NLM, 13/06/10. <http://www.burmalibrary.org/docs09/NLM2010-06-13.pdf>

A golden valve on the 24-inch natural gas pipeline from the Yadana natural gas platform is opened at the natural gas distribution centre in Ywama and a stone plaque unveiled, to mark launching of sending natural gas through the new pipeline. [A photo is included in the print edition of NLM.]

Monthly Eleven, June 2010. Excerpt.

http://eversion.elevenmediagroup.net/index.php?option=com_content&view=article&id=621%3Aburst-of-offshore-natural-gas-pipeline-causes-decline-in-electricity-distribution-to-yangon-&Itemid=109

The offshore gas pipeline [through Myainggaly] to Yangon burst at 10am on 02/06/10, so there was not enough gas available to generate electricity. Because the Tanintharyi-Yangon natural gas pipeline bursts frequently, a 24-inch diameter pipeline is being constructed [through Daw Nyein village in Ayeyawady division to the Ywama gas plant] to solve the shortage of electricity available for distribution in Yangon. A YESB official said the new pipeline from the offshore Yadana field was nearly completed, but was not yet ready to convey gas. The extended facilities at the gas control and distribution station at Ywama were ready, the official said, and as soon as the pipeline was operational, natural gas conveyed by the new 24-inch line would be distributed to the turbine engines.

Thomas Kean (editor, Myanmar Times), Jakarta Globe, 25/05/10. Excerpt.

<http://www.burmanet.org/news/2010/05/25/jakarta-globe-forsaken-but-not-forgotten-rangoon-will-rise-again-%E2%80%93thomas-kean/>

One of the main gripes in Rangoon, the city most susceptible to political unrest, is the lack of electricity; the government supplies only 300 megawatts a day, less than half of the estimated demand. Some neighborhoods receive less than eight hours of power a day, while most get no more than 12. A new natural-gas pipeline from the Yadana offshore field should help alleviate the power outages. At an estimated cost of \$270 million, the pipeline project is a rare display of government largesse in lower Burma, and should conveniently come online in the third quarter of 2010.

Wai Moe, IRROL, 15/05/10. http://www.irrawaddy.org/article.php?art_id=18475

The completion of a gas pipeline from the Gulf of Martaban to Rangoon has stalled due to quality-control issues. The pipeline project, which is estimated to be worth about US \$500 million, is being carried out by IGE Co Ltd, run by Nay Aung and Pyi Aung, sons of U Aung Thaung, Minister of Industry-1. IGE is a major supplier of substation and transmission line materials, oil and gas, and CNG filling stations for government projects. With an election coming later this year, the regime had promised to boost Rangoon's power supply by the end of April and Energy Minister Lun Thi has been pushing IGE to conclude the pipeline project a month ahead of the original deadline. Now accused of shoddy quality control in its work on the project, IGE is blaming Lun Thi for the problems it is facing. The delays could not have come at a worse time. Burma is experiencing its most severe heat wave in years, straining the city's limited resources, including its access to water, which requires electric pumps to ensure an adequate supply. "It's like living in hell," said one NGO worker. "The heat is intense, and we can't run our air conditioners or water pumps because of a lack of electricity. Officials involved with the pipeline project have recently vowed to complete the 288-km (179-mile) soon, according to *Weekly Eleven*, a private journal published in Rangoon.

NLM, 29/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-29.pdf>

Energy Minister Lun Thi inspected the Swiber Conquest pipelay barge and the pipeline center near Daw Nyein Village in Pyapon district. On completion, the 24-inch diameter [gas] pipeline will be 179 miles long: 86 miles inland and 93 miles inshore areas. So far, pipelines have been laid for 86 miles inland, and for about 85 miles offshore. Officials are working hard for completion of the whole project on schedule.

NLM, 08/01/10. <http://www.burmalibrary.org/docs08/NLM2010-01-08.pdf>

On 06/01/10, Deputy Energy Minister Than Htay visited the Yadana natural offshore platform where he was briefed on production and distribution of natural gas by the general manager and officials of Total Myanmar Company. The deputy minister also inspected the construction of the pipeline centre and landfall of the offshore natural gas pipeline installation enterprise near Daw Nyein village in Amar township in Ayeyawady division.

DPA, 30/11/09. <http://www.earthtimes.org/articles/show/296989.domestic-natural-gas-to-triple-in-myanmar-in-next-decade.html>

The supply of natural gas for domestic use is to triple in Myanmar over the next decade, the Myanmar Times reported quoting the Myanma Oil and Gas Enterprise (MOGE). The gas is due to come from two major projects coming on stream - Shwe and Zawtika - leading to increases in onshore gas production, and the construction of a new pipeline linking the older Yadana offshore gas project with the capital Yangon. Gas

exports are also scheduled to increase, almost doubling over the same period, said U Myint Oo, MOGE's acting managing director earlier this month. Electricity generation from natural gas in Myanmar is to drop from 39.8pc of the total in 2005 to just 4.3pc in 2030, when almost 95pc of electricity is due to come from hydropower projects.

NLM, 10/09/09. <http://www.burmalibrary.org/docs07/NLM2009-09-10.pdf>

Energy Minister Lun Thi inspected the site chosen to build a station to distribute natural gas sourced from an offshore field at the Ywama [power] station.

Anatoaneta Bezlova, IPS, 10/09/08. http://www.irrawaddy.org/article.php?art_id=16754

Although Burma ranks 10th in the world in terms of natural gas reserves, its per capita electricity consumption is less than 5pc of neighboring Thailand and China, as its government exports most of the country's energy resources.

NLM, 14/08/09. <http://www.burmalibrary.org/docs07/NLM2009-08-14.pdf>

Energy minister Lun Thi inspected the site for laying a natural gas pipeline across the Hline river on 10/08/09. The pipeline, which is being undertaken by MOGE, will terminate at the Ahlon gas power plant. After the minister was briefed on the use of horizontal directional drilling techniques under the bed of the Hline river, he oversaw laying of the pipeline from the Ahlone bank. The 24"-diameter pipeline is being laid at a depth of 42 feet and will reach 3,100 feet across the river. The work is a part of a project which will bring natural gas from the offshore Yadana field to Yangon.

Xinhua, 03/07/08. http://news.xinhuanet.com/english/2008-07/03/content_8482390.htm

More natural gas will be needed in addition to hydropower to generate the 500+ MW of electricity to supply the round-the-clock needs of the country's largest city, the weekly Yangon Times reported on 03/07/08. The journal quoted the EPM No 2 as saying that it requires a total of 135 million cubic-feet (3.82 million cubic-meters) of gas to meet the daily demand for electricity in Yangon. Of this total, 100 million cf/d would be needed from off-shore gas fields with the rest available from on-shore fields. According to the report only 67 MCF of offshore gas and 27 MCF of onshore gas are available daily for the generation of electricity in Yangon. At present, the city gets only 250 MW of electricity which has to be distributed alternately to the townships in the city. **(Compiler's note:** The gas volumes in the sentence beginning, "Of this total . . ." have been corrected)

NLM, 01/05/08. <http://myanmargeneva.org/NLM2008/eng/5May/n080501.pdf>

Electricity supply to Yangon has still not returned to normal because repair work on off-shore gas pipe lines which transport natural gas to four gas-fired power plants in the city has not yet been completed due to adverse weather conditions. Efforts are being made by the Yangon Division Electric Power Supply Board to maintain sufficient supply of power to the city.

NLM, 28/04/08. <http://www.myanmargeneva.org/08nlm/n080428.htm>

Power generation at the Ahlon, Hlawga, Ywama and Thakayta power plants that supply electricity to Yangon will be cut to 100 MW while offshore pipe lines that provide gas to the four plants are temporarily closed down for repairs. The service interruption will last from 6 pm on 27 April to 6 pm on 29 April, the Yangon City Electricity Supply Board announced.

Khettiya Jittapong, Reuters, 03/04/08. http://www.irrawaddy.org:80/article.php?art_id=11267

A leak in a pipeline from Burma's Yetagun offshore gas field will be fixed in five days by Malaysia's Petronas, Thai Energy Minister Poonpirom Liptapanlop said on Thursday. Petronas, operator of the gas-rich offshore field in the Gulf of Martaban, had found two cracks on the onshore part of the pipeline near Thai and Burma border. "Gas supply from Yetagun should be back to normal in five days," she said. About 1.16 billion cubic feet per day (cf/d) of gas from the Yetagun and nearby Yadana fields that is exported to Thailand is mostly used in power generation. Thailand's PTTEP said on Wednesday the leak caused a loss of supplies to Thailand of about 400-500 million cf/d. The leak also prompted PTT to postpone a plan to shut down the gas pipeline to Burma for routine maintenance from April 11-20, Poonpirom said.

NLM, 28/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071228.htm>

Natural gas production at the Yadana offshore gas field will be suspended while repairs are carried out to the production process of the field from 28 December, 2007 to 7 January, 2008. Gas-powered plants and factories are to reduce their production during the period. However, the authorities have already taken necessary measures not to affect the supply of electricity to Yangon during the period.

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[Start 08](#)

PATHI HYDROPOWER PLANT INAUGURATED IN TOUNGOO TOWNSHIP

NLM, 03/01/08. <http://burmalibrary.org/docs4/NLM2008-01-03.pdf>

The inauguration of Pathi hydropower plant of the Hydropower Generation Enterprise of EPM No 1 was held at the plant in Toungoo township this morning. Southern Commander Ko Ko said the plant near Ngwetaunglay Village, 10 miles from Toungoo, will use water stored behind Pathi Dam. The dam was completed in February 1997 and has been supplying irrigation water to 1,500 acres of farmland in Toungoo township since then. Now the EPM-1 had fulfilled the demand for electricity in the region by implementing the second phase of the project which will supply power to Thandaunggyi and Thandaungthit in Kayin state through a 33 KV power line. Since Pathi creek originates in Kayin state it is fitting that electricity provided by power plant in Bago division should be used there as a sign of the friendship and amity of the national races. The power plant is equipped with two 1-megawatt generators.

Other operating hydel power stations of EPM-1 in the Sittaung valley include the 20-MW Zaungtu plant in Bago township and the 25-MW Yenwe plant in Kyauktaga township. Also under construction in the Sittaung watershed are the 30-MW Khapaung project in Ottwin township, the 140-MW Thaukyekhat-2 project in Toungoo township, the 40-MW Pyuchaung project in Pyu township, the 60-MW Kunchaung project in Pyu township and the 75-MW Shwegyin project in Nyaunglebin township. It is expected that the Khabaung station will be inaugurated in the near future. The Kunchaung and Thaukyekhat-2 hydropower projects have been designed to supply irrigation water to farmland.

EPM-1 Zaw Min said that the Pathi hydropower plant was the thirteenth operating power plant of the Hydropower Generation Enterprise. The HPGE had begun work on the plant in December 2006 and conducted test-runs in December 2007. It will generate 8 million kWh annually. The Pathi hydropower plant is the 46th facility of its kind in the entire country, and the fourth operating station in Bago division and the Sittoung valley. Of the 15 hydropower projects currently under construction by EPM-1, seven are scheduled for completion by 2010: the 54-MW Kengtawng project, the 600-MW Shweli No 1 project, the 790-MW Yeywa project, the 30-MW Khabaung project, the 60-MW Kunchaung project, the 40-MW Pyuchaung project and the 75-MW Shwegyin project.

Afterwards, Managing Director Kyi Tha of the HPGE formally unveiled the signboard of the power plant and the commander launched generator No-1 using the controls on a computer system that automatically regulates operation of the power station. It will distribute power to Thandaung township and any surplus to the Toungoo region. [Photos of the interior and exterior of the Pathi plant are included in the print edition of NLM.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NE 47-01: Pyinmana

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-1.jpg>

Burma 1:250,000: Series U542, U.S. Army Map: NE 47-05: Toungoo

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-5.jpg>

The village of Ngwedaunggale [19° 01' N, 96° 32' E] and Pathi creek (not identified) are visible in grid square 26\0,10\0 near the bottom of the Pyinmana map, a short distance from the border with Thandaung township in Karen state. To locate the area in relation to the large town of Toungoo, see the Toungoo topographical map.

KHRG has a map showing the location of Thandaunggyi and New Thandaung in relation to Toungoo.

<http://www.khrg.org/maps/2007maps/toungoo2007f4.jpg>

Additional references

Data summary: [Pathi](#)

NLM, 20/02/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070220.htm>

EPM-1 Zaw Min, accompanied by D-G of HPID Aung Koe Shwe, inspects the Pathi hydropower project, 10 miles north-east of Toungoo. They are briefed by Managing Director Kyi Tha of the Hydro-electric Power Enterprise on construction building of the power station. Two [single-] megawatt generators to be installed at the station will produce an average 8 million kWh per year.

NLM, 30/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061230.htm>

EPM-1 Zaw Min inspects the Pathi hydel power project and assists in the construction work. Two 1-MW generators will be installed at in the plant which is expected to generate 8 million kWh per year. The power generated will be sent to the national grid. Pathi hydel power project is located 10 miles north-east of Toungoo.

Monywa Copper Mine Electric Power Plant Project by BOL Scheme, ECFA -- Japan, [late 2004].

http://www.ecfa.or.jp/japanese/act-pf/H16/minkatsu_Myanmar_Eng.pdf [doc, p.18]

According to a long range plan for development of hydropower resources developed in 2001 by the Planning Dept of the Ministry of Electric Power, two single megawatt generators were to be installed at the Pathi dam which was expacted to produce 10 million kWh annually. Procurement of the turbine generator sets was said to be underway. Completion was scheduled for 2003.

NLM, 09/01/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030109.htm>

Assistant Director of Toungoo District ID Zaw Htut Oo reports data related to the Pathi dam, canals and hydro-electric power project to the Southern Commander. It is irrigating 1,200 acres of farmlands. Deputy Director of HPD No 3 Construction Group Khin Maung Lat reports on construction of the building which will house the two turbines.

Website of the Irrigation Dept of the A&I Ministry. <http://www.irrigation.gov.mm/works/1988.html>

Pathi dam, 90 ft high; 2500 ft long; catchment area, 21.5 sq mi; average annual flow of Pathi creek. 65,000 acre feet; dam storage capacity, 30,500 acre feet, construction costs, K 490.53 million; begun in 1993-94, completed in 1996-97; dam opened on 28/02/97.

[BUYWA AND UPPER BUYWA POWER PROJECTS TAKE SHAPE](#)

NLM, 18/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071218.htm>

Generals Than Shwe and Shwe Mann and party inspected Ahtet Buywa dam project on Mone creek where they were briefed by A&IM Htay Oo and officials of the Irrigation Dept on the Ahtet Buywa, Buywa and Kyee-ohn Kyee-wa dam projects on Mone creek.

The Ahtet Buywa dam is on the upper reaches of Mone creek near Thukaungkyin village in Sedoktara township. It will generate electricity and supply water to the Buywa [20° 39' N, 94° 10' E] dam. This will increase the water available to the Mone creek and the Kyee-ohn Kyee-wa dams. As the final step in the process Mezali diversion weir below the Kyee-ohn Kyee-wa dam will be able to irrigate 100,000 acres of farmland in all seasons.

Industry No 1 Minister Aung Thaung and EPM No 1 Zaw Min reported on the supply of cement and heavy machinery for the projects.

Gen Than Shwe said the projects were aimed at providing an adequate supply of power to industries that will take shape over the next few years and efforts should be made to complete them earlier than scheduled. The engineers and technicians working on these projects had already gained much experience and should be able to be innovative in the fields of irrigation and hydro-electricity. The important thing was for them to have confidence in their work and stand on their own feet in the long run.

Afterwards, the visitors looked into the construction of the hydro-electric and diversion tunnels and the site for the main dam. The Ahtet Buywa dam will be gravel-filled. It will be 451 feet high and 3,300 feet long. It will generate 150 MW, while it is estimated that the Buywa dam below it on Mone creek is will generate 42 MW. Taken together all four dams on Mon creek will be able to generate 341 MW.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-15: Myohaung Buywa dam near Buywa village [20° 39' N, 94° 10' E], grid square reference: 12\1, 23\3
Upper Buywa dam near Thukaungkyin village [co-ordinates n.a.], grid square reference: 12\3, 23\2 [?]
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-15.jpg>

Additional references

Data summary [Buywa](#)

Data summary [Upper Buywa](#)

See below: 'Mon creek multi-purpose dam and power station opened' (NLM: 30/12/04)
'Kye-e-ohn Kye-e-wa multi-purpose dam on Mon creek underway' (NLM: 01/0703)

NLM, 22/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-22.pdf>

Lt-Gen Tha Aye of the MoD and party visit the Ahtet Buywa and Buywa dam projects. At Ahtet Buywa, they are briefed by D-G Tin Maung Ohn of the ID on preliminary construction tasks, geological data for the construction of the diaphragm wall, soil testing for construction of the dam, work on the diversion tunnel, hydro power structures, and a feasibility study on construction of the spillway. At Buywa dam project, work is proceeding on the diaphragm wall, on land preparations, and on digging a diversion canal. Arrangements are being made to connect the site with the power grid.

Khin Maung Than (Sethmu), NLM, 26/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-26.pdf>

The Buywa and Upper Buywa dam projects are being implemented in the hilly regions of Sedoktara township on the upper reaches of Mone creek which rises in the mountains of Chin state. Buywa dam is located near Bu village, 13 miles above the Mone creek dam. The Upper Buywa dam will be able to store 1,459,400 acre feet of water and Buywa dam will have a storage capacity of 403,300 acre feet. Besides the power produced at the dam itself, Buywa dam will increase the generating capacity of the Kye-e-ohn kye-e-wa dam on the lower Mone creek by about 120 more million kilowatt hours yearly. The Upper Buywa dam Project is being implemented near Thagaungkyin Village, 12 miles upstream from the Buywa damsite. It is expected to generate 534 million kilowatt hours yearly and will increase the amount of water in the area irrigated through the Mezali diversion weir in the rainy and summer seasons.

NLM, 17/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-17.pdf>

The rock-filled Ahtet Buywa dam near Thugaung Kyin village in Sedoktara township will be 4000 feet long and 451 feet high. It is expected to generate 534 million kilowatt hours a year. The earthen Buywa dam near Bu village in Sedoktara township will have a hydropower generation capacity of 195 million kilowatt hours.

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

At the co-ordination meeting (1/2008) of the Special Projects Implementation Committee in the office of the Commander-in-Chief (Army), EPM No 1 Zaw Min gave a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the Committee. [Among the the fifteen are] the Upper Buywa hydropower project (150 megawatts) in Magway division.

Kyaw Sein, NLM, 04/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-04.pdf>

A news crew of the Myanma Alin Daily recently made a trip to the Upper Buywa and Buywa dam projects in Sedoktara township. The Upper Buywa project site is located near Thagaungkyin Village, 25 miles above the Mone creek dam. The embankment of Upper Buywa Dam will be gravel filled and it will be 451 feet high and 3,300 feet long. At brim level it will store 1,459,400 acre-feet of water and at least 174,530 acre feet at minimum level. On completion, the power plant at the dam will be able to generate 534 million kilowatt hours yearly. It will also ensure a regular supply of water to the Buywa dam year round. According to U Than Tun,

deputy director of Construction Group No 8 of the Irrigation Dept, who is supervising the project, generators with a capacity of 150 MW will be installed in the plant at the Upper Buywa dam and the power produced will be used in the construction of the Buywa dam and power plant. At the site of Buywa dam which is 13 miles above the Mone creek dam the news crew learned that the location of the dam had been shifted about 4,800 feet upstream from the site originally chosen upon instructions of Gen Maung Aye when he visited the project on 5 May 2004. The earthen Buywa dam will be 151 feet high and 3,200 feet long. The dam will have a minimum storage capacity of 37,298 acre-feet of water and 169,446 acre-feet at full brim. It is estimated that construction costs of the Upper Buywa dam amount to K 124,826 million, while Buywa Dam is being built at an estimated cost of K 39,713 million. When the two dams are complete, the power plant at the Mone Creek dam will be able to generate 70 million kWh more than first planned. Likewise, the power station at Kyeeohn-kyeewa dam will increase its production by about 120 million kWh yearly. [Photos of the Buywa dam site are included in the print edition of NLM for 04/11/08.]

NLM, 21/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080821.htm>

On a visit to Kyeeohn-kyeewa dam project Maj-Gen Khin Zaw of the MoD is briefed by Director Tin Win of Construction Group 8 of the ID on developments at the Buywa dam, Upper Buywa dam and Myittha dam projects. The Kyee-ohn Kyee-wa, Mone, Buywa and Upper Buywa hydropower projects on Mone creek together will be able to generate 250 MW.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.igsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf

Buywa dam and power station with a planned capacity of 41 MW is under implementation by the ID. It will generate 195 million kWh annually when it comes on line in 2008. The Upper Buywa dam will be 137.5 m [451ft] high and the power station with a planned capacity of 150 MW is expected to generate 534 million kWh annually. It is currently in the planning stage and will be carried out by the ID and HPID.

NLM, 23/09/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060923.htm>

Bu Ywa dam project will be launched on the Mone Creek near Bu Village, 13 miles upstream Mone creek dam in Sedoktara township, and Ahtet Bu Ywa dam project on the same creek near Thukaungkyin village, about 25 miles upstream Mone creek dam.

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CHINA PETITIONED ON BURMA DAM PROJECTS

dpa, 02/12/07. http://www.nationmultimedia.com/2007/12/03/regional/regional_30058101.php

Burma anti-dam activists have sent a petition to Chinese President Hu Jintao urging him to better regulate Chinese companies involved in the construction of 10 hydropower projects worth \$30 billion in military-run Burma. The Burma Rivers Network petition - endorsed by 50,000 "affected people," 98 Burma organizations and 24 international organizations - called on the Chinese government to require the 10 Chinese companies involved in dam building in Burma to conduct proper social and environmental impact studies and reveal details on the projects to the affected communities. "The dams would represent over 30 billion dollars in investment," the petition said. "These Chinese dams will cause huge environmental and social damage for the peoples in Burma and will damage China's international image," said Aung Ngyeh, spokesman of the Burma Rivers Network.

The Burma Rivers Network, an NGO comprised of representatives of ethnic organizations from potential dam-affected communities in Burma, has used its petition to highlight the extent of Chinese companies' involvement in Burma's hydropower sector, which has been largely ignored because of a lack of publicity and transparency surrounding the deals. "In recent years, the number of Chinese businesses involved in hydropower projects in Burma has increased dramatically," the letter to Hu said. "At least 10 Chinese corporations have been named in connection with these dams on the Irrawaddy, Salween (Nu), Shweli and Paunglaung rivers, including Gezhouba Group Co (CGGC), Sinohydro Corp, Yunnan Machinery and Equipment Import and Export Co, and China Power Investment Corp," it added.

Most of the planned hydropower dams are situated in conflict areas, where the Burma military is waging jungle wars against ethnic minority groups, such as the Karen and Shan. While the Chinese companies are hoping the projects would earn revenues from electricity exports to neighbouring Thailand, Burma's military stands to gain politically by opening these areas up to their troops and through forced relocations of thousands of ethnic minority populations opposed to the government, observers charged.

The dam building is likely to have huge social impact not only at the project sites but also on the border areas between Burma and China and Thailand. "The impacts of the proposed dams in border areas will lead to instability and increased refugees flows into China, creating further opportunities for the spread of HIV/AIDS and drug trafficking into China," the Burma Rivers Network said. It urged the Chinese government to insist that Chinese companies conduct social impact assessments and environmental impact assessments that meet international standards before going ahead with construction.

Additional references

See above: 'Hydropower projects generate [concern in South Asia](#)' (Asian Energy: 15/03/09)

See also the websites of the Burma Rivers Network <http://www.burmariversnetwork.org/> and the Salween Watch <http://www.salweenwatch.org/> which focus on environmental concerns connected with large-scale hydropower developments in Burma/Myanmar.

See also the following reports which highlight environmental concerns connected with hydro and coal-fired electricity projects in Burma/Myanmar. Brief summaries of most of these reports are available in the publications section of the Burma Rivers Network website.

Burma Rivers Watch, Salween Watch & Karenni Development Research Group. *Stop the Dam Offensive Against the Karenni*, 4pp (March 2011, 4pp).

http://www.salweenwatch.org/index.php?option=com_content&view=article&id=279:stop-the-dam-offensive-against-the-karenni&catid=37:publications&Itemid=66

Pa-Oh Youth Organization, *Poison Clouds: Lessons from Burma's largest coal project at Tigyt*, 54pp (Kyoju Action Network, January 2011).

<http://www.burmalibrary.org/docs11/PoisonClouds%28en%29.pdf>

Shan Sapawa Environment Organization, *Roots and Resilience*, 48pp (July 2009).

<http://salweenwatch.org/images/stories/downloads/campaigns/rootsandresilienceenglish.pdf>

Saw Blaw Htoo et al, *Khoe Kay: Biodiversity in Peril*, 133 pp (Chiang Mai, Karen Environmental and Social Action Network, July 2008).

http://www.salweenwatch.org/images/stories/downloads/brn/2008_009_24_khoekay.pdf

Kayan Women's Union, *Drowning the Green Ghosts of Kayanland: Impacts of the Upper Paunglaung Dam in Burma*, 24pp (June 2008). <http://www.salweenwatch.org/downloads/DrowningtheGreenGhostsEnglish.pdf>

Palaung (Ta'ang) Youth Network Group, *Under the Boot* 57pp (December 2007).

<http://www.burmariversnetwork.org/images/stories/publications/english/underthebootenglishwithcover.pdf>

Kachin Development Networking Group, *Damming the Irrawaddy*, 64pp (October 2007).

<http://www.burmariversnetwork.org/images/stories/publications/english/dammingtheirrawaddy.pdf>

Karenni Development Research Group, *Dammed by Burma's Generals: The Karenni Experience with Hydropower Development From Lawpita to the Salween*, 81pp (March 2006).

http://www.burmacampaign.org.uk/reports/Damned_by_Burma%27s_Generals.pdf

Shan Sapawa Environmental Organization, *Warning Signs: An Update on Plans to Dam the Salween in Shan State*, 32pp (2006).

<http://salweenwatch.org/images/stories/downloads/publications/warning%20sign.pdf>

Foundation for Ecological Recovery: *Briefing Paper: Salween Hydropower Project (Thai–Burma border)* 7 pp (June 2003). <http://www.terrafer.org/articles/BriefingSalweenThai-BurmaJune03.pdf>

PYIN-U-LWIN HYDROPOWER PROJECTS SPEEDED UP

NLM, 30/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n071130.htm>

D-G Aung Koe Shwe of HPID and Pres Feng Ke of YMEC of the PRC sign for the purchase of materials needed for the implementation of Zawgyi No 1, Dattawgyaing and Wetwun hydropower projects. The equipment purchased will allow the projects to proceed on time.

Additional references

See below: [‘Yadanabon cyber](#) city slated for soft opening in September (MT: 24/09/07)

NLM, 27/11/10. Edited and revised. <http://www.burmalibrary.org/docs09/NLM2010-11-27.pdf>

Plans for the construction of Pwekawk dam on Galaung creek had to be changed due to cracked limestone at the floor of the proposed dam and seepage of water. Instead a diversion weir is presently under construction. Water diverted through the weir is needed to supply the high profile Yadanabon cyber city development as well as the growing city of PyinOoLwin. The area receives an average rainfall of 49 inches annually and Galaung Creek which has a 40 sq mi watershed, has an inflow of about 45,500 acre feet a year. The weir will be of a broad crest type, 300 feet long, with a 160-foot long embankment. Flow of water is estimated at 25,770 cubic-feet per second. Two 40-kw generators to be installed at the weir will supply electricity to Yaythayaukgon, Naungghlaing and Naunglon villages. The project will also irrigate 200 acres of farmland. Wheat, niger and groundnut are cultivated in the area. The project is now scheduled for completion in the 2011-12 financial year. [Photos of earth removal equipment at work on the site are included in the print edition of NLM.]

NLM, 23/04/10. <http://www.burmalibrary.org/docs08/NLM2010-04-23.pdf>

Construction of Pwekawk dam continues. Installation of the penstock pipelines is underway. The earthen embankment of the dam will be 1450 feet long and 107 feet high. The reservoir will be able to hold 1230 acre-feet and will supply water for agriculture and public consumption. It will contribute to generating 2.20 million kwh yearly to boost agricultural produce and provide electricity to local people.

NLM, 05/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-05.pdf>

A&IMin Htay Oo reports to the Special Projects Committee (SPIC) that Pwekawk dam on Gelaung Creek is a priority for the Irrigation Dept. It will supply drinking water to PyinOoLwin Myothit and Yadanapon Myothit. A small-scale hydro power station will be constructed at the dam.

NLM, 05/09/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nml/n080905.htm>

A&IM Htay Oo checks on the Pwekawk dam project near Yethayaukgon village in PyinOoLwin township. At the Doegwin Farm of the Myanma Agriculture Service near Hsingaunggyi village in the same township he inspects a small-scale hydropower unit that is generating 5 kW. [A photo of the generator is available on p 2 of the print edition of NLM.]

NLM, 22/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n071222.htm>

During a tour of the Pyin Oo Lwin area A&IM Htay Oo and CPTM Thein Zaw visited the Dokwin Agriculture Farm of the Myanma Agriculture Service where herbal orchids are grown in accordance with the guidance of the Head of State. Afterwards, the ministers inspected a small hydel power project on an irrigation canal of Dokwin Dam that can produce 5 kW. Generators are also equipped on irrigation canals to produce hydro power on a small scale.

NLM, 06/11/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061106.htm>

EPM No 1 Zaw Min received Chairman Feng Ke of YMEC at Wharton International Hotel in Nanning on 29 October. They discussed matters related to Shweli-1, Upper Paunglaung, Nancho, Wetwun, Dattawgyaing and Zawgyi-1 hydel power plants.

NLM, 15/04/06. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040415.htm>

Gen Than Shwe visits Wetwun hydroelectric power station and gives guidance on extending its capacity and on harnessing Dattawchai waterfalls to produce electricity. To further meet the demand for electric power in Pyin Oo Lwin he wants consideration given to building other small hydropower stations in the area by utilizing the flow of water at projects such as the Hsinlan dam which are used for drinking water and irrigation purposes.

NLM, 04/09/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020904.htm#1>

Officials report on the maintenance of the turbines at the Wetwun hydropower station. Nos 1 and 2 turbines at station were installed in 1933 and 1939 respectively. The turbines each generate 255 kW.

NLM, 09/03/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010307.htm>

EPM Tin Htut briefs Gen Maung Aye on the repair of Wetwun hydroelectric power Station in Pyin Oo Lwin township.

www.allmyanmar.com/new%20allmyanmar.com/pin%20oo%20lwin%20%20maymyo%20Myanmar%20Burma.htm

The best known waterfalls in the Pyin-oo-Lwin area are three picturesque falls: DattawGyaink (Hollow of the Sacred Relic), Wetwun Falls and Pwegauk Falls (better known as B.E. Falls as it is near the Depot of Burma Engineer Corps).

NORTH YAMA SUPPORT DAM TO GENERATE 250 KILOWATTS

NLM, 29/11/07. <http://burmalibrary.org/docs4/NLM2007-11-29.pdf>

The opening ceremony of the newly-built North Yama supporting dam built by Construction Group 4 of the Irrigation Dept was held at the pandal of the dam in Pale township in Monywa district this morning.

North-West Commander Myint Soe said the newly-built dam would contribute toward agricultural tasks and greening as well as supplying 250 kilowatts of electric power. It will benefit 385,444 acres of farmland and supply irrigation water to cultivate edible oil crops and beans and pulses in addition to paddy all the year round. A&IM Htay Oo said the dam had been built to fulfill the requirements of local farmers in both Yinmabin and Pale townships and that they were to make efforts to improve the agricultural sector with the use of irrigation water. Director U Victor of Construction Group 4 of the Irrigation Dept presented reports on building the dam to the commander and the minister. Afterwards, on behalf of the locals, U Tint Swe spoke words of thanks. [A photo of the dam appears in the print edition of NLM.]

Additional references

Khin Maung Than (Sethmu), NLM, 19/11/08. <http://www.burmalibrary.org/docs6/NLM2008-12-19.pdf>

I visited the North Yama support dam which is 136 feet high and 1,200 feet long. The dam can store 122,900 acre feet at full brim and 21,240 acre feet at minimum level. To generate hydropower, two 19-inch diameter pre-stressed steel pipes [have been installed] at the basin of the chute. [Photos of the dam embankment and control tower are included in the print edition of NLM. There is no indication in this report that generators have, in fact, been installed at the dam. The original version of this article was published in Burmese in Kyemon on 09/12/08.]

NLM, 27/11/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051127.htm>

Prime Minister Soe Win and party visited the North Yama support dam that is under construction on North Yama Creek two miles south east of Aingma village (22° 02' N, 94° 34' E) in Pale township. The

support dam is being built six miles upstream of North Yama dam that was opened in 1998. The support dam will be able to store 99,000 acre feet that will be available to the North Yama dam. It will supply water to 12,000 acres of land where double and mixed cropping can be made all year round. Arrangements are being made for construction of a small hydel power station.

NLM, 01/02/05. <http://burmalibrary.org/docs2/NLM2007-02-01.pdf>

Lt-Gen Ye Myint of the MoD and party visit the North Yama supporting dam project where they view the installation of 19-inch diameter steel pipelines for generating 500 kilowatts and the water control tower.

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FOREIGN CONSULTANTS FOR PRIVATE HYDRO PROJECTS

Kyaw Thu, Myanmar Times, 26/11/07. <http://www.mmtimes.com/no394/b005.htm>

Two private Myanmar companies developing hydropower projects are planning to hire foreign consultant companies, said an energy expert close to one of the companies on November 20. Asia World and Olympic Construction are the first two private, local firms to have been entrusted to build hydropower projects in Myanmar.

The expert said Olympic Construction is considering Swiss firm Colenco Power Engineering, Japanese Newjec Inc, Chinese Sinohydro Corp or another unnamed Chinese company to assist with its project. Of these four, Colenco Power Engineering is already consulting on the Yeywa project in Mandalay Division; Sinohydro is involved in the construction of the US\$1 billion Hutgyi project on the Thanlwin River; and Newjec Inc has worked on the Baluchaung 1, 2, 3 and Hutgyi projects since 1984.

However, he refused to say which company – or companies – Asia World is planning to hire, nor the value of any such deal, although he did say what its role would be. “The foreign consultancy company will help us to draw-up a project design and monitor the overall construction,” he said.

Asia World is slated to build the Thaukyegat hydropower project in Bago Division, which is expected to produce some 140 megawatts (MW) of electricity, while Olympic Construction will build the Baluchaung 3 project in Kayah State. This project is hoped to deliver a further 48MW. “The two companies have been running feasibility studies and preparing to submit a proposal to the Myanmar Investment Committee,” he said.

When finished, the electricity generated by the two projects will be sold to the Ministry of Electric Power 2 for distribution through the national grid.

Additional references

See above: ‘[Biluchaung No 3](#) hydropower project moving ahead’ (NLM: 14/02/09)

‘[Sai Tin hydropower project](#) plans announced’ (NLM: 28/01/09)

See below: ‘[Invitation for foreign investment](#) in electric power sector’ (Gov’t website, circa 1998)

‘More inputs needed to power a [hydro future](#)’ (MT: 04/06/01)

‘Burma eyes [private power producers](#)’ (Nation: 13/02/96)

‘[Thaukyekhat hydel power project](#): Notes’ (Appendix 16)

See also other articles listed in the topical index under ‘Independent producers and projects’. ([IP](#))

NLM: 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held coordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw of 05/03/10. . . . At the meeting, Minister for Electric Power No. 1 Col Zaw Min reported on matters related to five joint projects to be implemented with the investment of local entrepreneurs and seven joint projects with foreign companies. The Ministry of Electric Power No. 1 will jointly implement the five projects with the investment of local national entrepreneurs. They are: Upper Biluchaung Hydropower Project in Shan State (South) to generate 29 megawatts, Htakha Hydropower Project in Kachin State to generate 6 megawatts, Anyaphya Hydropower

Project in Taninthayi Division to generate 9 megawatts, Yangon Coal-fired Power Plant Project in Yangon Division to generate 270 megawatts and Kawthoung Coal-fired Power Plant Project in Taninthayi Division to generate 6 megawatts.

NLM: 01/01/10. <http://www.burmalibrary.org/docs08/NLM2010-01-01.pdf>

An MoU was signed between Hydropower Administration Department of EPM No 1 and Htoo Trading Co Ltd to co-operate in [the development] of the Upper Hsetawgyi and Htakha hydropower projects through the Build-Operate-Transfer (B.O.T) system in Nay Pyi Taw on 29/12/09. EPM-1 Zaw Min extended greetings and Chairman of Htoo Trading Co Ltd U Teza explained the purpose of the MoU. Later, the director-general of the Hydropower Administration Dept and a responsible person of Htoo Trading Co Ltd signed the MoU and exchanged documents.

Xinhua: 05/01/10. http://news.xinhuanet.com/english/2010-01/05/content_12757356.htm

Myanmar is encouraging private companies to invest in hydropower projects to share the government's efforts in fulfilling the country's growing electric power demand. Recently, the Myanmar authorities granted one more company to implement hydropower projects under a build, operate and transfer (BOT) system, according to EPM-1. Under an MoU reached on 29/12/09 between the ministry and Htoo Trading Co, the private company will implement two hydropower projects of Upper Hsedawgyi and Thaka, for the first time. In November last year [2009 or 2008?], two other local private companies -- the Future Power Co and the Min Anawyahtar Co Group -- had also been granted to implement the Upper Beluchaung and Saidin hydropower projects under the same system.

"Myanmar Country Report on Progress of Power Development Plans and Transmission Interconnection Projects", *Fifth Meeting of Planning Working Group of the Regional Power Trade Coordination Committee, Greater Mekong Subregion* (Vientiane, 17/06/08), Appendix 4, p 22.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/PWG5-Appendix4.4.pdf>

Private Sector Investment In Power Generation Sector

Local investors are allowed to participate in the scheme of Independent Power Producer (IPP) for medium hydropower projects. An MOU on the Thaukyegat-2 hydropower project (120 MW) was signed between the Ministry of Electric Power No 1 and Asia World Company Ltd on 2nd May 2008. An MOU on Baluchaung No 3 hydropower project (48 MW) was signed between the Ministry of Electric Power No 1 and High Tech Concrete Technology Co Ltd on 2nd May 2008.

NLM, 18/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080118.htm>

On a visit to Biluchaung No 3 hydropower site Lt-Gen Kyaw Win of the Ministry of Defence is briefed on arrangements for implementation of the project, construction of the power intake tunnel and the power plant and the generation of power by project co-ordinator Tin Maung Win of HPID. Kyaw Win checks the water current at the confluence of Bilu Creek and Pun Creek. HPID and High Tech Concrete Technology Co Ltd will jointly construct the diversion dam and the power intake tunnel of Biluchaung No 3 Hydropower Project. On completion, the power plant of the project will generate 344 million kwh yearly.

FULL RESERVOIRS TO BOOST HYDROPOWER

Kyaw Thu, Myanmar Times, 19/11/07. <http://www.mmmtimes.com/no393/n006.htm>

The production of electricity from hydropower is expected to be higher during the upcoming dry season than in previous years, an official from the EPM No 1 said earlier this month. He said reservoirs at hydropower projects throughout the country were holding more water than usual as a result of steady rains that lasted until the end of October, a month later than normal. "In previous years the production of electricity from hydropower projects dropped about 50pc during the dry season but this year we expect it to drop only about 30pc," he said.

Because hydropower is the source of about 50pc Myanmar's electricity, declines in production during the dry season can cause power outages in Yangon and other cities. Aside from hydropower, 40pc of the country's electricity comes from natural gas, 9pc from steam and 1pc from diesel engines. During the dry season the

government partially compensates for the drop in electricity from hydropower by increasing the percentage from natural gas.

According to the Yangon City Electricity Supply Board, about 11,284 MW of electricity are required from hydropower and 8013 MW from natural gas to supply 24-hour electricity to the public and to industries in Yangon.

The ministry official said problems with electricity shortfalls will be solved when the 790-MW Yeywa hydropower project in Mandalay Division is finished in December 2009. "When Yeywa is finished we will be able to meet the country's electricity needs," he said. Construction on the Yeywa project, located on the Myitnge River about 50 kilometres southeast of Mandalay, started in 2001. The total cost is expected to reach K15 billion.

Additional references

See below: 'Gas in [short supply](#) to meet demand for electricity' (MT: 17/09/07)
 'Full power supply promised for July' (MT: 04/06/07)
 'Low water levels hinder power distribution' (MT: 02/04/07)

CHINESE FIRM TAKES 51% INTEREST IN TASANG HYDROPOWER PROJECT

Kyaw Thu, Myanmar Times, 19/11/07. <http://www.mmtimes.com/no393/b004.htm>

A Chinese energy firm has picked up a 51pc stake in the US\$6-billion Tasang hydropower project planned for the Thanlwin River, an official of EPM-1 said on November 13. China Gezhouba Water and Power Group Co Ltd took up the majority holding earlier this month after Thailand's MDX Group told the Myanmar government it needed to reduce its stake due to financial difficulties, the official said. The design of the 7110-MW plant in eastern Shan State, scheduled for completion in 2022, represents the single largest investment ever in Myanmar and has not be changed, the official said.

Under the new arrangement, MDX Group holds a 24pc stake and Myanmar's Dept of Hydropower Implementation holds a 25pc stake, he said, adding that the EPM-1 Zaw Min, informed Thai ambassador Bansarn Bunnang of the change on November 8 in Nay Pyi Taw.

"The MDX Group have been implementing the project for a decade but there has been no significant progress so far. So the government handed it over to the Chinese consortium," the official said in a telephone interview. He added that the government had been annoyed at the slow pace of development and had decided to diversify the stake holdings because it was less confident about MDX Group's ability to proceed with the project.

A Yangon-based representative of MDX Group, U Win Moe, told the Myanmar Times last month that the Thai company was not facing any financial difficulties and had halted work at the Tasang site due to challenges posed by the wet season. Work at the site, some 75km from the Thai border, had since resumed, he said. U Win Moe was unavailable for comment last week.

MDX signed a joint venture agreement with the DHP in April 2006 to develop the project. The department was broken into three new departments the following month when the EPM was split in two.

Work on the Tasang project started on March 30 this year. Thailand had been expected to purchase most of the annual production of 35,400 million kWh of electricity generated by the plant, although it is now uncertain who the buyer will be, the ministry official said last week. Officials have said construction would take place over 15 years and create 15,000 jobs.

Meanwhile, officials of EPM-1 were due to discuss the Hutgyi power project with its stakeholders in Nay Pyi Taw on Nov 16. The Hutgyi dam is a \$1-billion, 1200-MW project planned for the Thanlwin River

downstream from the Tasang in Kayin State. It is a joint venture project involving EPM No 1, the Electricity Generating Authority of Thailand and China's Sinohydro Corp.

Map references

Several maps of the area where the Tasang dam will be located are available in *Warning Signs: An Update on Plans to Dam the Salween in Shan State*, (Shan Sapawa Environmental Organization [SAPAWA], 2006). See the maps on pp 7, 11, 16, 22, 23 and especially 24 which shows the area that will be flooded if the dam is built to the proposed height of 228m. <http://salweenwatch.org/downloads/warning%20sign.pdf>

See also the map on the Shanland website:

http://www.shanland.org/environment/2004/Dam_on_the_Salween_definitely_on.htm

Burma 1:250,000: Series U542, U.S. Army Map: NF 47-14: Mong Pan

Tasang dam, near Wan Kawpa [20° 31' N, 98° 38' E], grid square reference: 11\8, 28\4

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-14.jpg>

Additional references

Data summary: [Tasang](#)

See above: 'Mongton hydropower project to be developed on Upper Thanlwin' (NLM: 12/11/10)

See below: 'EGAT [agreed only](#) to study feasibility of Salween project' (BKP: 10/06/07)

'Myanmar, Thailand begin work on [controversial Tasang](#) dam' (AFP: 05/04/07)

'Hydropower Dept and EGAT ink agreement on [Hutgyi](#) project' (NLM: 10/12/05)

Jonathan Shieber and Wan Xu, Dow Jones, 24/03/10. Edited.

<http://www.foxbusiness.com/story/markets/industries/utilities/china-consortium-starts-work-myanmar-hydroelectric-project/>

Three Chinese companies which set up a consortium to build a 7.1-gigawatt hydropower dam and station across the Salween river in Myanmar in November 2009 are proceeding with development plans, a Chinese government agency said on its website. The State Asset Supervision and Administration Commission said the dam in Myanmar would be jointly developed by China, Myanmar and Thailand. The consortium includes China Three Gorges Corp., Sinohydro Corp., and China Southern Power Grid. The three companies have started work on the project, the commission said. Upon completion, the hydropower station will be the largest in Southeast Asia by installed capacity.

Rajeev Syal and Daniel Pye, The Observer, 27/09/09. Edited and condensed.

<http://www.guardian.co.uk/world/2009/sep/27/burma-dams-human-rights>

The British construction company Malcolm Dunstan and Associates has been condemned by human rights campaigners amid reports that the projects led to the forced relocation of villagers. The Devon-based family-run firm has been involved in concrete construction on the Yeywa dam in central Burma and the Ta Sang project on the Salween river. The projects, which will generate electricity for Thailand and China, have been targeted by human rights activists after reports that thousands of villagers had been removed from floodplains and opposition ruthlessly crushed. According to the firm's website, it was still involved in the Yeywa project in December 2008, but Dunstan declined last week to say whether it was still working on the site. He confirmed that his firm had been involved in the Ta Sang project but said that its work was completed some years ago.

Shan Sapawa Environment Organization, *Roots and Resilience*, pp 1 - 48 (July 2009).

<http://salweenwatch.org/images/stories/downloads/campaigns/rootsandresilienceenglish.pdf>

This report mainly focusses on the town of Kengkham and six village tracts along the Pang river in eastern Shan state which will be severely affected by flooding if and when the Tasang dam is built. Many photos of this traditional Shan community, "off-limits" to outsiders, are provided. Brief updates on recent construction work at Wan Sala near the Tasang dam site and logging activity in the Salween valley are included. At Wan Sala, MDX has finished building six houses, a large office and a health centre, and begun work on a huge building whose purpose is not identified. As of May 2009, all construction in Wan Sala was on hold and most

of the MDX staff had gone back to Thailand, presumably to wait out the monsoon season. Clear cutting has devastated forests on the east side off the Salween and the Wa Hong Pang Co has recently started building a logging road west of the Salween between Mong Pan and the Tasang dam site. No new information is provided about the involvement of PRC companies in the Tasang project, but there is an interesting reference to the website of a UK company, Malcolm Dunstan & Associates, which specializes in the design and construction of roller-compacted dams, and which claims to have been involved at some stage in the preparations for the Tasang dam, <http://www.rccdams.co.uk/about.htm>

China Southern Power Grid. 15/07/08. http://www.sp.com.cn/dlyw/gndlyw/200807/t20080715_109473.htm
In order to implement the tasks under the "Framework Agreement on Myanmar's Salween River Basin Hydropower Development Strategic Cooperation", the China Southern Power Grid Co, Sinohydro Corp and China Three Gorges Project Corp held the first joint working meeting on Myanmar's Salween River Basin, and decided to form a tripartite joint working group. The meeting confirmed the membership, working place, working mechanism and the initial plan for the next phase of the joint working group. This establishes the foundation for the implementation of Myanmar's Salween river basin hydropower projects, particularly the Tasang hydropower project. The working group will then develop the objectives, responsibilities and obligations, and start the assessment of the initial project technology and business risks. They will also arrange joint market field research, and start the pre-project work among Chinese, Thai and Myanmar sides.

"Myanmar Country Report on Progress of Power Development Plans and Transmission Interconnection Projects", Fifth Meeting of Planning Working Group of the Regional Power Trade Coordination Committee, Greater Mekong Subregion (Vientiane, 17/06/08), Appendix 4, p 24.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/PWG5-Appendix4.4.pdf>

The Tasang hydropower project on the Thanlwin river will be undertaken in three stages. A low-head, roller-compacted concrete (RCC) dam, 78 metres high, with a capacity of 200 MW will be completed in 2010. The first phase of the main RCC main dam, 227.5 metres high, with a capacity of 2133 MW will be completed in 2016. The second phase of the power plant at the main dam, with a capacity of 4977 MW, will be completed in 2022. Electricity produced by the first two stages is for export to Thailand. Export of electricity after the final stage is completed will be shared by Thailand and China.

Kyaw Thu, Myanmar Times, 24/03/08. <http://mmtimes.com/no411/b002.htm>

According to an energy expert close to EPM No 1, all hydropower joint ventures with Thailand are still suspended, despite Thailand's PM Samak Sundaravej recent visit which focussed on increasing investment in the energy sector. Executive director Precha Sekhararidhi of the MDX Group had been quoted as saying on March 17 that the company intended to move ahead with its Tasang project in Myanmar after finishing two dams in Laos. However, the energy expert insisted the Tasang project has not moved forward since the end of last year and no formal instructions have been given to HPID to re-start their work. Construction of the project started at the end of March 2007 and was expected to finish in 2022. The Thai company initially had an 85pc share in the project before Myanmar's government reassigned control of the venture to a Chinese company at the end of 2007. Under the new arrangement, MDX Group holds a 24pc stake, HPID has a 25pc stake, and the Chinese firm, Gezhouba Water and Power Group Co Ltd, holds a 51pc share.

Bangkok Post, 16/03/08. http://www.bangkokpost.net/News/16Mar2008_news01.php

Thailand will push ahead with construction of the Tasang hydropower dam and other infrastructure projects in Burma, Foreign Minister Noppadon Pattama said Saturday. The move came as Thailand tried to foster closer economic ties with Burma following the first official visit to the country on 14/03/08 by PM Samak Sundaravej since he took office in February. The Burmese junta raised the issue of the 7,110-megawatt Tasang dam, which Thailand won a concession to build 10 years ago. There has been little progress since then however. Mr Noppadon said the government would urge the private sector to go ahead with the project, which would boost energy security for the kingdom. The Tasang dam is the largest of the proposed hydroelectric projects on the Salween River in Burma's Shan State, about 130km from the Thai-Burmese border. The 228-metre-high dam is slated to be the tallest in SE Asia. The reservoir will flood hundreds of square kilometres of land, according to Salween Watch, a coalition of NGOs based in Chiang Mai, which monitors the issue. Thai firm MDX signed an agreement with the Burmese junta in 2002 to develop the project. However, the planned dam has met with stiff opposition from environmentalists and other activists because it could force several thousand people to leave their homes and land and move elsewhere.

Viparat Jantraprap and Wilawan Pongpitak, Reuters, 14/03/08.

<http://uk.reuters.com/article/oilRpt/idUKBKK8637420080314>

Thailand's MDX plc is relying on hydropower projects in neighbouring Laos and Myanmar to shore up its future revenues, according to executive director Precha Sekhararidhi. Its joint ventures were developing two hydropower projects in neighbouring Laos and expected to sell electricity from them in the next four to five years, Precha told Reuters in an interview. New capacity from the two Lao dams -- the Thuen-Hin Bun hydropower plant and the Nam Nguem 3 dam -- will more than double its power revenues and push the contribution of such revenues to 80pc of its total from 60pc. Electricity sales by its joint ventures, the 350 MW Bang Bo power plant in the Thai province of Samut Prakan and the 210 MW Thuen-Hin Bun hydropower plant in Laos, accounted for about two-thirds of revenues in 2007. Its 52pc-owned GMS Power will have a 20pc stake in the 280-MW extension of the Thuen-Hin Bun hydropower plant and a 27pc stake in the Nam Nguem 3 dam. GMS Power is also conducting a feasibility study for the Ta Sang hydropower project in Myanmar, expected to generate more than 7,000 MW of electricity, with GMS Power set initially to have a 85pc stake. "Technically, Ta Sang dam has a very high potential. We're not able to tell when we expect to finish the development of this project. It will take time, but as a developer, we want to make it quickly," Precha said. The Thai government is trying to persuade Myanmar's military government not to cut the GMS stake in the project. Myanmar officials have said it wants to cut the Thai stake to 24pc.

William Boot, IRROL, 08/03/08. http://www.irrawaddy.org:80/article.php?art_id=10753

The new Thai government of Samak Sundaravej has given the green light to large-scale infrastructure projects such as hydro dams on Burma's Salween River. Samak's first visit to Burma as prime minister, scheduled for the second week in March is expected to offer reassurances on the existing agreements between the two countries. "There was some breath holding in recent months, during the previous Bangkok-installed military government phase, on projects such as the hydroelectric dam on the Salween at Tasang," said Bangkok-based power industries consultant Collin Reynolds. "But I think the China link on this project has to keep it afloat, even though it is highly expensive and of questionable value given the environmental problems almost certain to ensue on both sides of the border."

SHAN, 29/02/08. http://www.bnionline.net/index.php?option=com_content&task=view&id=3665&Itemid=6

Only Thai trucks from MDX traveling to the Tasang dam site, 140 km away, are allowed to pass through the Kiu Pha Wok pass known as BP-1 by the border guards on the Burmese side, according to a businessman in Nawng Ook aka Arunothai, a Thai village right on the border. The pass has been closed since May 2002, following confrontations between the two countries.

William Boot, IRROL, 16/02/08. http://www.irrawaddy.org/article.php?art_id=10422

Suggestions that Thailand's new government is having second thoughts about supporting major hydro-electric projects on key Burmese rivers are "rather unlikely," according to energy industry analysts. "Thailand has already programmed these projects into its future energy needs," said industry analyst Sar Watana in Bangkok this week. "And this government is more pro-business and less environmentally concerned than its predecessor".

Kyaw Thu, MT, 11/02/08. <http://www.mmtimes.com/no405/b003.htm>

Hydropower projects underway on the Thanlwin river between Thailand and Myanmar are on hold while the Thai government changes hands. According to an energy expert close to EPM No 1, the Myanmar side still has not received any official information concerning the continuation of hydropower projects being developed between the two nations. The Hutgyi project in Kayin State is worth US\$1 billion and is a joint venture between Myanmar's Dept of Hydropower Implementation (HPID), the Electricity Generating Authority of Thailand (EGAT) and China's Sinohydro Corp. It is hoped to produce 1200 megawatts (MW) of electricity when finished. The Tasang hydropower project in Shan State is worth \$6 billion and is expected to generate up to 7110MW. It is being jointly developed by Thailand's MDX Group and the HPID. Work started last March and is expected to finish in 2022.

NLM, 24/01/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080124.htm>

Lt-Gen Kyaw Win checks the durability of the Tasang bridge and is briefed on developments at the Tasang hydropower project. A RCC dam will be built on the Thanlwin river that will eventually generate 35,446

million kWh per year. Graveling operations are being carried out on the road between the Tasang bridge and Mongpan.

Kwarrn Lake, Shan Herald, 16/01/08.

<http://www.shanland.org/environment/2008/chinese-dam-builders-set-up-60-pillars-for-tasang-dam/>

Sixty huge pillars have been installed at the site of the Tasang dam project by Chinese engineers. The pillars are about 17-30 yards long and have been set up on both sides of the Salween riverbank. About 40 Chinese dam builders arrived at the site at the beginning of Nov 2007 and have been working there since then. Another hundred Chinese and Thai engineers are expected as the original number has dwindled to about 13, according to a local source. Over 50 soldiers from the Burma Army's LIB 594, have set up a temporary camp on the west bank of Salween River to provide security for the dam project.

Nation (Bangkok), 21/11/07. http://nationmultimedia.com/2007/11/21/business/business_30056827.php
MDX has declined to confirm a report that a Chinese power company has replaced it as a majority stakeholder in the Tasang dam project in eastern Shan state by taking up a 51-pc share in the project. According to a report published in the Myanmar Times on 19/11/07 the Thai company's stake had been reduced to 24pc. An MDX official also told the AFP news agency that it was considering reducing its stake in the controversial hydropower project, the biggest in the military-run country. "We are looking for a business partner to go ahead with the project, and we are considering reducing our stake," the official said. MDX has reportedly invested about US\$6 billion (Bt203 billion) in the project. The Thai company has held an 85-per-cent stake in the project, with the rest owned by Burma's military government.

CHINA – ASEAN POWER CO-OPERATION & DEVELOPMENT FORUM: NOTES

China Electricity Council, 28-29/10/2007

http://www.eubia.org/fileadmin/template/main/res/pdf/news_articles/CP_07_Overview_EN_07271.pdf

The China – ASEAN Power Co-operation & Development Forum was one of eight fora at the China – ASEAN Expo held at the Nanning Convention Center in Guangxi, China at the end of October 2007. Other fora included in the program of this major business and trade conference included port development, forestry, rural energy projects, applied technology in the agricultural sector, etc. The power forum was notable for bringing together representatives not only of the financial and corporate side of the electric power industry but also those knowledgeable about the environmental and technological aspects of the industry in China, the ASEAN countries and elsewhere. Some of the presentations made by speakers at the power forum conference, including the full text of the paper by Zao Noam and Piaporn Deetes excerpted below, are available on the conference website. http://www.chinapower2007.com/en_neiye3.html Those interested in recent developments in the hydropower construction sector and other aspects of the electric power industry in Burma/Myanmar will find these presentations useful for comparison purposes.

The power forum is of particular relevance to developments in the electrical industry of Burma/Myanmar's because of the vastly stepped-up investment by PRC companies in hydroelectric projects in the country over the last few years. Mug shots of some of the leading players in these PRC power companies are included in the promotional material for the power forum. They include Liu Zhenya of the PRC's State Grid Corp, Yuan Maozhen of China Southern Power Grid Co Ltd, Li Xiaopeng of the China Huaneng Group, Zhai Ruoyu of the China Datang Corp, Lu Qizhou of the China Power Investment Corp, Fan Jixiang of Sinohydro Corp and Yang Jixue of the China Gezhouba Group Corp among others in a promotional website for the power forum. <http://www.chinapower2007.com/invitation.htm>

Additional references:

See above: 'Negative [impact of China's hydropower investments](#) in Myanmar' (ICG: 21/09/10)

'[China petitioned](#) on Burma dam projects' (dpa, 02/12/07)

See below: 'Chinese [hydropower investment in Mekong region](#): Perspectives' (LRS: 29/09/07)

'Myanmar report to [Mekong experts](#) on power trade' (ADB: 18/11/03)

'Power purchase [deal between Thailand and Burma](#) on the way' (Nation: 27/05/97)

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CHINESE HYDROPOWER INVESTMENT IN THE MEKONG REGION: CIVIL SOCIETY PERSPECTIVES

Zao Noam and Piaporn Deetes, "Chinese Hydropower Industry Investment in the Mekong Region – Impacts and Opportunities for Cooperation: Perspectives from Civil Society", Living River Siam, 29/10/07. [Excerpts]
For the full text see: http://www.chinapower2007.com/en_neiye3.html

The past decade has witnessed a trend to invest abroad on the part of Chinese hydropower corporations as China continues to overdevelop its own hydropower potential and environmental protection takes greater priorities within the country. Hundreds of state-owned, partially state-owned, and private Chinese hydropower companies, and thousands of associated engineering and design firms, having built up an armor of investment institutions and banks, continue to push hydropower development schemes. But with the realization that hydropower potential is near its capping point in China, these hydropower corporations – from design to construction – have begun to move out into the global energy market.

For example, Sinohydro Corp. agreed to finance the Hutgyi dam on the Salween/Nu River in Burma/Myanmar, and China Power Investment Corporation (CPI) signed MoU's for the N'Mai Hka and Mali Hka dam cascade in Kachin State, Burma/Myanmar just west of the Nu valley; meanwhile the Chinese central government postponed building the Nu River dam cascade in Yunnan for environmental reasons. Almost 50 different dams have been built, are undergoing construction, or are being surveyed by a team of a total of 21 different Chinese hydropower companies in mainland Southeast Asia, including Burma/Myanmar, Cambodia, Laos and Vietnam. And this does not include other dams not financed and/or built by Chinese corporations. At the same time, companies such as the the Yunnan Power Grid Corporation, a regional subsidiary of the China Southern Power Grid Co, have pushed beyond China's southern border to invest in the development of the electricity grid and energy resources of the countries of the Greater Mekong region.

As China's economy continues to outpace its own domestic supply of natural resource capital, Chinese businessmen are increasingly looking towards Southeast Asia as a nearby, cheap source of resources to feed domestic and international consumer markets and, concomitantly, to generate profits for Chinese businesses. This has resulted in a shift from Chinese foreign policy to "resource diplomacy" which underscores the economic-social-environmental tension currently re-defining China's relationship with ASEAN. Chinese businessmen, and the markets they serve, increasingly must tap into natural resources – in this case hydropower – from other countries in order to help build modern China while Chinese businessmen continue to make huge profits in the process.

Two main factors weaken the force of this disconcerting energy development strategy. The first is based on energy market analysis. National government agencies often exaggerate predicted future domestic energy demand in their Power Development Plans (PDPs), meaning that an eagerness in hydropower development in the region could provide an over-supply of hydro-electrical power on the market. In addition, many ASEAN countries, notably Burma/Myanmar, remain stuck in political turmoil, creating a politically unstable climate rendering high-risk investments which could later be dishonored.

The second factor revolves around local livelihood impacts, both those affected by downstream impacts from dams in China, as well as impacts by the community living in the vicinity of the dam. A concrete example of transboundary hydropower development impacts is on the Lancang-Mekong River, where the first two hydroelectric dam have already been built in Yunnan Province, while six more are awaiting construction. During the past decade, communities living along the Thai-Lao border of the Mekong have witnessed many changes in the river, citing Lancang dams in Yunnan as the cause. The villagers claim that one of the most adverse impacts is the unusual and unpredictable water fluctuation and the decreased minimum discharge. According to one study, after the construction of the Manwan dam the mean minimum discharge of the Mekong River on Thai-Lao border declined by 25pc. Fisher folk along the Mekong in Chiang Rai province have complained they could not fish in conditions where the river rose and then lowered swiftly in a day or two. As most fish in the Upper Mekong are migratory species that migrate upstream for reproduction, fish depend on the annual river flow for their life cycle. Thus, the water fluctuation inevitably greatly impacts fish migration, and thus abundance of fish.

The authors urge Chinese corporations involved in hydropower projects abroad to carry out transparent, comprehensive environmental, social and economic impact assessments and to make those publicly available, in order to adequately determine the feasibility of projects before concluding any agreements. These assessments must involve the participation of affected peoples. Furthermore, those carrying out hydropower projects must keep affected communities informed from the outset of all plans regarding the projects and involved in decision-making regarding those projects. This includes publicly releasing dam feasibility studies, investment and financial agreements, MoU's and MoA's, and clear information regarding responsible parties.

Additional references:

See above: 'Negative [impact of China's hydropower investments](#) in Myanmar' (ICG: 21/09/10)
 'Chinese [firm takes 51% interest in Tasang](#) hydropower project' (MT: 19/11/07)
 '[China - ASEAN Power Co-operation](#) & Development Forum: Notes' (CEC: 29/10/07)

See below: 'Electricity [ministers busy](#) in Beijing and Kunming' (NLM: 13/06/07)
 'MoU on [Upper Thanlwin](#) hydropower project inked' (NLM: 07/04/07)
 'Agreement signed for [Kachin hydropower](#) projects' (NLM: 02/01/07)
 '[China's first BOT](#) hydropower project in Myanmar revs up' (Mekong News: 30/12/06)
 'Ministers meet with [PRC suppliers](#) in Nanning and Wuhan' (NLM: 06/11/06)
 '[Taping river](#) hydropower projects under discussion in China' (Hubei Daily: 04/11/06)
 'Hydropower department and EGAT ink agreement on [Hutgyi](#) project' (NLM: 10/12/05)
 'Agreement signed on [Upper Paunglaung](#) hydropower project' (MIC: 04/09/05)
 'Coal-fired [Tigyit](#) plant nears completion' (MT: 25/04/05)
 'Dam design at [Yeywa](#) hydropower project saves time, costs' (MT: 04/04/05)
 '[Paunglaung](#) power plant Myanmar's first underground station' (MT: 14/03/05)
 '[Mon creek](#) multi-purpose dam and power station opened' (NLM: 30/12/04)
 'Prime Minister visits [Kengtawng falls](#) hydropower project' (NLM: 26/05/04)
 '[Shweli Transmission](#) Line Contract Signed' (People's Daily Online: 10/10/03)
 '[Khabaung](#) multipurpose dam project long overdue' (NLM: 13/09/03)
 'Contract for Shweli hydropower project [signed with YMEC](#)' (NLM: 09/08/03)
 '[Kye-ohn Kye-wa](#) multi-purpose dam on Mon creek underway' (NLM: 01/07/03)
 'Power station at [Thephanseik](#) dam commissioned into service' (NLM, 19/06/02)

FISHERIES FACTORIES TO GET 24-HOUR POWER "BY MARCH"

Sann Oo, Myanmar Times, 22/10/07. <http://mmtimes.com/no389/b006.htm>

Work on getting exclusive electricity supplies to fisheries factories ahead of the dry months following monsoon should be fully completed by March next year, the director general of the Dept of Fisheries, U Khin Maung Aye, told a meeting of fishery sector entrepreneurs. Factories were encouraged in June to sign on to the scheme in the hope it would provide them with 24-hour power.

In all, 68 out of 85 eligible factories agreed to the plan, which they must finance themselves by paying for necessary substations and connecting power lines. "We are waiting for the parts we need from abroad and we expect that all work will be finished within two or three months," said factory owner Tun Aye, referring specifically to his Shwe Yamon Company's processing plant at the Hlaingthaya IZ. The scheme, being organised by the Dept of Fisheries in conjunction with the YESB, is aimed at keeping plants operating so they can increase exports and earn more foreign currency for Myanmar.

Daw Toe Nandar Tin, owner of the Anawar Dawi fishery processing plant in Dawbon township, said it would cost K6-10 million to set up the new electricity connection to her factory. "According to the distance between the main power line and my factory, the initial calculations show that amount," she said at a special meeting held to discuss the project.

Fish Farmers Association chairman Than Lwin said the scheme should be expanded to cover ice factories. "Ice factories should also get electricity because ice plays a crucial role in the fishery sector," he said. "If they can get more electricity, production costs can be reduced for ice and that would eventually reduce costs for the fishery sector too." Many factories have welcomed the move to supply more electricity as it cuts back on the need to run costly diesel generators, which U Than Lwin said doubled ice production costs.

Although the initial plan included providing the nine fish-feed factories in Yangon with 24-hour electricity, the YESB said it was now considering reducing this, possibly to 18 hours a day. "Processing factories and cold storage facilities need electricity around the clock because of the nature of their work, but for factories producing fish feed, I think they would be okay if they got power for 18 hours a day," an official from YESB told the Myanmar Times.

Additional references

Sann Oo, Myanmar Times, 16/06/08. <http://www.mmmtimes.com/no423/b002.htm>

Officials from the Department of Fisheries say the export of fisheries products during the past two months of the current fiscal year has earned the country about US\$72 million. Though exports fell during May, officials claimed they were slowly reviving to normal levels. "After Cyclone Nargis hit, normal trade had resumed by May 9, and border trade by May 5," said one department official." An official from the Myanmar Fisheries Products Processors and Exporters Association said processing factories were running normally, thanks to regular electricity supply.

See below: ['Fisheries factories](#) offered 24-hour power' (MT: 09/07/07)
['Business leaders](#) to pay for new power stations' (MT: 17/07/06)

ELECTRIC POWER [PLANTS OPENED IN 2007](#)

Maung Linn Yaung, NLM, 11/10/07. <http://myanmargeneva.org/NLM2007/eng/10oct/n071011.pdf>

In 2007, the government opened the Yenwe hydroelectric power station ([YW](#)) that can generate 25 megawatts in Kyauktaga township, Bago division on 10 February, the electric power stations each of which can generate 60 kilowatts in four villages ([KY](#)) in Kayan Township, Yangon Division on 25 March, the Pyaing creek ([PY](#)) small-scale hydroelectric power station in Kyauktaw Township, Rakhine State on 30 March, the Kataik hydroelectric power station capable of generating 500 kilowatts in Paung township Mon state on 1 May, the Bontala ([BT](#)) hydroelectric power station capable of generating 250 kilowatts in Matupi township, Chin state on 2 May, the Chibwe ([CB](#)) creek hydroelectric power station that is able to generate 65 megawatts in Chibwe township, Kachin state on 5 May, a small-scale hydel power station capable of generating 20 kilowatts in Konbaung village, Kengtung township, Shan state north, and a small-scale hydel power station capable of generating 50 kilowatts in Namma (Wanlon) village, Kengtung township on 18 May and the Baingdah electric power station in DaikU township, Bago division on 20 May. [Photos of the exteriors of the Zaungtu station and Biluchaung stations accompany the text in the print edition of NLM.]

Compiler's Note: References to other articles in the compendium are noted in parentheses. There are discrepancies in the information presented in the article above with the more detailed information available in the news items and articles to which reference is made. The opening of a 500-kW hydropower facility at the Kataik dam is to be doubted. No mention is made of such a facility in the official account of the opening of the dam in the NLM on 02/05/07 <http://burmalibrary.org/docs2/NLM2007-05-02.pdf> or in the many news items referring to the construction of the dam. However, the original design of the dam may include the eventual installation of a small power plant there, as in other cases of irrigation dams throughout the country. Similarly, nothing is mentioned about a hydropower facility at the Baingda dam in the NLM article about the opening of the facility on 20 May 2007 <http://burmalibrary.org/docs2/NLM2007-05-21.pdf>

VILLAGE RICE HUSK POWER PLANT WILL SERVE AS [RESEARCH CENTRE](#)

Kyaw Thu, Myanmar Times, 24/09/07. <http://www.mmtimes.com/no385/n010.htm>

A team of engineers from Myanmar and Thailand has started a project to set up a rice-husk power plant that will bring electricity to Taguntaing village in Twante township, Yangon Division, U Win Khine, the general secretary of the Myanmar Engineering Society, said last week. The 8-million-baht (US\$ 251,000) project – which will result in the construction and installation of a 30-kilowatt rice-husk power plant in the village – is expected to be finished in December. “The aim is to develop the socio-economic conditions of the village,” he said.

The Study and Demonstration of Biomass Gasification for Electricity Project, funded by a grant from Thailand, will not only bring electricity to the village but will also help facilitate the development of research and technological specifications for rice-husk power plants, U Win Khine said. “Even though there are more than 500 rice-husk power plants in the country we have no standardised technical or equipment specifications that can guide us in their construction,” he said. “This project will help us develop these standards for future projects.”

The project is being conducted with help from researchers and equipment from Chiang Mai University. “They have also invited two local technical engineers involved in the project to attend the university for postgraduate degrees. They will conduct research during the project and write theses about it,” U Win Khine said.

He said the power plant would be built in Hlaingthaya IZ in Yangon and moved to the project site when it is finished. “After the project is done a committee will be formed to manage the power plant,” U Win Khine said. He added that MES has recommended that the university install power-saving light bulbs in Taguntaing. “If they use power-saving bulbs, an additional 100 households can get electricity,” he said.

Additional references

See above: ‘Rice husk [gasifiers to spur rural electrification](#)’ (MT: 21/07/08)

See below: ‘Plans for [\\$7-million-dollar](#) rice-husk power plant edge forward’ (MT: 27/08/07)

The list at the conclusion of this article provides links to other bio-gas generation articles in the compendium.

Min Lwin Swe, *Distributed Power Generation from Rice Husk Gasification in Rural Myanmar* (Graduate School, Chiang Mai University, May 2009, 137 pp). <http://www.scribd.com/doc/31735643/Distributed-Power-Generation-From-Rice-Husk-Gasification-in-Rural-Myanmar>

This is a master’s degree thesis based on a study of the bio-gasifier project in Tagoondaing. The study was designed to compare the efficiency in using bio-gas as a dual fuel to operate a generator in a village setting with the use of diesel alone. From the abstract (adapted): “In the village of Dagoon Daing in Twantay township, a rice husk gasifier-engine-generator system and electrification system was constructed and operated successfully for 4 hours per day. The engine was modified so that both diesel and producer gas produced by a bio-gasifier could be used. The maximum generator capacity of the unit was 50 kW. Lamp posts and electricity lines were installed along the main roads and connected to local school, temple and 304 households. Almost 400 light bulbs were fitted, serving nearly 1500 villagers. From the test results, it was found that at 31.28 kW, the rice husk consumption rate was 32.64 kg/h, representing a diesel replacement rate of about 65% with overall energy efficiency of 13.5%. The electricity cost was estimated to be in a range between \$0.12-0.23/kWh (150-300 kyat/kWh) in comparison to \$0.60/kWh (800 kyat/kWh) from an existing diesel system.” The thesis provides a wealth of information about the village in which the project was carried out as well as technical and economic information about bio-gasifiers in general and the down-draft gasifier used in the Tagoondaing setting. Many illustrative photos, diagrams, figures and tables are provided.

Than Htike Oo, Myanmar Times, 14/01/08. <http://www.mmtimes.com/no401/n013.htm>

The villages of Tagoondaing and Alesu, about 8 kms south of Twante has started to receive electricity supplied by a rice husk power plant. The power plant, which is fuelled by burning rice husks, was installed in Tagoondaing late last year with financial support from the government of Thailand and technical support from Chiang Mai University. "The gasifier engine generator is run by rice husks and can produce 50 kilowatts. We're supplying electricity to 304 homes in Tagoondaing and Alesu," said Dr Chatchawan Chaichana from Chiang Mai University. Local villagers expressed their appreciation for the project. "This is the first time in my life that I've had electricity," said 45-year-old Tagoondaing resident U San Oo. "We get electricity from 6pm to 11pm. Now that the roads are lit it is easier to come back from our farms at night. We feel safer from dangers like snake bites when we walk around after dark," he said, adding that schoolchildren have also benefited by being able to read and study later at night. Before the completion of the power plant villagers had to rely on batteries, candles and kerosene lamps for light. U San Thaung of the village electricity supply committee said residents will be charged K1500 a month for households using a fluorescent lamp, K1500 for a black and white television and K2000 for a colour TV. "We have expenses to operate and maintain the generator including buying diesel and providing salaries for four engineers. Right now we're getting rice husks for free from three rice mills in the area but later we'll need to buy more from other rice mills," he said. "The price will decrease if more houses use the electricity. We are planning to provide electricity to Innmagyi and Sarphyusu villages, which are not far from Tagoondaing," he said.

YADANABON CYBER CITY SLATED FOR SOFT OPENING IN SEPTEMBER

Ye Kaung Myint Maung, Myanmar Times, 24/09/07. <http://mmtimes.com/no385/n001.htm>

The first phase of the multi-billion-kyat Yadanabon Cyber City being developed near Pyin Oo Lwin in Mandalay division will be ready for a soft opening later this month, a senior official said last week. U Zaw Min Oo, the chief engineer at the Information and Technology Dept of MPT in Nay Pyi Taw, said the soft opening would take place soon after September 25, the deadline for completing construction and infrastructure work.

An MPT report has estimated the cost of the first phase of the cyber city project, involving a three-storey teleport building, three incubation centres and roads, at about K3.8 billion. The teleport building has nearly 82,000 sq ft of floor space, the incubation centres about 23,000 sq ft each, while the cyber city has 12 miles of roads, being built to a width of 24 feet. The soft opening is expected to be attended by national leaders, ambassadors from ASEAN countries and other countries involved in the development of the project, guests and the media. "Yadanabon Cyber City will be a new source of national pride," said U Zaw Min Oo, adding that the grand opening would take place next January to co-incide with the 60th anniversary of Independence Day.

U Zaw Min Oo said approval had been given to many international companies to invest in the cyber city. They include C-BOS, a Russian company that specialises in software development and is establishing a presence at the cyber city in co-operation with Myanmar conglomerate, Htoo Trading. Another foreign investor is Malaysia's Maxi Net company, which specialises in network solutions as well as software development, said Zaw Min Oo. Many global ICT companies have also shown interest but a list of confirmed investors has yet to be released.

The MPT report says the master plan for developing the cyber city covers 4400 acres, of which half will be allocated to software firms and the other half to hardware companies. The Yadanabon master plan provides for the site to be expanded to 10,000 acres, the report says. As well as the teleport building and three incubation centres, the master plan provides for the construction of facilities for international and Myanmar software companies, a convention centre, a research and development centre, a training centre, commercial and services facilities and residential accommodation.

The plan also provides for the development of indoor and outdoor sporting facilities, a cinema, police station, post office, bank, clinic and market. According to a recent report by the Department of Human Settlement and Land Development under the Ministry of Construction, the city is targeted to house 50,000 people. Water will be supplied to the site from two dams northeast of the cyber city and the EPM No 1 will be responsible for providing power, with consumption estimated at 50 MW.

Additional references

See above: 'Pyin-U-Lwin hydropower projects speeded up' (NLM: 30/11/07)

See below: 'Dam design at Yeywa hydropower project saves time, costs' (MT: 04/04/05)

Tin Maung, NLM, 12/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-12.pdf>

The 7th Myanmar ICT Week 2008 will be held at the Yatanarpon Myothit from the 12th to the 16th of December. At present, the ICT main complex of the teleport and seven buildings which will serve as the incubation centre have been completed. Plans are under way to build the international software centre, the local software centre, the commercial and service unit, the parking area and the convention centre, the training center, the research and development unit and the southern residential area. In the northern part of the Myothit, the Mandalay City Development Committee has started the construction of a private housing estate. Potable water from Hsinlan and Sitha Dams is being provided to the Myothit and arrangements have been made to supply electricity to the new town round the clock. [Photos of the main building of the teleport and the incubation centre as well as a scale model of the digital auto-exchange, transmission equipment and a factory that will produce MDF and telephone accessories accompany the article in the print edition of NLM.]

NLM, 07/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-07.pdf>

A co-ordination meeting for the Yadanabon Myothit Project was informed that land has been allotted to 35 local and foreign companies that will make investments in the 372-acre software factory area in the new town. Work is proceeding on the construction of roads, installation of power lines and the provision of water.

Min Lwin, IRROL, 29/07/08. http://www.irrawaddy.org/article.php?art_id=13614

Twelve local and foreign information technology companies have been given permission by Burma's ruling regime to invest in the country's largest IT center, the Yadanabon Cyber City, according to Rangoon-based industry sources. The three foreign companies include the Russian-owned firm CBOSS, Maxinet of Australia and Global Technology, which is believed to be based in either Thailand or the UK. According to well-informed sources, the regime rejected proposed investments by Shin Satellite of Thailand, ZTE and Alcatel Shanghai Bell of China and Malaysia's IP Tel Sdn Bhd. Burma has three Internet service providers—the state-owned Myanmar Posts and Telecommunications (MPT), BaganNet/Myanmar Teleport (formerly known as Bagan Cybertech) and Information Technology Central Services (ITCS), launched by the government-aligned Union Solidarity and Development Association in 2007. All are based in Rangoon.

Kyaw Zin Htun, Myanmar Times, 14/07/08. <http://www.mmtimes.com/no427/news.htm>

The government on July 2 urged 12 companies that agreed to invest in the Yadanabon cyber city project to begin developing their plots within two months. CPT Minister Thein Zaw delivered a strong message to the companies to speed their operations, said a CPT official who was present at the meeting. These companies were: Myanmar Teleport, FISCA enterprise, Htoo Trading, Russian firm C-Boss, Myanmar World Distribution, Maxinet, Global Technology, Nibban, Tamoenyel Chanthar Tun Wai Thar, Yadanarpon Cyber Corp, Myanmar Info-Tech, MCC and Fortune International, which had all previously agreed to build at the site. The companies involved had also agreed to spend a total of US\$22 million at the site. These companies have been assigned 12 plots, with a combined area of 70 acres. One-off rental fees of K15 million an acre for factory space have been set and companies are expected to sign 50-year leases. The rental fees for training and development buildings, which measure 23,000 sq feet, were set at K2 million a month. The 10,000-acre Yadanabon site includes seven training and development buildings, 30 factory plots, a convention centre, a services district and a research and development area. There are also direct fibre optic cables and satellite connections with India, China and Thailand. Yadanabon is expected to accommodate about 50,000 residents.

Shah Paung, IRROL, 21/12/07. http://www.irrawaddy.org/article.php?art_id=9715

The opening ceremony of the Yadanabon Information and Communication Technology (ICT) Park took place 14/12/07. Burmese state media reported that the center is situated on 10,000 acres of land, over one-fifth of which will house the production of software and hardware. According to the editor of a weekly journal, Rangoon will remain the IT and business center of the country, because most students and IT experts were

based either there or in Mandalay. He added that it would not be easy to contract IT personnel to work in Yadanabon Cyber City and that transportation costs would become a problem. According to Gen Than Shwe who was present at the opening the government had provided a water and power supply, communications and administration facilities for the new town to enable local and foreign entrepreneurs to make investments in the ICT park. State media said that a total of 11 local and foreign companies had proposed investments in the project including Shin Satellite from Thailand; ZTE and Alcatel Shanghai Bell of China; IP Tel Sdn Bhd (Malaysia); and CBOSS (Russia). However, sources inside Burma said that many people doubt whether the project will come to fruition, because even in large cities like Rangoon and Mandalay, the government cannot provide enough electricity to run businesses. Electricity is currently rationed to six hours per day in rotation across those cities. Internet café owners in Burma still have to use their own generators to power their work stations.

Htar Htar Khin, Myanmar Times, 12/11/07. <http://www.mmtimes.com/no392/b008.htm>

The three-storey teleport building, centrepiece of the Yadanabon Cyber City project, is now 95pc complete. The building comprises a total 81,778 square feet of floor space including a technical equipment area, an international conference room, an IT exhibition area, a meeting room and a service area, according to U Si Thu Myint Swe, a senior architect with ST&T Architecture & Building Services, who designed the teleport building's interior. Built by A1 Construction, the building will be handed over to the telecommunications ministry once all work finishes this month. It will officially open in the second week of December, 2007 U Aung Zaw Myint, president of the Myanmar Computer Industry Association, said on November 7. The teleport building will be first used to host Myanmar ICT Week – an annual exhibition that allows IT businesses to showcase their products and services to the general public – which is leaving its former home at Tatmadaw Hall in Yangon for Yadanabon Cyber City. The cyber city will eventually be made up of nine “zones” being developed simultaneously, although a completion date is yet to be set. The nine zones comprise the teleport building; seven single-story “incubation units”; local and international software zones; a park and convention centre zone; a commercial and services zone; a research and development zone; a training centre; and a residential area. U Si Thu Myint Swe said the residential area would include a 400-acre subdivision of duplexes and standalone houses as well as a 123-acre section of serviced apartments. A report by Myanma Post and Telecommunications (MPT) estimated the cost of the first phase of the project, including the teleport building, three incubation centres and roads, at about K3.8 billion. The Yadanabon masterplan also calls for indoor and outdoor sporting facilities, a cinema, police station, post office, bank, health clinic and marketplace.

NLM, 18/08/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030818.htm>

The opening ceremony of the Mandalay Information Communications Technology Park and an International ICT Exhibition was held in the park centre on the third floor of the Yadanabon Market on 16 August morning. General Khin Nyunt, chairman of the Myanmar Computer Science Development Council said that new park had emerged as a result of the formation in February 2003 of the Mandalay ICT Development Corporation Ltd consisting of IT technicians, IT entrepreneurs and executives and members of the computer associations in Mandalay. The ICT park would play a pivotal role in enabling economic and social organizations and government departments in Mandalay and the whole of upper Myanmar to make extensive use of information technology. Mandalay division commander Ye Myint thanked the Head of State for his assistance in the opening of the ICT Park in Mandalay, so that it could keep abreast of Yangon in the IT field. He said the ICT park in Mandalay was a place where softwares of international standard could be produced. Mandalay ICT Park Chairman Than Aung said that the co-operative efforts of the executives of the Computer Scientists Association and the Computer Industry Association in Mandalay had enabled the park to be built in a period of four months. Then General Khin Nyunt and party viewed the operations and displays and course work of the 35 software and hardware IT companies occupying the centre. Afterwards Maj Than Aung formally opened the International ICT Exhibition and General Khin Nyunt and party viewed the services of MPT and Bagan Cybertech in the centre.

Moe Zaw Myint, Myanmar Times, 21/01/02. <http://www.ibiblio.org/obl/docs3/MT099.htm>

The Information Communication Technology Park, the first such centre in Myanmar, was inaugurated at Yangon University's Hlaing campus on January 21. The Park adjoins a teleport and internet data centre established by semi-government Bagan Cybertech, which opened the same day. In all it is estimated some US\$10 million has been spent on the complex. "The opening of MICT Park and Bagan Teleport and Internet

Data Centre is an encouraging event for the development of the ICT sector," said U Thein Htut, a director of the Myanmar ICT Development Corp, the consortium which developed the park. "The park will create business opportunities for Myanmar software companies, while the teleport and internet data centre will assist in the expansion of communications infrastructure," U Thein Htut said. The concentration of IT companies at the park would enable the development of big software projects which were beyond the scope of a single company acting alone, he said. The park provides facilities for 32 tenants. They include 24 Myanmar IT companies, which have already established operations at the facility. The park also has two Japan-Myanmar e-learning centres and six rooms have been reserved for future use by foreign software firms. Bagan Cybertech provides the MICT Park with high speed data communication broadband Internet access and telephony voice services, in collaboration with Ministry of Communications, Posts and Telegraphs. A three-day 'Myanmar Software and Solutions' exhibition opening at the park today features displays by 38 Myanmar and foreign companies of software developed for use in the banking and finance, hospitality, manufacturing, telecommunications, health care, human resources and entertainment sectors. The events promoting the opening of the MICT Park also include a two-day seminar starting at Traders Hotel on January 21. It will be attended by participants from Asean countries and Europe.

See below: '[Homegrown software](#) industry struggles on' (MT: 12/03/07)
 'Collaborate on contracts, [ICT sector](#) urged' (MT: 12/12/05)
 'Electronics industry [spreading roots](#) in industrial sector' (NLM: 06/06/04)
 '[Software growth](#) badly in need of human touch' (MT: 16/10/00)

GAS IN [SHORT SUPPLY](#) TO MEET DEMAND FOR ELECTRICITY

Minh Zaw, Myanmar Times, 17/09/07. <http://mmtimes.com/no384/n010.htm>

An YESB official said early this month that round-the-clock electricity supplies in the city would likely end by the end of November. "When the rainy season ends we lose a lot of our hydropower. But if we had enough natural gas supplies we could keep the power on 24 hours a day," he said.

During the rainy season Yangon gets 200 MW of electricity from a hydropower station in Lawpita in Kayah State and an additional 200 MW from four gas-based power stations, which is enough for the city but not enough to power the outlying industrial zones. According to the EPM No 2, 99 million cu ft of onshore gas or 134 mmcf of offshore gas are needed for Yangon's four gas-based power stations to run at full capacity of more than 300 MW. However, the current supplies of 59.46 mmcf are only enough to produce about 200 MW.

In the meantime, Yangon's total power needs have skyrocketed to 530 MW this year, up from 430 MW last year, resulting in difficulty providing 24-hour electricity supplies to the city even during the rainy season. "Increasing demand from IZs and increasing use of electric appliances have contributed to supply shortages," the YESB official said. He said officials at the ministry were always busy trying to figure out ways to distribute available energy supplies to people in the city. "We've divided the city into three areas but we have also developed 79 patterns of power distribution depending on the situation," the official said.

He said he was optimistic about the future of electricity supplies in Myanmar. "Right now about 19pc of the country is on the national grid, with 60pc of the electricity going to Yangon and 40pc going to the rest of the country. But projects are underway to build hydropower dams that will produce more than 21,000 MW. So far we're getting about 700 MW from hydropower," he said. "The present problems with electricity will be solved by the end of 2009, we think," the official said.

Additional references

See above: Power [supply improves](#) in Rangoon (Mizzima: 28/07/09)
 '[Generator sales spike](#) upwards in Yangon' (MT: 15/12/08)
 'More [gas to be diverted](#) from Yadana for national use' (MT: 14/01/08)
 '[Full reservoirs](#) to boost hydropower' (MT: 19/11/07)

See below: [‘Pipeline to solve electricity shortages’](#) (MT: 16/09/02)

Xinhua, 03/07/08. http://news.xinhuanet.com/english/2008-07/03/content_8482390.htm

More natural gas will be needed in addition to hydropower to generate the 500+ MW of electricity to supply the round-the-clock needs of the country's largest city, the weekly Yangon Times reported on 03/07/08. The journal quoted the EPM No 2 as saying that it requires a total of 135 million cubic-feet (3.82 million cubic-meters) of gas to meet the daily demand for electricity in Yangon. Of this total, 100 million cf/d would be needed from off-shore gas fields with the rest available from on-shore fields. According to the report only 67 MCF of offshore gas and 27 MCF of onshore gas are available daily for the generation of electricity in Yangon. At present, the city gets only 250 MW of electricity which has to be distributed alternately to the townships in the city. [Compiler's note: The gas volumes in the sentence beginning, Of this total, have been corrected.]

BBC Burmese Service, 23/04/08.

<http://www.burmanet.org/news/2008/04/23/bbc-news-rangoon-life-powerless-and-nervous/>

From an interview with an anonymous Yangon resident: "Our country's situation is getting worse. We used to get electricity and power for six hours a day. Now it has reduced to five hours a day. Sometimes the power is from 5pm one evening to 5am the next morning, and sometimes it comes on close to midnight and goes off at 5am. The blackouts mean people cannot channel water up to their apartments. Can you imagine what our life is like here? Meanwhile the economy is getting worse, the price of commodities is rising sky-high, while people's incomes just don't change. The junta is building dams for hydropower but the power hasn't arrived yet. After years of being broken the power station hasn't been repaired because they don't have any spare parts."

Kyaw Thu, Myanmar Times, 31/03/08. http://www.mmtimes.com/no412/b_brief.htm

Yangon will receive an additional 2 mmcf/d of natural gas in coming months thanks to a successful drilling program at the Maubin gasfield, the state-run Mirror newspaper reported on March 21. Most of the new supply will be used in electric power plants in Yangon. The gas was discovered at Well No 5 on the field. MOGE will conduct more exploration activities in the Maubin region, 18 miles (29 km) south of the Nyaungdon gasfield. The natural gas deposits in and around Maubin are all shallow wells and these formations usually only yield gas.

Banyol Kin, IMNA, 30/01/08.

http://www.bnionline.net/index.php?option=com_content&task=view&id=3442&Itemid=6

Power supply is being cut off day and night in Rangoon. "We only get electricity twice a week. Businesses that depend on electricity have to have alternate supply like engine power, [i.e. from private generators]" said a Rangoon resident. Internet cafes and other shops run on electricity hardly generate income and yet the cost of electricity has doubled, said an internet shop owner. "Today I wanted to copy my photograph from my digital camera but the shop owner was unable to do it because there was no electricity. The fuel price has also increased so they are unable to generate electricity from generators," said a Rangoon resident.

NLM, 11/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071211.htm>

A coordination meeting on power supply to the states and divisions including Yangon division was held at the meeting hall of the ministry in Nay Pyi Taw, on 8 December. After EPM No 2 Khin Maung Myint made an opening speech, Chief Engineers Tin Maung Tun and Aung Khine briefed the minister on work in progress. MD Tin Aung of EPSE, MD San Oo of MEPE and D-G Thein Tun of HEPD gave supplementary reports. After hearing the reports, Deputy EPM No 2 Win Myint reported on dealing with the public and efficient use of funds in running the project and timely completion of project tasks. Next, the minister called for close supervision in the supply of power as consumption is on the increase. He said the public should be made aware of [matters related to] power supply starting immediately.

Mizzima 23/11/07.

http://www.bnionline.net/index.php?option=com_content&task=view&id=3063&Itemid=6

The erratic supply of electricity in Rangoon has further worsened. Except for very important areas such as the Bogyoke market, Tamwe market, and a few other localities, residents in Rangoon said power black outs are the order of the day in most townships. Earlier, authorities supplied electricity and effected power cuts on

a rotational basis in different townships, but recently the supply of power has become much more erratic, residents said. Even VIP areas such as Bahan township no longer enjoy uninterrupted supply. Though most townships have been facing regular power black-outs since October, the industrial township of Hlaingtharya has been receiving regular power supply. However, workers at the industrial zone in Hlaingtharya township said they received a notice yesterday stating that electricity would be cut-off in the township from 5pm to 11pm. "We received a notice from the electricity department saying that electricity will be cut-off from 5pm to 11pm. Since we are in the administrative office, we have to inform all the 500 industries in the township. But most industries use their own generators for power supply," a manager in the Hlaing Tharyar industrial zone told Mizzima.

Total: Yadana [undated: beginning of 2007]. http://burma.total.com/en/contexte/p_1_3.htm

Contractually, Myanmar is entitled to take up to 20% of Yadana's production for domestic consumption. Until recently, it was taking about half of its entitlement, with 40 to 50 million cubic feet per day (1.1 to 1.4 million cubic meters per day). Since December 2006, it is taking 100 to 110 million cubic feet per day (2.8 to 3.1 million cubic meters per day). The gas is piped further north to a cement factory in Myaingkalay and then to Yangon via a pipeline built and operated by MOGE that ties into the Yadana pipeline at Kanbauk.

See below: 'More gas needed for 24/7 power in Yangon (MT: 02/07/07)
'Full power supply promised for July' (MT: 04/06/07)
'Electricity supplies get boost from YESB plan' (MT: 24/07/06)
'Pipeline to solve electricity shortages' (MT: 16/09/02)

RISING WORLD LEAD PRICES ZAP YANGON BATTERY MARKET

Sann Oo, Myanmar Times, 10/09/07. <http://mmtimes.com/no383/b005.htm>

Prices of batteries in Myanmar are rising in line with soaring international prices for lead. However, the full impact is not likely to be felt until the dry summer months because of currently good electricity supplies due to full hydropower lakes, battery traders in Yangon said. Lead acid batteries enjoy regular sales to vehicle owners but sales to customers using them to augment electricity supplies at home tend to peak during the hot months of February through May, the dealers said.

Lead cost US\$1,200 per tonne on the London Metal Exchange (LME) one year ago but has since almost tripled to around \$3,300. According to the LME, batteries account for 71pc of the world's lead consumption. "The world price for lead has gone up about 75pc in recent months and that affects costs for battery producers worldwide and they have to raise the prices of their batteries," said U Than Oo, MD of Best Battery Trading Co Ltd, which stocks Atlas batteries imported from South Korea. "Some foreign producers have cut back their production and our supplier only sent part of our last order," he said. Over the past year battery prices in Yangon have risen 10-20pc, he added.

U Than Oo said some manufacturers use recycled lead acid to be able to offer cheaper products. "Pure lead costs about 30pc more than recycled lead but recycled lead is lower quality and results in a shorter lifespan for batteries," he said.

Most of Myanmar's discarded batteries are exported to China where battery makers recycle the lead, often sending the lead back into Myanmar in the form of new batteries. "Every part of a battery can be used again so China buys up the old batteries," U Than Oo said.

Additional references

See below: 'Inverters keep lights and TV sets running' (MT: 04/07/05)
'Local battery brands compete with imports' (MT: 24/11/03)

Aye Sapay Phyu, MT, 02/06/08. <http://www.mmtimes.com/feature/care2008/care02.htm>

U Than Htike Lwin of Proven Technology Industry, manufacturer of Toyo batteries, said many new technologies and gadgets rely on batteries for their power supply. He said Toyo lead acid batteries are manufactured in Myanmar, according to Japanese industrial standards. "We manufacture them using 99.99pc pure lead. The raw materials are produced by Yangon Metal Industry Co Ltd, which is the only large-scale private supplier of purified lead in the Myanmar market. Being able to get enough standard purified lead locally cuts a lot of the extra expense," he said. The chemical components are imported from Italy and Japan in order to get the best quality products.

Kyaw Zin Htun, Myanmar Times, 10/03/07. <http://www.mmtimes.com/no409/b001.htm>

Recycled lead mass-produced at the factory of the Yangon Metal Industry Co in the Shwe Pyi Thar IZ will replace imported lead for the first time. U Than Htike Lwin, director of the company, said the recycled metal, which is 99pc pure, will be mainly used in Toyo batteries produced by Proven Technology, a sister company. "About 95pc of the total lead consumption of Toyo batteries will be produced from this factory," he said. Until now, only small- and medium-sized companies had produced the metal. This is the first time that recycled lead has been mass-produced in Myanmar – normally it is sold to Chinese companies and exported. Two new kinds of lead – tin-based and calcium lead – are at the testing stage, and the company hopes to market them next November. The factory, which was built in 2003, can produce on average of 300 and 500 tonnes a month, U Than Htike Lwin said. "Although quality is important, the price is more important. If this factory can produce quality lead at a reasonable price, it has the potential to attract interest from local battery manufacturers," said U Aung Min Oo, the owner of two locally produced battery companies, Lwin Star and Hein. Nearly all local battery manufacturers use lead produced by small- and medium-sized producers by recycling old batteries. The average market price of lead this month is about K4100 a viss, which is 1.6 kilograms or 3.6 pounds.

Kyaw Zin Htun, MT, 17/12/07. <http://www.mmtimes.com/no397/b002.htm>

Proven Technology Industry Co, maker of domestically produced Toyo batteries, plans to make tubular battery, the first of its kind in Myanmar. They are called tubular batteries because the lead plate is made from linked tubes rather than the perfectly flat plates normal wet-cell batteries use. The type is already popular internationally but hasn't been tried yet in Myanmar, according to Toyo GM Than Htike Lwin. He said it is well suited for use with solar panels. The company plans to produce tubular batteries with capacities ranging from 250 to 800 amps which will be distributed to government projects and private businesses. The lifespan of tubular batteries will be at least two-and-a-half to three years and they are expected to last twice as long as normal batteries. The tubular batteries will be produced at the company's factory in Shwe Pyi Tha IZ. They will cost 25pc more but deliver twice the performance.

Kyaw Zin Htun and Kyaw Hsu Mon, MT, 10/12/07. <http://www.mmtimes.com/no396/b002.htm>

The domestic car battery and inverter industry is facing stiff challenges as the domestic and international price of lead – the main raw material – increases production costs, producers said last week. Only two local companies mass-produce batteries in Myanmar – GP and Toyo – but small- and medium-scale producers have been popping up around the country in recent years. Some of them have been forced to suspend their production because lead is too difficult, or expensive, to buy. Daw Rosie Rao, the managing director of GP Battery Industries Private Ltd, said the price of lead had nearly doubled in the past year – from US\$2000 a tonne in October last year to between \$3800-4000 now. "We've had to increase the price of our batteries because raw material costs have increased significantly," she said, adding that the company imports its lead from Australia. U Than Htike Lwin, general manager of Proven Technology Industry Co, which makes Toyo batteries, said the company has been skirting around the international price rises by buying lead locally and then refining it for production. He said smaller manufacturers that do not have the same resources are being forced out of production. "Chinese battery companies are buying as many of the discarded batteries in Myanmar as they can and then recycling the lead at their factories. This is also pushing up the price of lead," he said. U Than Htike Lwin said that when used batteries are available they sell for between K800 and K1000 a viss (about \$480 a tonne). U Kyaw Sein, a battery retailer in Latha township, said most customers this year have been buying 120-amp instead of 150-amp batteries because prices are too high. A 150-amp GP battery retails for about K160,000, while a GS battery, imported from Thailand, sells for about K167,000, meaning there is little price advantage in buying local. "Last year the 150-amp batteries were our best-selling item but this year the 120-amp batteries are out-selling them," he said. U Kyaw Maung, the manager of

Arrthit Battery sales centre in Tarme township, said that some customers have chosen to buy imported batteries because the price gap between them and locally produced versions has narrowed so much.

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan. *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Final Report: Volume 1: Summary*, pp 9, 18.
[http://lvzopac.jica.go.jp/external/library?](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1)

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1)

Lighting systems supplied by battery charging stations (BCS) have been widely introduced in Myanmar since the early 1970s. 24pc of households at the national level and 32pc in rural areas were found to be using them during a household income and expenditure survey carried out by the Central Statistical Organization in 1998. Lighting is by 4-8 watt fluorescent lights. Battery-lighting systems were introduced when kerosene disappeared from the market after the first world oil crisis in 1973. Before that kerosene lights were the main source of lighting for farm households. As a result of the non-availability of kerosene, many BCSs, powered either by the grid or by small diesel generators, operate on a commercial basis countrywide. However, batteries and fluorescent lights available in the market have a short lifetime and need frequent replacement. In the households that cannot afford to buy a fluorescent light at about \$1.00, people use small incandescent bulbs that are less bright but are cheaper and last longer than fluorescent lights. These battery-lighting systems provide valuable lighting for dinner and communication among the family. However, such lighting is inadequate for children to read books and may even weaken their eyesight. Battery recycling shops are in operation on a commercial basis in most parts of the country. Batteries are collected nationwide and recycling manufacturers in Yangon produce recycled batteries. The cases and connectors are recycled at shops operating in local areas. This recycling process reduces the disposal of old batteries and helps to reduce environment pollution.

Compiler's Note: Good pictures of a battery charging station and household lighting system with fluorescent lights are available on page 9 of Volume I. A separate volume in the same series, entitled *Memo on Interviews/Field Surveys in Villages for Rural Electrification: February 2001 - November 2002*, presents interesting examples of the use of the battery operated lighting system on pages 57, 59, 60, 62, 66, 68, 72, 73, 85, 87-89. Many of these examples involve price comparisons between different sources of power used in charging the batteries such as diesel operated generators, rice husk gas systems and solar panels.

[http://lvzopac.jica.go.jp/external/library?](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3)

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3)

PETROL SUBSIDIES AND THE PRICE OF ELECTRICITY

San Oo Aung, Burma Digest, 02/09/07. Excerpt.

<http://burmadigest.info/2007/08/29/analysis-of-how-tatmadaw-had-ruined-the-myanmar-economy>

PM U Nu started the Lawpita electricity generation project before Ne Win took over. "To make paradise on earth with the use of electricity" was his famous slogan. It really generated and sparked a lot of progress after that dam started electricity distribution.

But with the population growth and natural degeneration of the turbines, Myanmar is now sliding into hell. Because of lack of proper planning and lack of hard currency, even in Yangon people get electricity in short shifts. In the second largest city, Mandalay, people get electricity once every few days. Only Naypyitaw gets regular 24-hour electricity supply. School children, offices, all industries and factories suffer. Fans, air conditioners, lifts, escalators, fridges and freezers are all useless unless the owners have their own back-up supply.

But the fuel to run those generators is like a luxury. Petroleum and diesel are restricted items sold by rationing with permits. People have to buy from the roadside smugglers, if they need them. APC sells

petroleum and permits. There are frequent problems because of adulteration and fire hazards from the illegal improper storage by these petrol hawkers.

The rights of energy generation, production and distribution are jealously guarded by the Myanmar military. If they can't manage after forty long years, they should allow local and foreign players to get involved. Advice from experts of the World Bank and IMF that the Myanmar military should stop fuel subsidies is false and short-sighted. Their statements make it look like the SPDC is doing the right thing.

The very low earning power of the Myanmar people, which is even ridiculously lower if converted into foreign currency at the black market exchange rate, must taken into consideration. It is clear that to force the whole population, including the low-earning poor, to use vitally needed commodities like petrol or gas at the black-market exchange rate is totally wrong.

Additional references

See above: 'Chaungzon supplied with [electricity at a big loss](#)' (NLM: 29/03/11)

See below: 'Fuel [price increase](#) impacts industrial use of electricity' (IRROL: 15/08/07)

'Electricity [rates raised](#), subsidies for civil servants dropped' (AP: 15/05/06)

Alfred Oehlers, IRROL, 22/08/07. Excerpt. http://www.irrawaddy.org/article.php?art_id=8318
Burma is essentially a diesel-powered economy. We see this in the buses, trains and trucks that rumble around the country. We also see this in the dilapidated power plants that sometimes generate electricity. Most of all, we see this in the ubiquitous portable generators that exist in nearly every home, factory and shop that can afford one. For a long time now, diesel prices have been kept artificially low through subsidies. But as demand for diesel has continued to grow in tandem with an expanding economy, the amount spent on these subsidies has similarly expanded, posing an ever increasing strain on the regime's finances. The only solution has been to import diesel, since Burma's ageing refineries simply cannot refine crude volumes sufficient to meet demand. And as this is usually done at spot market prices, it is an extremely costly solution.

PLANS FOR 7-MILLION-DOLLAR RICE-HUSK POWER PLANT EDGE FORWARD

Kyaw Thu, Myanmar Times, 27/08/07. <http://www.mmtimes.com/no381/b005.htm>

It will likely be several more months before the government signs an MoU with a Japanese organisation for the construction of a US\$7-million rice-husk electricity plant, an official with the A&IM said. The power plant planned for Dedaye in Ayeyarwady Division will be the biggest of its kind in Myanmar and is aimed at cutting long-term costs for rice millers in the area.

A target for starting the three-year construction project lapsed in January. "The Japanese side wants to sign the MoU as soon as possible," said the ministry official. He added that the government was currently reprocessing financial data in preparation for the signing.

The Japanese government is providing the rice-husk power plant at a cost thought to be over US\$6 million. Installation will be carried out by the Japan government's alternative energy research arm, the New Energy and Industrial Technology Development Organisation. The Myanmar government is to loan the Myanmar Rice Millers Association (MRMA) \$780,000 to cover construction costs at the six-acre site 70km from Yangon.

The association aims to make this money back once the plant is running by selling electricity to 13 rice mills and one ice factory in the area, MRMA joint S-G Win Aye Pe told The Myanmar Times. The plant will produce a total of 1500 kW per day through consumption of three tonnes of rice husks and will be able to distribute 1000 kW to millers. A third of the plant's output is required to keep it running.

Once completed – likely in early 2011 – the power plant will be operated by a committee comprising local authorities and representatives of the A&IM and the EPM No 2. “We will provide training to workers employed at the rice-husk power plant and send some overseas (for advanced training),” the agriculture ministry official said. The official also noted that the growing number of smaller rice-husk electricity generators being set up in Myanmar – particularly in Yangon division and Mon state – was beginning to drive up the price of rice husks.

Additional references

- See above: ‘Rice husk [gasifiers to spur rural electrification](#)’ (MT: 21/07/08)
 ‘Village rice husk power plant will serve as [research centre](#)’ (MT: 24/09/07)
 See below: ‘[Rice-husk generators](#) slated for villages in Yangon division’ (MT: 11/06/07)
 ‘[Inventor co-op](#) society exports first rice-husk generators’ (MT: 21/08/06)
 ‘[Interest growing](#) in rice-husk generation’ (MT: 10/07/06)
 ‘Paddy husk power plant tested to cut rice [milling costs](#)’ (MT: 19/12/05)
 ‘[Biogas power plants](#) supply electricity to rural areas’ (MT: 16/08/04)
 ‘Biomass gasifier used for [tobacco curing](#) in Myingyan’ (TERI: 08/04)

FUEL PRICE INCREASE IMPACTS INDUSTRIAL USE OF ELECTRICITY

Irrawaddy On-line, 15/08/07. http://www.irrawaddy.org/article.php?art_id=8250

The retail price of compressed natural gas in Burma has more than tripled in a new round of fuel cost increases that threaten to close down many businesses. Prices of other fuels doubled. CNG —compressed natural gas — increased in price by more than 300pc, jumping from K600 (\$US0.46) for a 50-liter canister to K2,175 (\$1.60). The price of diesel oil doubled, from K1,500 (\$1.15) to K3,000 (\$2.30), while a gallon of gasoline rose from K1,500 to K2,500 (\$1.90).

The owner of a Rangoon printing house told The Irrawaddy the rise in the price of diesel made it impossible for him to continue his business. He said the diesel oil he used to generate his electricity already cost him K7 million (\$53,850) a month. A wholesale trader who also runs a vehicle rental business in Rangoon said, “Everyone is now very depressed and disappointed.”

The black market price of diesel oil has risen from K3,000 – K3,200 (\$2.30 - \$2.40) a gallon to K4,000 - K5,000 (\$3.00 - \$3.80), and some outlets have stopped selling it altogether. City bus fares have also doubled, Rangoon residents reported.

Meanwhile, the price of gold on the Burmese market rose today from K464,000 (\$356) to K469,000 (\$360) per kyattha (16.33 grams).

Additional references

- See above: ‘Chaungzon supplied with [electricity at a big loss](#)’ (NLM: 29/03/11)
 ‘Small businesses, [factories struggle](#) to keep up with rising fuel prices’ (IRROL: 06/03/08)
 ‘[Petrol subsidies](#) and the price of electricity’ (Burma Digest: 02/09/07)
 See below: ‘Electricity [rates raised](#), subsidies for civil servants dropped’ (AP: 15/05/06)

Myo Myo, Energy Supplement, Myanmar Times, 21/07/08.

<http://www.mmtimes.com/feature/energy08/feamain.htm>

Bio-ethanol fuel is now used widely in vehicles and generators in Lower Myanmar, according to industry experts. Bio-ethanol is cheaper than other fuels -- it costs only K2500 per gallon in Yangon while in Mandalay the price is K2,500. But, while the price of bio-ethanol is lower than petrol, it's less efficient and consumes 20pc more fuel. “Water pumps and other generators can use bio-fuel so now some people are running their water pumps and generators on bio-ethanol, especially in Ayeyarwady division,” U Thoun Win of the Yangon Renewable Energy Research and Development Committee said. U Thoun Win said the

government was in the process of drafting legislation to govern the production of bio-fuels, which in Myanmar are usually made from either sugar cane, nipa palm, potato, sorghum, cassava or palmyra. He said that while there were global concerns the production of bio-fuels was reducing food production and contributing to the global food crisis, this was unlikely to be a problem in Myanmar. "There are many unused areas of Myanmar that can be used to grow crops, so we don't need to worry about that aspect of food security."

DVB, 25/02/08. <http://english.dvb.no/news.php?id=998>

The official electricity quota for households in Tharawaddy is six hours per day, but some residents have complained they are only getting two hours of electricity a day, while others get only four hours a week. But one resident said that those who paid the extra money were being given greater access to electricity. Locals who can afford it have chosen to pay the money, particularly those whose businesses could not run without electricity. "It's still a lot cheaper than running our own generators and spending money on fuel to run them, because 5,000 kyat of fuel will not even last one hour," the resident said. Township power supply officials told DVB they were providing six hours' electricity per day to each area of the township on a staggered basis.

Ye Lwin, Myanmar Times, 14/01/08. <http://www.mmtimes.com/no401/b001.htm>

Maj Gen Thein Swe, chairman of the Export and Import Supervisory Cte, told a meeting of the UMFCCI of plans that would allow organisations and private businesses to apply to the Trade Council for fuel import licences. U Myat Thin Aung of the Myanmar Industrial Ass'n said industrialists want to import fuel, especially diesel. He said demand for diesel is definitely on the rise in the manufacturing sector. Sometimes it takes three months for us to get enough fuel through the current importing process, he said. Myanmar mainly imports diesel from Malaysia, Thailand and Singapore. The imports place a heavy drain on the nation's currency reserves. Ministry of Energy statistics show that Myanmar produces about 80 million gallons of diesel each year for domestic consumption but imports account for some 330 million gallons a year. Diesel consumption has tripled in the last decade while the thirst for petrol has doubled. Industry insiders say construction projects – especially the building of dams and hydropower projects – are pushing up the price of fuel because they require so much energy and fuel to build. Domestic energy experts say that the cost of importing fuel in 2007 was about US\$600 million.

Ye Lwin and Aung Kyi, Myanmar Times, 31/12/07. <http://www.mmtimes.com/no399/b006.htm>

Pun Hlaing International Hospital, operated by First Myanmar Investment will be re-organised In an attempt to staunch losses, said U Theim Wai, company chairman, at the 15th annual general meeting on December 18. Starting from January 1, the company will launch a series of cost-controlling programs including the reduction of the workforce from 430 staff members to about 200. U Theim Wai said to make the hospital profitable within the next 18 months. He said that FMI's management did a feasibility study before the hospital was built but he admitted that there was difficulty in fully evaluating the country's market and conditions. He said location, expenditure and electricity supplies were criteria that the feasibility study did not correctly evaluate. Pun Hlaing hospital is situated in the Hlaing Tharyar Industrial Zone, which is at least one hour's drive from downtown Yangon. This location makes visits difficult and undesirable for patients, physicians and surgeons. Another unexpected cost has been electricity. U Theim Wai said that before the hospital was granted a special power line by the Yangon Electricity Supply Board, generator costs were about K2 million a day. "Now that the authorities have provided us with a special power line, we can tighten our belts to some extent," he said. Another cost reduction, he announced is reducing the hospital's operating area to only one third of total floor space.

Wai Moe, IRROL, 26/12/07. http://www.irrawaddy.org/article.php?art_id=9743

In mid-August the government increased the price of subsidized fuels, creating severe problems for transport operators and people already struggling with soaring prices for food and other essential goods and services. The inflation rate approached 50 percent at the end of 2007, according to The Economist Intelligence Unit. "Owners are afraid to extend their businesses at the moment," said a successful businessman who works in one industrial zone. "We [businessmen] think all business situations are uncertain after the crackdown on protesters [in August and September]." An additional factor is the lack of electricity. Since November, electricity distribution has been irregular in Rangoon with long outages. Disruptions grew worse this month, with many residents experiencing about five hours of electricity daily. In many industrial zones there is no electricity from 5 p.m. to 8 a.m., forcing factories to operate only in the day time. Running private generators

to supply electricity is no longer an option for many businesses, since diesel fuel sells for around 5,000 kyat (about US \$3.9) a gallon, said a factory owner.

Myanmar Times, 17/12/07. <http://mmtimes.com/no397/n002.htm>

A challenge for hotels at the popular Ngwe Saung beach resort in Ayeyawaddy division is supplying electricity to guests. "All the hotels have to run their own generators and buying diesel adds about K15,000 a room to the cost of running the hotel each day," said U Maung Maung Aye, manager of the Silver View Hotel. While many hotels run their generators from 6pm to 6am some of the bigger resorts keep them on 24 hours a day.

Alfred Oehlers, IRROL, 22/08/07. [excerpt] http://www.irrawaddy.org/article.php?art_id=8318

Burma is essentially a diesel-powered economy. We see this in the buses, trains and trucks that rumble around the country. We also see this in the dilapidated power plants that sometimes generate electricity. Most of all, we see this in the ubiquitous portable generators that exist in nearly every home, factory and shop that can afford one. For a long time now, diesel prices have been kept artificially low through subsidies. But as demand for diesel has continued to grow in tandem with an expanding economy, the amount spent on these subsidies has similarly expanded, posing an ever increasing strain on the regime's finances. The only solution has been to import diesel, since Burma's ageing refineries simply cannot refine crude volumes sufficient to meet demand. And as this is usually done at spot market prices, it is an extremely costly solution.

Shah Paung, IRROL, 16/08/07. http://www.irrawaddy.org/article.php?art_id=8266

Higher gas and diesel prices have also raised the cost of transporting goods, where companies in the former capital have been forced to rely on black market sales of diesel. The price of black market diesel has gone up from about K3,000 (\$2.26) to as much as K5,000 (\$3.77).

IRROL, 21/10/05. http://www.irrawaddy.org/article.php?art_id=5109

Burma has a quota system for the allocation of fuel to car owners who receive vouchers that allow them to receive up to 60 gallons of fuel each month at a cost of K180 (US\$ 0.14) per gallon. The ninefold price increase on 19/10/05 raised the price of subsidized gasoline to to K1,500 (\$1.22) per gallon, while diesel fuel used primarily in the industrial sector rose to around K4,000 (\$3.26).

Myanmar Times, [April, 2002?]. [not available on-line]

Six months ago [MT: 15/10/01], the EM Lun Thi, told the Myanmar Times that the ministry was distributing 7.5 million gals of petrol and 16 to 19 million gals of diesel a month. Meanwhile, diesel consumption by generators has fallen dramatically since the EPM began providing 10 hours of electricity a day to all IZs in Yangon late last month. An official of Myanmar Petroleum Products said daily diesel consumption at factories in the Shwepyitha IZ No 2 had dropped 50pc to 4,170 gals. The improvement in the power supply had also enabled the South Dagon IZ to save 5,000 gals a day.

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RELIABLE POWER SUPPLY GIVES ADVANTAGE TO THAI SHRIMP FARMERS

Sann Oo, Myanmar Times, 13/08/07. www.mmtimes.com/no379/b002.htm

Myanmar shrimp farmers should work harder to acquire quality-recognition certificates to better tap export markets as well as build a more skilled labour base, an official from the Myanmar Shrimp Association (MSA) said after returning from a research trip to Thailand. The MSA sent a 14-member delegation to Thai shrimp farms last month to learn from the neighbouring country's success in producing and exporting the seafood.

Association chairman Hla Maung Shwe, who led the delegation on the July 23-26 trip to shrimp farms, hatcheries and processing plants in southern Thailand, said Myanmar's organisational structures and labour practices paled in comparison with those used in the neighbouring kingdom. "They use advanced farming technologies, like farming under a roof in a controlled environment, which helps them achieve a higher level of production," U Hla Maung Shwe said. Greater productivity meant lower per-unit costs, he explained.

“They can produce like factories. Their production runs according to a schedule, and they don’t have to worry about the weather.”

The high quality of Thai shrimp was also recognised worldwide, U Hla Maung Shwe said. “They pass all the international quality-assurance standards. Most of their farms have quality certificates, and that’s one of the most import things if you’re going to compete in the world market. “It’s something our farmers need to practice more widely.” He added that Myanmar’s workforce also appeared to lag behind their Thai counterparts. “They only need a few workers compared to our farms and most of their workers are very skilful,” U Hla Maung Shwe said.

The MSA delegation visited Thailand at the invitation of the Charoen Pokphand (CP) Group, which U Hla Maung Shwe said provides about 10pc of the 500,000 tonnes of shrimp Thailand exports annually. By comparison, Myanmar exported some 25,000 tonnes of prawns in 2006-07, earning US\$120 million. Of this, only \$13 million came from shrimp farms, with most prawns sourced from the open seas. Myanmar farmers should take whatever lessons they can from Thailand as they chase a bumped-up export target of \$60 million this fiscal year, U Hla Maung Shwe said. “Some of their methods are not so different from what we do here, while others are much more advanced. And although we can’t make investments like they do at the moment, there are other good things we can take from them.”

Something Myanmar shrimp farmers likely wish they could take from Thailand is a reliable electricity supply, which U Hla Maung Shwe said put producers there at an advantage because they did not need to run more expensive diesel generators. “They can get electricity to run the machines at their farms,” he said. “And they can easily transport their products to processing factories in a short time.”

Additional references

See above: ‘Electricity supply key to [industry shift](#) to Myanmar’ (MT: 16/08/10)

See below: [‘Fisheries factories’](#) offered 24-hour power’ (MT: 09/07/07)

Singu Soe Win, NLM, 02/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-02.pdf>

Kyaukpyu sea prawn incubation farm is in Zetiya Village, 3 km from Kyaukpyu town . It consists of an office, light-proof buildings, 14 nursery tanks, two incubation tanks, two seawater tanks, two pasteurization tanks, and a filtering tank. Adult female prawns are bred in a single light-proof water tank. Once they they conceive eggs, they are transferred to another tank. The newly-laid eggs are invisible to the naked eye. Tiger prawns hatch and grow up in the dark. A female tiger prawn lays about 2,000,000 eggs in her lifespan. Since the mother tiger prawn grew up in the sea, the shrimps can be raised only on a sea shore line. Tiger shrimps are kept in seawater with the PPT rate between 28 and 30 in the dark for 45 days. After the 45-day period, when a shrimp has grown to the size of a match stick, they are sold to private prawn breeders. By making an investment of 25,000 kyats, a breeder can make a healthy profit of over 2.5 million kyats from a tiger prawn. However, raising prawns is a demanding task. The whole business is paused in the rainy season when there are no customers. But, the power generator has to keep operating round the clock because babies and the mother tiger prawn have no resistance to light at all.

Sann Oo, Myanmar Times, 21/07/08. <http://www.mmtimes.com/no428/business.htm>

Myanmar’s shrimp farming industry is struggling to compete with neighbouring countries because of high global fuel prices, the chairman of the Myanmar Shrimp Association said last week. “We have to rely on diesel to run the machines, such as motors for paddlewheels, at our shrimp farms while other countries like Thailand and Vietnam have electricity at their farms,” association chairman Hla Maung Shwe said. Shrimp farms need the paddlewheel aerators to enhance splashing in the water, which speeds up evaporation, increasing the salinity of the pond water. He said shrimp farmers in other countries have much better electricity access, which helps them to keep production costs low. “About 92pc of farms in Thailand and Vietnam are connected to the power grid ... but we have to use the diesel to run the motor,” he said, adding that the average cost of the one kilowatt hour of electricity is just K100, while diesel costs about K450 per kilowatt hour, he said.

Alfred Oehlers, IRROL, 22/08/07. [excerpt] http://www.irrawaddy.org/article.php?art_id=8318

Burma is essentially a diesel-powered economy. We see this in the buses, trains and trucks that rumble around the country. We also see this in the dilapidated power plants that sometimes generate electricity. Most of all, we see this in the ubiquitous portable generators that exist in nearly every home, factory and shop that can afford one. For a long time now, diesel prices have been kept artificially low through subsidies. But as demand for diesel has continued to grow in tandem with an expanding economy, the amount spent on these subsidies has similarly expanded, posing an ever increasing strain on the regime's finances. The only solution has been to import diesel, since Burma's ageing refineries simply cannot refine crude volumes sufficient to meet demand. And as this is usually done at spot market prices, it is an extremely costly solution.

PREMIUM RATES FOR ELECTRICITY IN MON VILLAGES

Banyol Kin, IMNA, 03/08/07. <http://www.monnews-imna.com/2007/augupdate.php?ID=705>

Ironical as it may seem, Burma which is the richest in terms of gas reserves among south-east Asian countries has one of the poorest power supplies at home. It is now allowing the private sector to supply electricity in Mon State .

A private company KTO (Ko Than Oo and Brothers Electric Mart) is supplying electricity twice a day from 6pm to 10pm and 4am to 7am to about ten villages in Ye township. "When we subscribed four months ago, we had to pay K110,000 (US\$86.60) for the meter board, and for electricity we paid whatever was consumed. For our house we have to pay about K300,000 (\$236.00) but now it has increased. A meter board now costs K150,000 (\$118)," said a consumer in Ye township. The private firm's charge for one unit of electricity is equal to the price of one bottle (six bottles = 1gal) of diesel which costs about K700 (\$0.50) compared to normal public sector electricity per-unit cost of K50 (\$0.03).

"Everybody is keen on having electricity but it is difficult to get a connection. We applied last year but have not got it yet. When we ask them they keep saying next month every time," said a Mudon town resident.

In some places like Chaungzone township (10.5mi from Moulmein) gas-fired generators have been set up using paddy husks from the villages. But power is not available all the time. When it is on, it is only from 6pm to 10pm. In the Moulmein area, 12 MW of electricity is currently available to the public, while 22 MW is available for Mon State, according to the state electrical engineer interviewed by telephone.

The military government cannot fulfill the demand for power, although the country is rich in natural gas and its Yadana gas is being sold to Thailand for generating electricity. Yadana gas is piped from the field to the gas grid that supplies the Ratchaburi and Wang Noi power plants in the Bangkok region (total capacity of 6400 MW, with Yadana gas used to generate 2500 MW). Around 70pc of the power generated in Thailand is gas-fired, using local gas resources supplemented by gas from Myanmar's Yadana and Yetagun fields.

Additional references

See above: 'Chaungzon supplied with [electricity at a big loss](#)' (NLM: 29/03/11)
'Regular power [service restored in Mon and Karen States](#)' (IMNA: 22/10/09)

See below: '[Acute shortage](#) of electricity disappoints Mon residents' (IMNA: 21/02/07)
'[Private operators](#) meet need for alternative power service' (MT: 03/02/02)

IMNA, 08/07/08. http://bnionline.net/index.php?option=com_content&task=view&id=4441&Itemid=1

Residents of villages in Mudon, Thanphuzayat and Ye townships who paid the Ministry of Electric Power to setup power lines have started switching to private companies to get electricity installed. "My family paid about one million kyat but the nothing has happened so far. Now electricity is available because we changed to a private company," said a villager in Mudon township. Others are also interested in buying electricity from private players, but a majority are finding it difficult because they have already applied for government power. Private electricity is paid by units and the price is equal to a bottle (six bottles per gallon) of diesel at

K 4200. "We can cook, watch TV, and light up well. Depending on usage we have to pay more. We pay about K 10,000 a month for electricity," a private electricity consumer told IMNA. Ko Than Oo & Brothers, a firm close to Tenasserim based military commander, runs a private power generating company in northern Ye township. A majority of private power generators use diesel. The private company is telling people that they will provide electricity if the 160 families from a village apply.

IMNA, 30/06/08. <http://www.monnews-imna.com/newsupdate.php?ID=1066>

Villagers in Mon State are being deprived of power supply despite spending money to apply for electricity connections. In Hnee-padaw and Kwan-hlar in Mudon Township they paid about K 0.6 million per house and have to pay more to get the power line installed in their houses. "We applied for electricity supply over a year ago. The authorities told us that we would get it in February 2008, but we have not received it yet," said a Hnee-padaw villager. "We had to pay about K 5 million to the village council for the recommendation before applying. Despite the payment, the VPDC did not arrange for electricity supply. The money collected was meant to be a bribe," said a villager who applied in Hnee-padaw. About 1,000 out of 1,500 households in Hnee-padaw village applied to get connected. The remaining households wanted to apply, but they were apprehensive that even after paying they would not get a connection. Not only Hnee-padaw village but Kwan-hlar also paid about K 2 million after shelling out K 0.6 million for an electric box, according to a Kwan-hlar villager. "Sein-taung village in Mudon Township got electric boxes which cost over 0.8 million Kyat per house for electricity supply. But they only got power for about one or two hours for two days," said the villager. While the wait continues some private business firms are using fuel engines to distribute electricity among villagers. Villagers also have to pay on a weekly or monthly basis.

IMNA, 24/12/07. http://www.bnionline.net/index.php?option=com_content&task=view&id=3238&Itemid=6

Most villages in Mon State are trying to get power by spending their own funds. Karoat-pi (Kayokpi) village in Thanphyuzayart township has spent about K 100 million to extend electric poles and have more transformers. A household has to pay K 0.7 million including K 0.3 million for electric meter boxes and K 0.4 million for electric poles and other costs. Some people say that they would spend that amount if they could get electricity regularly. Others have not subscribed because they don't have faith in the government's ability to supply electric power. Moreover the government raised the cost of electricity about 10-fold in 2006 and since August 2007 it costs about K 50 per kilowatt hour. The township electric service also charges K 500 per month for maintenance purposes.

BANGLADESH, MYANMAR TO SIGN HYDROPOWER DEAL

Xinhua, 15/07/07. http://news.xinhuanet.com/english/2007-07/15/content_6379678.htm

Dhaka and Yangon have agreed to sign an MoU to build a large hydropower plant in Myanmar to feed Bangladesh's power-hungry national grid, private news agency UNB reported. The agreement was reached when a Bangladesh delegation recently visited Myanmar, as part of a hectic government search for sources of electricity, Power Secretary M Fouzul Kabir, who led the delegation on the visit from July 10 to 13 to the neighboring country, told reporters Sunday.

A delegation will make a follow-up visit to Myanmar in November and sign the MoU to conduct a joint techno-economic feasibility study of a planned hydropower plant in Rakhaing State that could supply power to Bangladesh. Kabir said three locations are being considered as potential sites for the plant. Among those, a site on the Lemro River of Rakhaing State has the best prospects, as there is a potential for building a 500 MW-600 MW plant. This site is approximately 100 km from Bangladesh.

Kabir said both countries would examine all the possible options which could serve as the basis for such a big-venture plant. "It could be either a government-government joint-venture project or a private-public joint-venture between the two countries." But, he added, everything will be decided after the feasibility study.

The Power Secretary said the feasibility study would look into the technical and financial viability of the project so that both countries can benefit from it. He mentioned that the proposed power plant would be built under long-term planning and would have no role in resolving the present power crisis.

Compiler's Note: Prospective locations for the power plants on both the Lemro and Michaung rivers would appear to be in Paletwa township in southern Chin state rather than in Arakan (Rakhaing) state. For possible sites on the Lemro river see Burma 1:250,000: Series U542, U.S. Army Map: NF 46-15, Myohaung. <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-15.jpg>
 For possible sites on the Michaung see Burma 1:250,000: Series U542, U.S. Army Map: NF 46-11, Mount Victoria. <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-11.jpg>
 For the Saingdin falls site, see Burma 1:250,000: Series U542, U.S. Army Map: NF 46-14: Akyab Saingdin Falls in Buthidaung township [co-ordinates n.a.], grid square reference: 12\4, 21\6 [?] <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-14.jpg>

Additional references

Data summary: [Laymyo](#)

See below: [Sai Tin hydropower project](#) plans announced' (NLM: 28/01/09)

'Mini-hydro facilities slated for [dams in Kyauktaw township](#)' (NLM: 26/11/08)

'[Thahtay creek](#) dam and other hydropower projects in Arakan' (NLM: 20/04/06)

'Electric power supply in Arakan state' ([Appendix 10A](#))

NLM, 11/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-11.pdf>

Laymyochaung hydropower project listed as located in Mrauk-U township.

Daily Star, 25/01/11. <http://www.thedailystar.net/newDesign/news-details.php?nid=171548>

Bangladesh has initiated a dialogue with a Myanmar company to buy hydropower from Rakhaine State of Myanmar. "Discussion is going on and I myself had talks with the company officials about importing electricity," Foreign Minister Dipu Moni said at a press conference in Dhaka yesterday. The private firm has been awarded contracts to set up two hydropower projects, mentioned the minister adding, of the two, one 80 megawatt plant will start production in 2015 and another 800 megawatt project will be operative in 2018. "I met with them on January 23 in Yangon during my visit there to attend the 13th ministerial meeting of Bay of Bengal Initiative for Multisectoral Technical and Economic Cooperation [BIMSTEC] and the company agreed to sell hydropower on completion of the projects." She mentioned that import of electricity from Myanmar would require two grid lines in either side of the border. However, pricing of electricity is yet to be finalised.

NLM, 20/01/11. Excerpt. <http://www.burmalibrary.org/docs11/NLM2011-01-20.pdf>

EPM-1 Zaw Min met with V-P Zou Jiahua of China Datang Corp and Pres Kou Bingen and party of China Datang Overseas Investment Co Ltd in Nay Pyi Taw for discussions on joint implementation of hydropower projects. Afterwards a ceremony to sign MoAs on the implementation of the Ywathit, Nampawn, Namtamhpak, Lemro, Lemro-II and Saingdin hydropower projects was signed between the HPD of EPM-1, China Datang Overseas Investment Co Ltd and Shwe Taung Hydropower Co Ltd [of Myanmar] took place in Yeywa Hall of the Ministry.

New Nation (Bangladesh), 23/09/10. Excerpt. Edited.

<http://ebiz.ittefaq.com/issues/2010/09/23/news0054.htm>

After the first day of the annual Bangladesh-Myanmar Joint Trade Commission meeting in Dhaka, Commerce Secretary Md Ghulam Hossain told reporters they had discussed importation of electricity from Myanmar. He said Deputy Minister for Commerce of Myanmar Aung Tun had expressed interest in setting up a hydro-electric power station in Arakan state which could export up to 400 MW of electricity to Bangladesh. However, Myanmar was not in a position to set up the power station as a joint investment.

Financial Express (Bangladesh), 02/09/10. Edited and condensed.

http://www.thefinancialexpress-bd.com/more.php?news_id=110954&date=2010-09-02

A high-powered Bangladesh delegation received Burma's consent over cross-border electricity trade during its recent visit to the country, according to a senior power ministry official. The agreement is aimed at exporting around 575 megawatts of electricity. A Burmese delegation is expected to visit Dhaka shortly to sign an MoU on the electricity trade between the two countries. Before finalizing the deal, Burma has sought

a power purchase guarantee from Bangladesh, said the official who was a member of the delegation that visited Burma last week. The delegation included top officials from the power ministry and Power Development Board (PDB). The power plants with an electricity generation capacity of 500MW and 75MW will be installed on the Lemro and Michaung rivers. Burma's Shwe Taung Development company has already tied up with a Chinese firm to build these power plants with a view to exporting the output to Bangladesh. It has already secured a land lease in Rakhine state to set up the power plants.

Bangladesh is currently reeling under an acute electricity and gas crisis with electricity generation hovering around 4200MW against demand of over 6000MW and gas output at around 1980 million cubic feet per day (mmcf) against the demand of over 2300 mmcf. Operations at four major gas guzzling fertiliser factories have been closed down to make room for generating more electricity at gas-based power plants as more than 80pc of the country's power plants are based on gas. Compressed natural gas (CNG) filling stations have been ordered to close down for six hours daily to ensure smooth gas supplies to power plants. Holiday staggering in industries is continuing and there is a halt to new connections both for natural gas and electricity. The country's hectic economic activities have sky-rocketed energy demands over the past two years. The government has targeted to produce additional 10,000mw electricity by 2014.

NLM, 27/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-27.pdf>

EP-1 Zaw Min receives Ambassador Anup Kumar Chakma of Bangladesh and Development Secretary Md Mofazzel Hossain of the Ministry of Power Energy and Mineral Resources of Bangladesh at the ministry in Nay Pyi Taw.

Xinhua, 07/12/09. http://news.xinhuanet.com/english/2009-12/07/content_12603866.htm

Myanmar [will] add three more hydropower plants in western Rakhine state to fulfill the electricity demand in the region, sources with the Ministry of Electric Power said on 07/12/09. The hydropower projects namely Saidin, Thahtay Chaung and Laymyomyit [will] cost over US\$ 800 million in total, the sources said, adding that these plants can produce 687 megawatts after completion.

NLM, 28/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-28.pdf>

On a visit to Sittwe, PM Thein Sein announces that the Sai Tin (Saidin) hydropower plant is to be built soon in Buthidaung township to provide electricity for the northern part of Rakhine state. A lake is to be created where rainwater will be stored to make it possible to generate power during the summer when water is scarce. It is expected that the plant will be able to produce 236 million kilowatt hours a year which will be supplied to Sittway, Buthidaung, Maungdaw, Kyauktaw, MraukU and Minbya. On the same occasion, EPM No 2 Khin Maung Myint reports on arrangements to link the power grid system in the rest of the country to the Rakhine, Kachin, Chin and Shan East states and Taninthayi division.

NLM, 13/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-13.pdf>

In a report on the water resources in Rakhine state from which electric power can be generated, EPM No 1 Zaw Min draws attention to the 500-MW Laymyo project and the 76.5 MW Saidin project which reportedly are in the planning phase.

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

At the co-ordination meeting (1/2008) of the Special Projects Implementation Committee in the office of the Commander-in-Chief (Army), EPM No 1 Zaw Min gave a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the Committee. [Among] the fifteen are the Laymyo [Lemro] hydropower project (500 megawatts) in Rakhine state.

NLM, 12/10/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n081012.htm>

[While in Dhaka,] Minister for Energy Lun Thi met Adviser to the Ministry of Power, Energy and Mineral Resources M Tamin at the latter's office on 8 October and held comprehensive discussions on energy and power matters.

Daily Star (Bangladesh), 09/10/08. <http://www.thedailystar.net/story.php?nid=57884le=1055>

Talking to the Daily Star after a meeting with Myanmar's Energy Minister Lun Thiin, Prof M Tamim, special assistant to the Bangladesh power and energy ministry, said Myanmar would seriously look into a proposal to set up a hydropower plant in that country. UNB [previously] reported that according to the proposal Bangladesh would build the hydropower plant at its own cost and get 70pc of the electricity from the project, while 30pc would go to Myanmar as royalty. The hydropower project proposal was initiated by Bangladesh about two years ago. Both sides also signed an MoU to implement the project. As a follow-up, Bangladesh offered to conduct a joint visit to select a project site in Myanmar's Rakhine state more than six months ago, but there was no response from the other side. Tamim yesterday said the Myanmar side agreed to conduct the joint visit by experts to select the project site. "We've urged the Myanmar minister to expedite the move," Tamim said.

Financial Express (Bangladesh): 08/12/07.

http://www.thefinancialexpress-bd.com/search_index.php?page=detail_news&news_id=19350

Sources at the Bangladesh Power Division say a move to build a hydropower plant in neighbouring Myanmar and bring in electricity through a cross-border transmission line is stuck up due to lack of further initiatives. The two countries agreed in July last to sign an MoU to build a hydropower plant on the Lemro river under joint venture. But it would require a prefeasibility study before taking up such a project, and in pursuance of the initiative the Power Division had sought foreign ministry approval to send a technical committee to Yangon for the study. But the Power Division has not received any response from the foreign ministry to a letter sent nearly two months ago, seeking clearance for such visit, the sources said. Power secretary Fouzul Kabir Khan said the committee had been due to visit Myanmar for a pre-feasibility study in November. An MoU was scheduled to be signed at that time for carrying out a joint feasibility study to build a hydropower plant on the Lemro river in Rakhine state, about 100 kilometers from Bangladesh border. He said there is a potential for generating about 500 megawatt (MW) to 600 MW electricity from the plant. Fouzul said the hydropower plant project could be either a government-to-government joint-venture project or a private-public joint venture between the two countries. An international consultant might be appointed to conduct the feasibility study. Experts from both the countries might also be included in the study team, sources said.

Independent (Bangladesh), 29/10/07. <http://www.theindependent-bd.com/details.php?nid=61718>

Bangladesh may drop the idea of importing electricity from Myanmar for reasons of security as well as the huge cost of establishing a power plant there. Local experts feel an investment of US\$2 billion could yield more benefit by being utilised within Bangladesh. They cite difficulties in setting up a power grid in hill and forest areas and in monitoring and of maintaining it in difficult terrain. The Power Ministry will still invite Myanmar power sector officials to visit Bangladesh in November, but more as a diplomatic courtesy. The rivers close to the Bangladesh border do not have much power potential; the Michaung can produce 100 MW and the Saingdin has a potential of 80 MW, while the Lemro has a potential of up to 400-600 MW. For every MW of capacity, it is necessary to invest TK5.5 to 6.5 crore (US\$800,000 – 950,000).

Independent (Bangladesh), 16/09/07.

<http://www.theindependent-bd.com/archive.details.php?nd=2007-09-16&nid=57170>

Bangladesh and Myanmar will conduct a joint feasibility study on the technical and financial issues involved in power transmission between the two countries before discussing issues relating to a specific project, according to a delegation that spent four days in Myanmar. The Lemro river was said to have an enormous potential of 500-600 MW but the rivers closer to Bangladesh do not have as much potential; the Michaung could produce 100 MW, and the Saingdin, 80 MW. A huge dam would have to be installed. The project would involve a transmission line of 350 - 400 km; also the upgrading of transmission lines in Bangladesh. The whole project could cost more than a billion dollars. Myanmar would require 30pc of power produced; there would be 35-year concession period; each MW capacity would cost between TK5.5 to 6.5 crore (US\$ 800,000 – 950,000).

Narinjara News, 25/06/07. <http://www.narinjara.com/details.asp?id=1315>

Bangladesh would have to spend US \$1 billion to import electricity from Burma if it goes ahead with a hydro project to be set up on the Ma Aei-Chaung and Lemro rivers in Rakhine state. The project would involve installation of an 800-MW plant in two phases along with a 120-km-long 132-kV transmission line between the two countries. A delegation led by Bangladesh Power Secretary Fawzul Karim, accompanied by Power

Development Board Ch Khijir Khan, and MD Harunur Rashid of the Bangladesh Power Grid Co will go to Burma in July to discuss the project with their Burmese counterparts. Bangladesh power ministry sources say the Burmese government sent a proposal to the Bangladesh government outlining conditions for the project, including 30pc of the power produced and transfer of the plant to Burma after a 40-year concession period.

Narinjara News, 11/06/07. <http://www.narinjara.com/details.asp?id=1301>

Bangladesh will look for funds from the WB, ADB and Japan to prepare a feasibility report on a hydropower project in Burma. The Power Division (PD) requested the Economic Relations Division to seek funds for the study since a large investment is required. An assessment of potential sites prepared by an expert team of the Power Development Board (PDB) identified sites along the Michaung and Lemro rivers in Arakan State as having potential for generating 800 MW. These areas are viable as they are situated close to Bangladesh's Cox's Bazar. Bangladesh requires around 5,000 MW of power, but its production capacity staggers between 3,000 MW and 3,300 MW, depending on the condition of its decades-old power plants.

Kyaw Thu, Myanmar Times, 04/06/07. <http://www.mmtimes.com/no369/b001.htm>

The Myanmar government is willing to help neighbouring Bangladesh meet its energy needs by exporting hydroelectricity, a senior official from EPM-1 said on May 28. "If Bangladesh agrees to buy electricity, we will build hydropower plants in Rakhine state and export electricity to Bangladesh," said the official, who declined to be named. Bangladesh, which has widespread poverty, might not need to fund hydropower plants in order to import electricity from Myanmar, he added, speculating that an Indian energy company may be willing to invest in such a project, which would fit with India's "Look East" policy. He said that if a deal was struck it would likely involve the construction of more than one dam. There are many rivers in Rakhine State, which borders Bangladesh, that could support hydropower plants, he explained. "We (the Ministry of Electric Power 1) will survey the Kaladan River, Lemro River, Sai Tin Creek and Dalet Creek (all in Rakhine State) for the possible implementation of hydropower projects. A Bangladeshi delegation led by the country's power secretary is due to arrive in Yangon early this month to hold talks on buying electricity from Myanmar and the implementation of hydropower projects. The speed of sourcing energy from abroad is of key concern to Bangladeshi officials as the country faces a lasting and politically sensitive power crisis. Tapan was quoted in Bangladeshi media last week as saying Myanmar authorities had already set some conditions for Bangladesh's proposal to set up a hydropower plant. He did not reveal what these conditions were or where funding for a power project might come from. "After negotiations, we will be in a position to know whether it will be viable to set up plants there," Tapan said.

Financial Express (Bangladesh), 27/01/07. [no longer available on-line]

The Power Division (PD) is weighing the possibility of bringing hydro-electricity from Myanmar following the severe power scarcity in Bangladesh over the last few months. PD has assigned the Bangladesh Power Development Board (PDB) to assess the potentialities. Natural gas, the main source of power in Bangladesh, is declining gradually. The Myanmar Energy Minister has urged the Bangladeshi ambassador in Yangon to set up hydro-electricity plants there. A PD official said that as per Myanmar government's rules and regulations, Bangladesh would have to supply 30pc of the power generated to domestic consumers in Myanmar and the remaining 70pc could be brought to Bangladesh through a cross-border transmission line.

POWER SUPPLY, BANK CREDIT -- KEYS TO [SME BREAKOUT](#)

Win Nyunt Lwin, Myanmar Times, 09/07/07. <http://mmtimes.com/no374/b006.htm>

Myanmar should emphasise the development of small and medium enterprises (SMEs) to put the country on a competitive footing with regional rivals, according to an official at the Ministry of Commerce. Dr Htein Lynn, a deputy director at the ministry's Directorate of Trade, said enhancing the efficiency of smaller businesses would increase exports and earn Myanmar more foreign exchange. It would also increase companies' chances of survival when barriers to competition from other Southeast Asian countries are removed in a free trade agreement (FTA) scheduled to take effect in 2015, he said.

"When there are zero tariffs in the region, products from our country must be competitive in terms of price as well as quality or we will lose," said Dr Htein Lynn, who obtained a PhD from Germany's Goettingen University through research into the SME sector. The food and beverage industries were prime areas for enhancement, he said, claiming these businesses helped bridge the gap between agro-based and industrialised economies by using agricultural products in an industrialised setting, thereby encouraging growth in both sectors.

Myanmar was undergoing a gradual shift from an agricultural country to an "agro-based industrialised country", Dr Htein Lynn said. But for the transition to have the greatest chance of success, businesses need to be supplied with enough electricity to meet their needs, as well as have a modern banking system at their disposal, he told The Myanmar Times. "Only when there is a good banking system can small businesses get loans for their development," he said.

Co-operation between the government and the private sector would remove obstacles to development, Dr Htein Lynn added, noting that a stable business climate was necessary to support the planning required to achieve long-term progress.

FISHERIES FACTORIES OFFERED 24-HOUR POWER

Sann Oo, Myanmar Times, 09/07/07 <http://mmtimes.com/no374/b002.htm>

Fisheries factories in Yangon were last week invited to provide details necessary for the YESB to provide them with 24-hour power independent of neighbourhood supplies. U Nyo Win, deputy chief engineer for the YESB, told factory owners at a weekly meeting of leading figures in the fishery sector that the authorities were willing to help set up electricity substations in the city to provide power supplies exclusively to processing plants.

The substations, which must be funded entirely by the private factories that would receive the electricity, are intended to help companies sustain production over the dry summer months when electricity supplies nationwide decline due to reduced output at the country's hydropower stations. No estimate was given on how many substations might be built, although U Nyo Win said the YESB hoped to see the system in place before the end of this year.

"We will arrange to get power to the factories, especially for the coming summer. "Factories owners need to submit their plans for what they want to the YESB," U Nyo Win said on July 3 at the meeting held at the Myanmar Fisheries Federation (MFF) headquarters in Yangon. The board would then calculate and inform factories of the costs involved before arranging for the transmission plants and power lines to be installed, he added. U Nyo Win said the system would allow electricity to reach factories even when neighbouring residential areas were blacked out.

Securing sufficient electricity has long been the bane of factories in Yangon but supplies this year have become especially important to the fishery sector as it chases an ambitious export target more than 60pc higher than it earned during 2006-07. "Electricity is crucial for our processing plants as we make efforts to reach US\$750 million (of exports). Factories play a crucial role in achieving that," U Han Tun, chairman of the Export Promotion Cte, said at the meeting.

He applauded the move to increase electricity supplies, saying power should be distributed to processing plants, ice factories and animal feed factories because all were essential to building a strong marine products industry. Using generators dramatically increased production costs, he said.

There are currently some 85 factories processing marine products in Yangon. "We will work as hard as we can to get them electricity – that way they can increase their production," U Nyo Win said. "We will help the fisheries sector achieve their export target."

The MFF and the EPM No 2 recently set up a committee to help coordinate the establishment of the exclusive electricity supplies. The 22-member committee comprises 18 factory owners from various townships and one representative each from the YESB, the Export Promotion Cte, the Myanmar Fishery Producers and Exporters Ass'n (MFPEA) and the Dept of Fisheries. Townships with fisheries factories that might get the substations include Thaketa, South Dagon, Hlaingthaya and Mingala Taung Nyunt.

A representative of factory owners in South Dagon township said last week that longer electricity supplies would be of great help and the companies he represented were keen to press ahead with securing the separate power lines. "Currently we receive electricity in a half-day rotation, from 5am to 12pm or from 12pm to 7pm. Basically, that is not enough for our plants," he said.

A representative from Thaketa township, which has six factories producing marine products, was also eager to see the scheme implemented. "We've finished our negotiations and plan to submit a proposal to the YESB," he said. "We are hoping to get the final budget to proceed very soon."

The 15 factories in Yangon that produce animal and fish feed were also invited to provide outlines of their needs for uninterrupted power supplies to the YESB. D-G Khin Maung Aye of the Dept of Fisheries warned that businesses should prepare now for the coming summer. "Although we are far from next summer when electricity shortages will happen, we need to prepare right now. It is a long-term plan and we cannot do it in a short time," he said. "Electricity is important. We want you to take this opportunity now that officials are arranging for what you need. Complaining later is not helpful."

Meanwhile, a US\$1.4-million project funded by South Korea to help develop Myanmar's electricity network, is currently focussing on power lines and substations in Yangon and Mandalay, the local Flower News reported last week. The network development project aims to share Korean knowledge and experience in power system operation and protection, general facilities testing, fault analysis and the provision of relay equipment. It is funded by South Korea's International Cooperation Agency (KOICA) and undertaken by the Korea Electric Power Corporation in collaboration with the state-run Myanmar Electric Power Enterprise.

Additional references

See above: 'Electricity supply key to [industry shift](#) to Myanmar' (MT: 16/08/10)
 'Fisheries [factories to get 24-hour power](#) by March' (MT: 22/10/07)
 'Reliable electricity supply gives advantage to [Thai shrimp](#) farmers' (MT: 13/08/07)
 See below: '[Business leaders](#) to pay for new power stations' (MT: 17/07/06)

COLENCO ENGINEERING TO ADVISE ON [UPPER YEYWA PROJECT](#)

NLM, 04/07/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070704.htm>

The references previously included with this key article can now be found above in the article titled: 'General Than Shwe visits the [Upper Yeywa](#) hydropower project' (NLM: 22/04/10)

[MORE GAS NEEDED FOR 24/7 POWER IN YANGON](#)

Kyaw Thu and Zaw Htet, Myanmar Times, 02/07/07. <http://mmtimes.com/no373/n007.htm>

An official of the YESB said last week that households and industrial zones in the city will only start getting 24-hour electricity when natural gas supplies increase and water levels at hydropower dams rise. The official, speaking on June 27 during a press conference at board headquarters in Ahlone township, said the city needs to receive at least 19,000 MWh of power a day to enjoy 24-hour electricity but is now getting less than 17,000 MWh. He said that last July, when Yangon was getting around-the-clock electricity, the city was receiving 11,284 MWh from hydropower and 8,013 MWh from gas turbines, for a total of 19,297 MWh a day.

But this year, as of June 25, Yangon was only getting 10,195 MWh from hydropower and 6,326 MWh from gas turbines, or a total of 16,521 MWh a day. "The shortage of natural gas supplies to Yangon's four gas turbine power plants is the main reason for the decrease in electricity production," the official said. He said gas supplies to the four power stations had dropped from 108 million cubic feet of gas a day (cf/d) last July to 59,466 million cf/d this month. "We need 130 million cf/d to supply regular electricity to the whole country," he said. "The amount we get is quite low compared with demand."

Yangon's gas supplies come from offshore and onshore gas fields in Myanmar. Some have speculated that the Ministry of Energy, which is responsible for supplying natural gas to Yangon's four power stations, has shifted natural gas supplies to fulfil the needs of the growing number of compressed natural gas (CNG) stations in the country. However, an energy expert said last week that the 27 CNG stations in Yangon use only about 12 million cf/d, a mere fraction of the 240 million cf/d [of natural gas] used throughout Myanmar.

Of this total, 130 million cf/d come from onshore gas fields and 110 million cf/d from the offshore Yadana gas project in the Gulf of Mottama. Most of the natural gas goes to power stations, cement factories and fertiliser factories. The natural gas used to supply the CNG stations comes from Myanmar's biggest onshore gas field – Nyaungdon, located about 55 km west of Yangon – which produces 80 million cf/d.

The state-run daily newspaper The Mirror announced on May 2 that a new onshore gas deposit found in Maubin in Ayeyarwady Division was producing 3.2 million cf/d. The report said the Ministry of Energy was planning to use the gas to supply CNG filling stations, gas turbines and factories. The YESB said officials were now negotiating to boost gas supplies to Yangon's gas turbines.

Another reason for the shortage of electricity supplies this year has been an increase in the number of commercial electricity meters from 589,599 in 2006 to 692,044 this year, according to figures from the board. The addition of more than 100,000 commercial meters comes in anticipation of increased electricity supplies following the completion of several major hydropower projects in the near future. Meanwhile, the same official said the board started installing household power meters earlier this month in Yangon households that also run cottage industries. The price of the meters is K400,000 for 10 kilowatts hours (KWh), K600,000 for 20 KW and K800,000 for 30 KWh.

Compiler's note: Complaints about periodic shortages of electric power in Yangon are commonplace in media reports, but little attention has been paid to the question of how more efficient use of natural gas could serve as a partial remedy for the situation. The introduction of co-generation plants and combined cycle operation of the existing network of electric power plants in the city in the late 90s marked an important step in this process. In an interview with the Myanmar Times in 2002 U Soe Myint, director-general of the national Energy Planning Dept, stated that the city's power plants were using approximately 300,000 cf of natural gas for each megawatt of power generated. ("Normally, 3 million cu ft of gas can generate 10 MW." (Myanmar Times: Vol 6, No 129, 17/06/02; not available on-line); However much more efficient ratios are widely reported. For example, AECI's Chouteau Power Plant in north-eastern Oklahoma reports that its combined-cycle operation with a capacity to provide 522 MW uses roughly 86 million cubic feet of natural gas per day, i.e. 165,000 cf of gas per MW generated. <http://www.aeci.org/FacilitiesCH.aspx>. Even better efficiencies are promised through the development of fuel cell technology that uses natural gas to generate electricity through electrochemical reactions as opposed to the combustion of fossil fuels. http://www.eei.org/industry_issues/energy_infrastructure/fuel_diversity/natural_gas

Additional references

See above: 'Power [supply improves](#) in Rangoon' (Mizzima: 28/07/09)
 'Gas turbine failure restricts electricity supply in Yangon' (Xiinhua: 01/02/09)
 'Gas in short supply to meet demand for electricity' (MT: 17/09/07)
 See below: 'Full power supply promised for July' (MT: 04/06/07)
 'Electricity supplies get boost from [YESB plan](#)' (MT: 24/07/06)
 'Pipeline to solve electricity shortages' (MT: 16/09/02)

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MYANMAR ELECTRIC POWER ENTERPRISE: FUNCTIONS AND OBJECTIVES

Country Report on Infrastructure Development with a Focus on Public Private Partnerships (PPP) (ESCAP: July 2007, pp 23 – 27. http://www.unescap.org/ttdw/ppp/reports/Myanmar_6july2007.pdf

Myanma Electric Power Enterprise (MEPE) under EPM No 2 is responsible for the construction of transmission lines and substations and the operation and maintenance of gas turbine power stations and combined cycle power plants. MEPE has laid down the following objectives [and priorities]:

- (a) Electricity from hydropower station to be utilized as base load and that from gas turbines as peak load.
- (b) In order to optimize the use of natural gas by the gas turbines, combined cycle power plants are to be implemented.
- (c) To expand the national grid system and to eliminate the need for electrification of towns and village by diesel generating sets.
- (d) To revive the study of alternative production of electricity using saw dust from saw mills and paddy husks from rice mills. (The use of electricity by firing boilers with such waste to generate its own electricity requirement instead of utilizing power from the grid is much appreciated and encouraged.
- (e) To reduce the loss of electricity incurred in transmission and distribution.
- (f) In remote areas, where electricity from the national grid cannot be utilized; the generation and distribution of electricity will have to be provided by diesel generating sets and wind and solar facilities.

MEPE distributes electricity contributed by major hydropower and gas turbine stations to five states and six divisions through the national grid system which supplies 94pc of the power requirement in the country. Due to the rapid expansion of towns and villages and the construction of many multi-storied residential buildings and the introduction of industrial zones, the peak load in the country grew from only 332 MW in 1988 to 996 MW in 2006/2007.

MEPE has been fulfilling about 45pc of daily power requirements from gas turbines. Daily average electricity consumption is 16.61 million units of which 8.2 million units was produced from hydropower and 6.57 million units from gas turbine, 0.09 million units from diesel and 1.73 million units from steam. Whereas electricity generation in 1988/89 was 2,226 million kWh, by 2005/2006 it had increased to 6,064.16 million kWh.

The national grid system of transmission lines covers eleven of the fourteen states and divisions in the country. Since 1988 it has been extended from 1717 miles to 3,260 miles of 230-kV, 132-kV and 66-kV up to December 2006. The total number of primary substations in Myanmar is 84, of which five are of 230 kV, 22 are of 132 kV and 47 are of 66 kV voltage ratings.

The following are on-going power transmission expansion projects for implementation in the near future:-

- (1) Shweli-Mansan-Shwesaryan 230-kV double circuit transmission line (180 miles) and primary substations.
- (2) Hlaingthaya-Athoke 230-kV transmission line (73 miles) and primary substation.
- (3) Thaketa-Thanyin 230-kV double circuit transmission lines (12 miles) and primary substation.
- (4) 230-kV double circuit transmission lines connected to new Yeywa power station (total 183 miles) and primary substations.
- (5) Taungoo-Tharyagon-Bago-Thanyin 230-kV transmission line (177 miles) and primary substations.
- (6) Bago-Myaungtagar 230-kV transmission lines (50 miles) and primary substations.
- (7) Belin-Monywa 230-kV double circuit transmission line (110 miles) and primary substation.
- (8) Meikhtilar-Taungtwingyi 230 KV transmission line (105 miles) and primary substation.
- (9) Thazi-Myingyan 132 KV transmission lines (65 miles) and primary substations.
- (10) Kyaingtaung [Kengtaung]-Namzang 132-kV transmission lines (73 miles) and primary substation.
- (11) Namzang-Thebaw [Pinpet?] 66-kV transmission line (23 miles) and primary substation.
- (12) Namzang-Lashore [Langkho?] 66-kV transmission line (26 miles) and primary substation.
- (13) Namzang-Loilem 66 kV transmission line (14 miles) and primary substation.
- (14) Myingyan-Ngathayauk 66 KV transmission line (22.79 miles) and primary substation.

About 6pc of the power supply is generated in areas outside the national grid by isolated generating sets. According to the Border Areas Development programme, 199 towns and villages outside the national grid System were being served by 265 diesel generating sets with an installed total capacity of 8.8 MW.

Additional references

Country Presentation Myanmar: Franco-ASEAN Seminar, 6-7 September, 2007.

<http://burmalibrary.org/docs2/MMpresentation.pdf>

This slide set has updated lists of MEPE's substation and transmission projects currently underway or in the planning stage. See p 12 for a list of existing substations, p 24 for information about existing transmission facilities, pp 25 – 27 for transmission line projects, p 28 for substations under construction, pp 30 – 32 for a list of transmission projects to be implemented in the near future, p 33 for a list of substations to be constructed in the near future, p 29 for a map of the existing national transmission grid, p 34 for a map of the future national grid system and p 35 for a long-term planning projection of the national grid system. The lists, the maps and an interpretive article can be found in Annex 1: National High-Voltage [Grid System and Maps](#).

Sr.	From	To	Voltage (kV)	Circuit	Length (miles)
1	Yeywa	Belin	230	2	30
2	Yeywa	Meikhtila	230	2	80
3	Shwezaryan	Belin	230	2	25
4	Belin	Meikhtila	230	2	65
5	Meikhtila	Thazi	230	2	14
6	Shweli	Mansan	230	2	60
7	Mansan	Shwesaryan	230	2	120
8	Thaketa	Thanlyin	230	2	12
9	Taungoo	Tharyargone	230	2	56
10	Tharyagone	Bago	230	2	54
11	Bago	Thanlyin	230	2	65
12	Bago	Myaungtaga	230	1	50
13	Belin	Monywa	230	2	110
14	Meikhtila	Taungdwingyi	230	1	105
15	Phyu	Toungoo – Bago line	230	2	4.5
16	Thazi	Myingyan	132	1	65
17	Kengtawng	Namzang	132	1	73
18	Kyee-on Kyee-wa	Mann	132	1	94
19	Kun	Toungoo – Bago line	230	1	8
20	Tounggoo	Shwedaung	230	1	100
21	Upper – Paunglaung	Nancho	230	1	26

Substation Projects under construction

Sr.	Name	Voltage Ratio (kV)	Capacity (MVA)
1	Shweli	230 / 66 / 11	45
2	Mansan	230 / 66 / 11	60
3	Shwesaryan	230 / 132 / 11	200
4	Shwesaryan	230 / 33 / 11	60
5	Thanlyin	230 / 33 / 11	100
6	Belin	230 / 132 / 11	160
7	Meikhtila	230 / 33 / 11	60
8	Monywa (Extension)	230 / 132 / 11	400
9	Shwemyo	230 / 33 / 11	100
10	Thephyu (Yeni)	230 / 33 / 11	100
11	Myingyan	132 / 66 / 11	90
12	Namzang	132 / 66 / 11	75

Transmission projects to be implemented in the near future

Sr.	From	To	Voltage (kV)	Circuit	Length (miles)
1	Nancho	Shwemyo	230	1, TB	28
2	Shweli No 1 and No 2	Shweli No 3	230	2, TB	50

3	Shwekyin	Tharyargone	230	1	40
4	Shweli	Mong Mit	230	2, TB	20
5	Belin	Pakokku	230	1, TB	120
6	Belin	Meikhtila	230	1, TB	65
7	Meikhtila	Nay Pyi Taw	230	1, TB	90
8	Maei	Kyaukphyu	230	1, TB	75
9	Thahtay	Ann	230	1, TB	97
10	Thahtay	Athoke	230	1, TB	145
11	Shwedaung	Oakshitpin	230	1, TB	24
12	Hinthada	Athoke	230	1, TB	60
13	Athoke	Pathein	230	1, TB	40
14	Hutgyi	Mawlamyaing	230	2, TB	123
15	Namzang	Pinpet	132	1	53
16	Upper Kengtawng	Kholam	132	1	40
17	Thahtay	Oakshitpin	230	1	70
18	Ann	Mann	132	1	80
19	Pimput	Kalaw	132	1	40
20	Hutgyi	Thaton-Pa'an grid	230	1	90
21	Hinthada	Myaungtaga	230	1	80
22	Myitkyina	Taping Nos 1 & 2 & Shweli No 1 HP stations	230	1	135
23	Upper Thanlwin	Kyaington	230	2, TB	12
24	Manipur	Pakokku	230	2, TB	180
25	Shwesaryay	Monywa	230	2, TB	30
26	Thaukyegat	Taungoo	230	1, TB	25
27	Bawgata	Tharyargone	230	1, TB	20
28	Tanintharyi	Myeik	230	2, TB	40
29	Myeik	Mawlamyaing	230	2, TB	222
30	Myeik	Kawthaung	230	1, TB	250
31	Myitsone	Myitkyina	230	2, TB	60
32	Myitkyina	Ohndaw	230	2, TB	320
33	Htamanthi	Hopin	230	2, TB	100
34	Htamanthi	Phaungpyin - Kalewa - Monywa	230	1, TB	340
35	Meikhtila	Nya Pyi Taw	230	1, TB	90
36	Tasang	Pyinmana	500	1, QB	200
37	Htamanthi	Monywar	500	1, QB	230
38	Belin	Toungoo – Bago grid	500	1, QB	300
39	Monywa	Mann- Oakshitpin - Hinthada grid	500	1, QB	350
40	Myitsone	Mong Mit – Belin grid	500	1, QB	430
41	Htamanthi	Myitsone	500	1, QB	220

Sub-station projects to be implemented in the near future

Sr.	Name	Voltage Ratio (kV)	Capacity (MVA)
1	Oakshitpin	500/230	kV 500
2	Pyinmana	500/230	kV 500
3	Monywa	500/230	kV 500
4	Mann	500/230	kV 500
5	Hinthada	500/230	kV 500
6	Belin	500/230	kV 500
7	Taungoo	500/230	kV 500
8	Bago	500/230	kV 500

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ELECTRICITY MINISTERS BUSY IN BEIJING AND KUNMING

NLM, 13/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070613.htm>

The ministers who accompanied SPDC Secretary No 1 Thein Sein on his visit to the People's Republic of China from 5 to 10 June held talks with officials of China during the visit.

EPM No 1 Zaw Min and EM Lun Thi called on V-C Jang Kho Pao of the National Development and Reform Commission at the State Guest House in Beijing. Minister Zaw Min and V-C Jang Kho Pao held talks on hydropower projects being implemented by companies from Myanmar and China. Minister Lun Thi and V-C Jang Kho Pao frankly discussed energy projects being carried out by companies from Myanmar and China. Similarly, Minister Zaw Min met with V-Cs Deng Zon Zi and Jin Shoar Lu of China Power Investment Co at the hall of Grand Hotel Beijing at 10 am on 7 June. They discussed work on the hydropower projects at the Ayeyawady confluence and Chibwe creek and future tasks to be carried out in those places. On 8 June, Minister Zaw Min received V-C Li Pingting of Yunnan Power Grid Corp at the Empark Grand Hotel in Kunming. During the meeting, they discussed the Namlway and Namkha hydropower projects [in eastern Shan state].

EPM No 1 Zaw Min and EPM No 2 Khin Maung Myint visited the 2400-MW Gingchaung hydro-power project being implemented by the Farsighted Co in Lijiang, Yunnan province, where they met with Chairman Li and discussed matters related to the upper Thanlwin hydropower project and the connection of power lines.

On 6 June, EPM No 2 Khin Maung Myint met officers of the Central China Power Grid Co at the Grand Hotel in Beijing. They dealt with matters related to the supply of equipment for the Hlinethaya-Myaungdaka-Athoke power line and sub-power stations. Later the same minister met V-C Jian Lianxing and party of the China Poly Group Corp and discussed co-operating on a power grid project in Myanmar. On 7 June, the minister met the chairman of the China National Heavy Machinery Corp, Lu Wenjun, and party and discussed supply of equipment for the Yeywa project. The minister also met the vice-chairman of the China International Water and Electric Corp, Wang Yu, and party and discussed co-operating in a power grid project in Myanmar and transfer of technology. On 8 June, the minister met the chairman of Sichun Machinery and Equipment (I & E) Co Ltd, Yao Yuning in Kunming and discussed the supply of materials for the Shweli power line and timely completion of the project.

EPM No 2 Khin Maung Myint also met with the chairman of Sichun Tonghui Industrial Group, Hongyuan Jin, and they discussed a power grid project and establishment of windmills in the Myanmar coast. Later, the same minister discussed the purchase of T&D instruments for 230-KV and 132-KV power lines with General Manager Gao Rong of the China National Electric (I&E) Southwest Co. In the evening, the minister met with Chairman Feng Ke and V-C He Wen of the Yunnan Machinery and Equipment Co Ltd and discussed co-operating on a power grid project in Myanmar with them.

Additional references

See below: 'Ministers meet with [PRC suppliers](#) in Nanning and Wuhan' (NLM: 06/11/06)

See also the listings for individual projects in the categories [FS](#), [EP](#), [HS](#), [TS](#)

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RICE-HUSK GENERATORS SLATED FOR VILLAGES IN YANGON DIVISION

Kyaw Thu, Myanmar Times, 11/06/07. <http://mmtimes.com/no370/n005.htm>

Yangon division PDC in collaboration with the EPM No 2 has started a project to provide electricity to remote villages in the division using power plants fuelled by rice husks, an official from the ministry said on June 7. The official said the project will benefit villages and towns in locations where rivers and creeks have made it difficult to build towers for power lines, and are therefore beyond the current reach of the national power grid. "Setting up rice-husk power plants to supply electricity will help bring social and economic development to these villages and towns," the official said.

The ministry official said the YDPDC has been working to get villages to contribute to the project by purchasing the power plants from the Myanmar Inventor Co-operative Society. "The ministry will help provide equipment and local power lines where they are needed," he said. The power plants convert rice husks, which would otherwise be burnt in the open air or left to decay, to a source of biofuel that is used to power generators that produce electricity. Benefits include reducing reliance on oil and natural gas by using a renewable resource as a source of fuel.

The Myanmar Inventor Co-op has already set up a 15-kW plant in Kayan township, about 50 km (30 mi) from Yangon city. U Soe Tint Aung, the president of the society, said the K4.5-million plant will supply electricity to households throughout the town. "The project will expand to other towns and villages in Yangon division. We already have orders for two more rice-husk power plants in Thongwa township near Kayan, each with a capacity of 160 kW," he said. There are 51 townships in Yangon Division, 30 of which make up the Yangon metropolitan area. The remaining 21 include areas that are not served by the national power grid.

Additional references

See above: 'Plans for [\\$7-million-dollar](#) rice husk power plant edge forward' (MT: 27/08/07)
 See below: '[Inventor co-op](#) society exports first rice-husk generators' (MT: 21/08/06)
'[Interest growing](#) in rice-husk generation' (MT: 10/07/06)
'Paddy husk power plant tested to cut rice [milling costs](#)' (MT: 19/12/05)
'[Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)
'Biomass gasifier used for [tobacco curing](#) in Myingyan' (TERI: 08/04)

EGAT [AGREED ONLY](#) TO STUDY FEASIBILITY OF SALWEEN PROJECT

Krabi Agencies, Bangkok Post, 10/06/07. http://www.bangkokpost.net/breaking_news/breakingnews.php?id=119346

Thailand has no plans to buy electricity from the controversial [Tasang] hydropower dam on the Salween River in Burma, and the present government is not looking for cheap energy supply from that country, Energy Minister Piyasvasti Amranand said on Sunday. The Electricity Generating Authority of Thailand (EGAT) had never signed a contract with Burma to purchase electricity but had merely inked an MoU to conduct a feasibility study of the project. "If someone is clearing a road, that's their business. Our government's policy is different from the previous government, different from five years ago," he told Bangkok-based foreign correspondents during a talk on "Renewable Energy Policy in Thailand" in the southern resort island here last night.

Piyasvasti said the present government, which came to power after the Sept 19 coup that ousted former prime minister Thaksin Shinawatra, was looking to Laos, another neighbour, to meet its power supply needs, with the possibility of buying 5,000 MW. "We intend to buy more power from Laos and we are encouraging Thai investors to invest there. Anything beyond 2015, we will look at China, but it all depends on the next government," he said.

The Thaksin government's friendly business relations with the military junta in Burma was criticised by international human rights groups, particularly its plan to buy hydro power from Burma. Burma's state-run *New Light of Myanmar* newspaper reported that Thailand's MDX Group had invested about US\$6 billion in the Tasang project in eastern Shan state, the biggest of four planned dams on the Salween River, the longest undammed waterway in the region. Construction of the 868m-long and 227m-high dam, located about 75 km from the Thai border in Shan state, started on March 30. Once completed, generators installed at the power station would have a total capacity of 7,110 MW. The project is expected to generate 35,446 million kWh yearly. Human rights groups have claimed the project would displace more than 80,000 hill tribe people from their homeland in the Shan, Karenni and Karen states in Burma as well as from the Mae Hong Son province in Thailand.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-14: Mong Pan Tasang dam, near Wan Kawpa (20° 31' N, 98° 38' E), grid square reference: 11\8, 28\4
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-14.jpg>
 See also the map at the Shanland website:
http://www.shanland.org/environment/2004/Dam_on_the_Salween_definitely_on.htm

Additional references

Data summary: [Tasang](#)

See above: 'Chinese [firm takes 51% interest in Tasang](#) hydropower project' (MT: 19/11/07)

See below: 'Myanmar, Thailand begin work on [controversial Tasang](#) dam' (AFP: 05/04/07)

Christa M Thorpe, SHAN, 22/06/07. <http://www.shanland.org/environment/2007/activists-believe-thailand-continues-involvement-with-salween-dam-projects>

A claim by Thailand's Energy Minister Piyasvasti Amranand that EGAT had not signed contracts with Burma is receiving skeptical reactions from Salween Watch activists. A report published by the Shan Sapawa Environmental Organization lists two official agreements, an MoU signed by the MDX group of Thailand with Burma's Ministry of Energy (20/12/02), and an MoA between MDX and the Burmese Dept of Hydroelectric Power witnessed by EGAT (03/04/06). The amiable business relations between Burma and the previous Thai government under Thaksin Shinawatra were strongly criticized by various human rights groups, who remain unconvinced that Thailand will now drop the incentives for hydro-electricity purchases from Burma.

NLM, 21/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070621.htm>

On 25 May 2007, Triangle Region Commander Maj-Gen Min Aung Hlaing inspected construction of Namhupakwe bridge being undertaken by MDX Co from Tarhsan Hydropower Project on Nakaungmu-Mongton Road.

Sai Silp, IRROL, 11/06/07. http://www.irrawaddy.org/article.php?art_id=7434

The current Thai government position on Burmese plans to build a series of dams on the Salween River is no guarantee that human rights abuses connected with the projects will end, according to Sai Sai, a Shan environmentalist from the organizations Shan Sapawa and Burma Rivers Network. He was reacting to a statement by Thai Energy Minister Piyasvasti Amranand pointing out that EGAT had never signed a contract with Burma to purchase electricity but had merely inked an MoU to conduct a feasibility study of the project. Sai Sai suggested that the current government might have adopted a new stand on the Salween dams projects because of pressure from opponents. There has been wide criticism of the projects which opponents claim will involve the forced relocation of ethnic communities from the areas of the planned dams. Thailand recently announced it remained interested in the exploitation of such power sources as natural gas and hydro-electricity from Burma while searching for alternative sources such as bio-energy and nuclear power. EGAT director Kraisri Kannasuta has said the generating authority is looking for a suitable site for a nuclear power plant. Former Thai Senator Tuenjai Deetes said that it is a good sign that EGAT was looking for other sources of energy than hydropower from Burma, but she maintained that agreements between previous government and other countries were difficult to change because relationships and investment might be affected.

MA MYA DAM PUT INTO SERVICE IN MYANAUNG TOWNSHIP

NLM, 08/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070608.htm>

The Ma Mya Dam in Myanaung township, Ayeyawady division, was inaugurated this morning. The facility, built by Construction Circle 9 of the ID, is on Ma Mya Creek, about one-and-a-half miles north-west of Hmyinwataung Village on the Pathein-Monywa road. The dam can irrigate 10,000 acres of monsoon paddy, 4,800 acres of summer paddy, 5,200 acres of pulses and beans, 8,000 acres of summer paddy and 2,000 acres of edible oil crops.

After Gen Khin Maung Than of MoD formally opened the dam, he and his party viewed the dam's water control tower and earth embankment and inspected the operation of a 2-kW generator on the right main canal that will supply power to Hmyinwahtaung village. They also looked over a 2-kW generator and a 3-kW generator that will supply electricity to staff quarters at the dam.

The earth embankment of the dam is 11,800 ft long and 150 ft high. It can store 70,000 acre-feet of water and it has two reinforced concrete conduits measuring 4 ft by 6 ft each and an ogee-type reinforced concrete spillway. The dam will irrigate 10,000 acres of farmland in Myanaung township and prevent overflow of water onto farmlands on either side of Ma Mya creek.

A plan is under way to install two 250-kW generators at the dam to supply power to the region. Four 2-kW and two 3-kW generators are currently being operated using canal water from dam to supply electricity to Hmyinwahtaung village and its surrounding areas. Among 17 outlets along the canal from the dam to Letpankwin Village, small-scale hydropower is being generated at two outlets, and the remaining outlets will be installed with generators.

Project submission

Rural Electrification with Mini Hydro Power (Ma Mya Dam) Project, Application Form, ASEAN Renewable Energy Project Competition, 06/05/09. 20 pp.

http://www.aseanenergy.org/download/aea/renewable_energy/2009/awardees/mm_Rural%20Electrification%20with%20Mini%20Hydro%20Power%20%28Ma%20Mya%20Dam%29%20Project.pdf

The project was submitted to the 2009 ASEAN renewable energy competition with the aim of showing how to take advantage of drop structures along the canal irrigation system of a rural dam to produce electricity and the ease with which a micro hydropower plant could be installed without disturbing the irrigation system. An analysis of the savings in carbon emissions compared with that required to generate a similar amount of energy using an engine using a fossil fuel is included. The presentation focuses on the installation of micro hydropower turbine-generators along one of the main canals of the government's Ma Mya dam in Myanaung township in the Irrawaddy delta area of Myanmar. It includes details about the design of the project, technical, financial and market considerations, manufacture of the turbines used, the operational and maintenance program and the sustainability and replicability of the project. Information about the changes brought about in the village of Myinwartung which received electricity for the first time as a result of the project is also featured. Numerous photos, charts, tables, diagrams and two maps accompany the text. Table 1 lists four sites where turbine-generators were already installed along the right main canal of the Ma Mya dam at the time of submission, while Table 3 lists five other sites where installation is underway. A map showing the project layout and a sectional profile of the installations at one of the drop sites are especially useful. The project submission appears to have been prepared by U Htun Naing Aung of Kaung Kyaw Say Engineering, consultant to the project.

Topographical map references:

Burma 1:250,000: Series U542, U.S. Army Map: NF 46-08: Prome. Ma Mya dam, 1½ miles NW of Myinwadaung [18° 06 N, 95° 06 E], grid square reference: 8/9, 24/3.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne46-8.jpg>

A topographical map pinpointing the location of the dam, the canals and irrigation coverage can be found at http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=30&Itemid=45

Additional references

Construction circle 9 website

http://www.construction9.com//index.php?option=com_frontpage&Itemid=1

Basic information and technical data related to the construction and operation of the Ma Mya dam can be found on the website of Construction Circle 9 of the Irrigation Dept.

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=28&Itemid=42

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=29&Itemid=44

Information on the micro-generator program

A sectional profile of the low head micro-turbine generators used on canals at the Ma Mya dam along with design data and other specifications can be found on the website of Construction Circle 9 of the Irrigation Dept. Design data and pictures of the single-phase turbine generators are also provided. The two-, three- and five- kilowatt generators and turbines were manufactured in China, while the turbine casing, draft tube and other parts were produced by the Myanmar Irrigation Dept.

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=36&Itemid=57

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=37&Itemid=53

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=38&Itemid=54

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=39&Itemid=55

See below: 'Mini hydropower plants planned for rural areas' (MT: 08/08/05)

NLM, 26/12/09. <http://www.burmalibrary.org/docs08/NLM2009-12-26.pdf>

There are now 11 micro hydropower stations along the right main canal of Ma Mya dam. These stations are supplying electric power to 1,085 households in nine villages. After repairs to the main embankment in 2008-09, the right canal is supplying water to 4450 acres in 2009-10. [A photo of the right main canal is included in the print edition of NLM.]

NLM, 13/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-13.pdf>

South-West Commander Kyaw Swe checks the installation of two generators on the right canal of Ma Mya dam in Myanaung township.

<http://volunteer-volunteerblog.blogspot.com/2008/09/ma-mya-dam-for-irrigation-and-power.html>

Ma Mya dam on Ma Mya Gyi creek in Myanaung township was opened last year [2007]. The dam is located about a mile west of MP 17/0 on the Okshitpin – Pathein road. It was constructed to control the large volume of water that flows along the creek which originates in Rakhine mountain range and flows into Ayeyawady River and use it for irrigation purposes. It can also generate electricity. At present, the right canal has been constructed and is supplying water to 5,000 acres of farmlands to grow summer paddy. On a visit to the dam, accompanied by Staff Officer Khin Maung Than, I studied the supply of electricity to two villages in the area through the installation of micro hydropower generators at water outlets along the right canal of the dam. The Chinese-made 2-kW, 3-kW and 5-kW generators were installed [at] five water outlets together with turbine casing parts manufactured and installed by Construction Circle 9 of the Irrigation Dept. Engineers of the department calculated capacities of the turbine casings and draft tubes as well as the inflow of water and water level in installing the generators. Electricity is being supplied to Hmyinwahtaung and Ngabatkya villages.

FULL POWER SUPPLY PROMISED FOR JULY

Ye Lwin, Myanmar Times, 04/06/07. <http://mmtimes.com/no369/n002.htm>

Regular electricity supplies later this year will depend on adequate water in the dams and reservoirs supplying 11 hydropower stations which generate 48pc of Myanmar's total output, officials from EPM No 2 said last week. A regular supply of power was likely by mid-June, subject to the early arrival of the monsoon, the officials said. "One of the reasons why more electricity was supplied in May than April was due to heavy rain in the first week of May," said U Aung Khine, the chief engineer of the YESB. "Last year, we managed to provide 24-hour electricity throughout the country from July 9 to December. This year, we will be able to provide 24-hour electricity no later than July 9," U Aung Khine told the Myanmar Times.

As well as the 11 hydropower stations, Myanmar's electricity supply is provided by nine natural gas turbines and five thermal power plants. A statement released by EPM No 2 on May 23 said the country's total production capacity is 1542 MW but the amount being generated was 782 MW. The hydropower stations have a combined output of 738 MW but have been operating at 58.8 percent of capacity because of low water levels in the dams or reservoirs, the statement said.

During the summer season, only the Lawpita hydropower station, at the Moebwe dam in Kayah State, was able to operate at full capacity, the statement said. It said the nine natural gas turbines, which have a combined capacity of 450 MW, were operating at 42pc of capacity. To operate at capacity, the turbines need 206 million cubic feet a day but are receiving just under 102 million cubic feet a day on average, it said. The five thermal power plants have a combined output of 285 MW but are operating at 38pc of capacity, the statement said.

Demand for electricity in Yangon is 530 MW, of which 410 MW is for public consumption and 120 MW for industrial zones, said Col Maung Maung Latt, secretary of the YESB.

The 11 hydropower stations and a coal-fired thermal power plant are operated by EPM No 1, which is responsible for supplying the national grid. The natural gas turbines and the remaining thermal plants are under EPM No 2, which is responsible for transmission. Just under 50pc of electricity supply is distributed in Yangon division, 3.1pc is for Nay Pyi Taw and the balance goes to the rest of the country.

Additional references

See above 'Full reservoirs to boost hydropower' (MT: 19/11/07)
 'Gas in [short supply](#) to meet demand for electricity' (MT: 17/09/07)
 '[More gas needed](#) for 24/7 power in Yangon' (MT: 02/07/07)
 See below: 'Electricity supplies get boost from [YESB plan](#)' (MT: 24/07/06)
 '[Pipeline to solve](#) electricity shortages' (MT: 16/09/02)

FACTORIES URGED TO SPEED UP PRODUCTION OF [LAMPPOSTS AND WIRING](#)

NLM, 30/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070530.htm>

EPM No 2 Khin Maung Myint inspected the Maga lamp post factory in Hlinethaya IZ No 4 today. Factory manager U Toe Hlaing gave an account of the production process. The minister called for quality control and extensive production of lampposts in order to increase the supply of power and inspected the production line. He also inspected the Ne Lin Aung lamppost factory in Shwepyitha IZ where factory manager U Myint Tun reported on the production and distribution of lampposts. The minister stressed the importance of quality control and inspected the work site and the products.

Next, the minister inspected generators and factories under construction at Asian Golden Myanmar cable wire factory in the Shwepyitha IZ where factory owner U Shao Seng and factory manager U Kwun Wai explained the production process. The minister gave instructions on the products.

Later the minister met with lamppost factory owners and entrepreneurs at Sein Myodaw lamppost factory in Thadugan IZ [in Shwepyitha]. He told them that extensive production of lampposts was needed for the installation of wire lines in the power sector. Factories should speed up the production of quality lamp posts and distribute the products at reasonable prices, he added. Factory manager U Htay Win conducted the minister around the production area of the Sein Myodaw factory. Then the minister fulfilled the requirements of the factory.

Additional references

See below: 'Advanced [insulator factory](#) opened in Chauk township' (NLM: 04/09/10)
 See other articles under the category 'Power Grids and Distribution Networks'. [PG](#)

THAI COMPANY PURSUING BIG HYDROPOWER PROJECT IN [TANINTHAYI](#)

Kyaw Thu, Myanmar Times, 21/05/07. [Issue 367 of the MT is not available on-line.]

Foreign investment in Myanmar hydropower is likely to soar in coming months as the government plans to sign a series of deals with neighbouring countries, an official from the EPM No 1 said on May 15. The government expects to sign deals for hydropower projects with companies from China and Thailand interested in implementing major power plants in eastern Shan state and Tanintharyi division, the official said on condition of anonymity.

"There are two hydropower project sites in eastern Shan state and one in Tanintharyi division," the ministry official said. The Shan state sites were sought by Chinese firms, while a Thai company was pursuing a project in Myanmar's southern Tanintharyi division, he added. "We are conducting data surveys for the project in Tanintharyi division," he said, adding that the surveys indicated a project there could generate 600 MW.

Meanwhile, the same official said that surveying at the Hutgyi dam site in Kayin State had been stopped over the rainy season and that a draft feasibility report on the project would be finished by July. Additional information required to finalise the report would be acquired when survey work resumes after the rainy season, he said. The Hutgyi hydropower plant is expected to cost US\$1 billion and generate 600 MW. It is being developed by Myanmar's HPID, EGAT and China's Sinohydro Corp.

Compiler's note: For possible sites on the Tanintharyi (Tenasserim) river see Burma 1:250,000: Series L509, U.S. Army Map: ND 47-14: Mergui and Thailand 1:250,000: Series L509, U.S. Army Map: ND 47-15: Hua Hin.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nd47-14.jpg>

http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-nd47-15.jpg

Website reference

Sahaviriya Steel Industries Plc website information. [n.d.] www.ssi-steel.com/en/abt/abts.htm

Sahaviriya Steel Industries Plc, or SSI, was established in 1990 as Thailand's first manufacturer of hot-rolled steel sheet in coils (HRC). Today SSI has become the country's largest high-quality and high value-added steel sheet producer. At an investment cost of Bt13.3 billion (over US\$500 million), SSI erected a modern hot strip mill with an annual production capacity of 2.4 million tonnes on a 480-acre plot of land in the Bang Saphan district of Prachuap Kirikhan Province, 400 km from Bangkok on the western coast of the Gulf of Thailand. Operations in Bang Saphan include a cold strip mill with an annual production capacity of 1.2 million tonnes, an electro-galvanizing mill with an annual production capacity of 180,000 tonnes, a deep-sea commercial port for ocean-going vessels, with annual through-put capacity of 6 million tonnes, as well as engineering and repair and maintenance services. The company's head office is located near Silom Road, in Bangkok's central business district. SSI employs over 800 persons, both in Bangkok and Bang Saphan.

Additional references

Data summary: [Tanintharyi](#)

See above: 'Hydropower planned for [border industrial zones](#)' (MT: 31/05/04)

NLM: 01/10/10. <http://www.burmalibrary.org/docs09/NLM2010-10-01.pdf>

EPM-1 Zaw Min receives Premchai Karnasuta of Italian-Thai Development Public Co Ltd of Thailand in Nay Pyi Taw. They concentrate on cooperation in implementing projects.

Bangkok Post, 26/08/10. Excerpt. Edited.

<http://www.bangkokpost.com/business/economics/192949/new-spp-bidding-round-for-2000-mw-due-soon>

Thailand will support the 600-MW Tanintharyi dam that will provide electricity to Burma's Dawei (Tavoy) port, where major infrastructure developments are planned, with Chinese backing. Italian-Thai Development Plc holds the concession, with the water resources unit of Team Consulting Engineering and Management Co as the adviser. The project will be completed in 2017.

Ko Shwe, Mizzima, 26/06/09. (edited and condensed)

<http://www.mizzima.com/news/inside-burma/2362-tenasserim-hydropower-project-under-survey.html>

A source interviewed by Mizzima advises that a local person from the Tenasserim valley area has been hired to monitor water levels in the river. The water monitor is being paid Baht 50,000 (US\$ 1,500) per month by a survey group in Thailand for the monitoring operation. "In the hot season the river level is measured once a day and in the rainy season it is measured every hour," the source said. It is believed the monitoring activities are related to a deal signed in October 2008 to construct a power dam and station on the Tenasserim. Villagers in the area said the survey group has marked two potential dam sites on the river. One near Ler Pa Doh village, called the upper potential dam site, and another near Muro village, called the lower potential dam site. The upper and lower potential dam sites are about three hours distance apart by boat. Other sources say Thai surveyors and Burmese soldiers visited the proposed dam sites in late December 2008 and collected sample stones and sand from the areas for examination. According to an official of the Mergui brigade of the KNU, which has a base in the area, this is the second time that Thai and Burmese authorities have collected information of this kind along the river. The first survey, conducted in 2007, saw KNU officials confiscate the survey equipment, including a Global Positioning System (GPS), cameras and other materials. [Compiler's note: Ler Pa Doh appears to be the Karen name for a village on the Tenasserim (Taninthayi) river identified on topographic map ND 47-14 (above) as Sanpe (12° 45' N, 98° 57' E) grid square 10\09, 23\09. Note the series of rapids in the river immediately to the north of the village. The location of Muro is not certain.]

Myanmar Country Report on Power Development Plans, 21/11/2008. Slide 15.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

Italian-Thai Development Co is to develop a 600-MW capacity hydropower facility in Taninthayi division.

Bangkok Post, 12/10/08. http://www.bangkokpost.com/breaking_news/breakingnews.php?id=131360

Burma has signed an agreement with Thailand and with Singapore companies to provide electricity from a Burmese hydro-power project. It is understood that the Electricity Generating Authority of Thailand, or Egat, signed on behalf of Thailand.

NLM, 12/10/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n081012.htm>

A signing ceremony was held in Nay Pyi Taw on 09/10/12 for the Taninthayi hydropower project which will be undertaken by the Department of Hydropower Implementation (HPID), the Italian-Thai Development Co Plc of Thailand and Wind Fall Energy Services Ltd (BVI) of Singapore. The MoU was signed by the director-general of HPID and Pres Premchai Karnasuta of Ital-Thai who explained about the project. Among those witnessing the ceremony was Director Chua Chay Jin and party of Windfall Energy Services. The power project is expected to generate 600 MW.

NLM, 25/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070325.htm>

EPM No 1 Zaw Min reports to the SPIC that the Taninthayi hydel power project will be undertaken on the Taninthayi river, about 37 miles from Myeik. The project will generate 600 MW.

The Nation (Bangkok), 06/12/05. http://www.sea-user.org/news-detail.php?news_id=1478

Egat Plc is set to ink an agreement with the Burmese electricity authority on Friday to form a J-V to construct at least five hydropower plants in Burma with a combined capacity of 10,000 MW. CEO Kraisi Karnasuta said yesterday that the energy ministers of the two countries would witness the signing ceremony. The MoU will encourage the J-V to put up a hydropower plant at the Wegyi Dam in Burma. A second [hydropower] plant will be located opposite Prachuap Khiri Khan province, with a capacity of 600 MW. The output will be supplied directly to the Sahaviriya Steel mill in the province.

NLM, 28/04/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040428.htm>

General Than Shwe at a co-ordination meeting of the National Electric Power Development Committee: Other major electric power projects are . . . the 600-MW Taninthayi project in Taninthayi division.

Source of information MEPE?, [n.d.]

www.aseanenergy.org/energy_sector/electricity/myanmar/future_electricity_projects.htm

Nippon Koei CL prepared preliminary report for the 600-MW Taninthayi hydropower project with estimated annual production of 3,476 million kWh.

Myanmar Snap Trade Directory [undated: circa 1999. <http://www.myanmarSnap.com/investment07.asp>
A preliminary study by Nippon Koei of a 600-MW hydropower project in Taninthayi division is under negotiation. Power produced would be for export to Thailand.

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ELECTRICITY METERING PROGRAM TAKING ROOT

IMNA, 11/05/07 <http://www.monnews-imna.com/2007/mayupdate.php?ID=612>

Thirteen villages in Mudon township will get electricity through an arrangement being worked out by an electricity committee and three companies, according to a source close to a member of a Village Peace and Development Council in the township .

"The electricity committee in the village and the companies said they cannot tell villagers whether they would get power supply this year or next. But the villages will get it for sure," said an applicant for electricity connection. They are not clear about the companies involved and are afraid to ask about them.

The villagers have to pay half the cost to be enrolled by May 15th. The payment to apply for the power connection is about K 600,000 per house. "The amount to be paid is for a household applying for a new connection. Villagers who had already applied in the past ten years need to pay about K 500,000 per household," added the applicant.

The committee called a meeting of villagers on May 2nd and asked them to submit applications. However, they did not mention when the villagers would have to pay the second instalment.

The 13 villages including Wet-tae, Nyaung-gone, Kyaik-ywe, Taw-guu, Thagun-taing, Kawga-law have approximately 300 houses per village, according to a Nyaung-gone villager. About 300 electric boxes have already been booked for Nyaung-gone village.

Villagers are apprehensive that the power supply will be limited even after the meters are installed because even Mudon town residents only get a little electricity. A Mudon resident said that they get power supply for about an hour a week and it costs as much as K 500 a month.

Additional references

See above: 'Premium rates for electricity in Mon villages' (IMNA: 03/08/07)

See below: 'Padaung factories begin production of generators and meters' (NLM: 17/10/06)

Khonumthung News, 12/12/08.

<http://www.khonumthung.com/kng-news/2008-news-archive/dec08/authorities-collect-meter-box-control-bill/>

The Electricity Dept in Kalemmyo continues to collect a meter box service charge even though it has not provided electricity on a regular basis for the past three months. The department collects K500 monthly from each household with a meter box. The power lines of those who do not pay the monthly charge are disconnected. There are about 10,000 meter box users in Kalemmyo. Departmental staff said that a shortage of water at the local hydropower station and defects in the machinery at the station were responsible. . But military camps in the area continue to receive power on a 24-hour basis through a VIP transmission line. In the absence of regular service meter box users have turned to private electricity providers. The main source of power is the Yeechaung hydropower plant two miles from Kalemmyo.

Khonumthung News,13/09/08.

http://bnionline.net/index.php?option=com_content&task=view&id=4939&Itemid=99999999

The cost of electric meter boxes has been increased six fold by the electricity department recently in Falam township. Last year, the price of installation was K100,000 but now the authorities are charging K700,000, according to a local from Falam town. "People who are in need of meter boxes are finding it extremely difficult to buy now because of the price hike. We don't understand why they suddenly raised the price."

Despite the increase in prices, people are buying the meter boxes at the prevailing prices as there is no other way to get power supply except through the electricity department in Falam. 'Var' hydro-power house set up in 1975 supplies power to only nine villages in Falam township including Lungrang, Laizo, Congthe, Taisun, Congheng, Zamual, Var, Parte and Lumbang. for three hours daily from 6 pm to 9 pm.

Narinjara, 15/07/08. http://bnionline.net/index.php?option=com_content&task=view&id=4490&Itemid=1

In Maungdaw Township, residents have to apply to the township authorities to get an electric meter box and pay an official charge of K 150,000 if they need electricity supply from the government. However, after the authorities grant permission for a meter box, residents have to again pay K 16,000 to the EPC for installing the meter box in their house. Residents have to pay another K 5-10,000 to the individual EPC employee for a cover box for the meter. The cover box is made of wood and is hung on the wall of the home by the EPC employee when they set up the meter. After the meter box is finally installed, the EPC collects K 500 every month as a maintenance fee for the meter. The woman from Maungdaw said that she spent K 200,000 just to be able to get electricity, but the power is only available at her home from 7pm to 9 pm four days a week.

KNG, 21/02/08. http://www.bnionline.net/index.php?option=com_content&task=view&id=3593&Itemid=6

Residents in Lekone quarter of Myitkyina are being charged K 120,000 (US \$ 99) per household to set up a pylon on the main road to connect their quarter with the city's power supply. Most cannot afford to pay that kind of money. But those who apply for an electric meter box for their house can get it within six months. To apply for a meter box, they need recommendation letters from the authorities in the quarter. This is to prove that the house still does not have a meter box. The box has to be paid for by residents. Even if residents do get a meter box, the authorities need to set up the pylon and string the wires needed. The expensive part of getting electricity is paying for the infrastructure, according to a local resident. In Myitkyina, the KIO's Buga company provides most of the electricity to the town but most of it goes to the Burmese military army camp and its buildings.

Myanmar Times, 02/07/07. <http://mmtimes.com/no373/n007.htm>

Another reason for the shortage of electricity supplies in 2007 has been an increase in the number of commercial electricity meters from 589,599 in 2006 to 692,044 this year, according to figures from the YESB. The addition of more than 100,000 commercial meters comes in anticipation of increased electricity supplies following the completion of several major hydropower projects in the near future. Meanwhile, the same official said the board started installing household power meters earlier this month in Yangon households that also run cottage industries. The price of the meters is K 400,000 for 10 kWh, K 600,000 for 20 kWh and K 800,000 for 30 kWh.

DVB, 25/06/07. <http://english.dvb.no/news.php?id=194>

Residents of Pwint Phyu in Magwe division told DVB that the local branch of the national electric power company [MEPE] recently removed existing foreign-made meter boxes from local houses and replaced them with Burmese products that recorded much higher levels of electricity usage than normal. "This is happening all around town. They are removing our old meter boxes . . . In their receipts they said it cost 1000 kyat but they asked us for 7000 kyat, saying the extra would go to a Naypyidaw fund," one resident said on condition of anonymity. Another local said that the new meter boxes were recording between three and four times the amount of electricity usage as the older boxes. "Our old meter box was installed in about 1957 when electricity was first available here. It worked fine . . . I told them not to replace it because I couldn't afford a new one but they were like bandits," he said.

Shan Herald, 20/06/07

http://www.bnionline.net/index.php?option=com_content&task=view&id=1882&Itemid=6

Based on a promise to people in Mongton that they would be provided with electricity, authorities have been selling meter boxes to locals. The going price is K 1,500,000, said a local who arrived at the Thai-Burma border on June 15. About 400 meter boxes have been sold to people in Mongton town. All families living near a main road have to buy a meter box. Over 200 boxes were sold in Nakaungmuu. Electricity supply has been promised for August, though there are no transmission lines and lamp-posts on the road yet. A 75 MW-dynamo (sic) brought from China arrived in Mongton on May 25, the local added. "About 50 soldiers have been ordered by the Mongton-based strategic operations commander to work daily at hydropower sites. The soldiers are from IB No 65 and LIBs nos 553, 554, 227, 293, 225, and 519," a local close to the

army said. Two small hydropower projects are under construction. One is in Phaline-Namm Narnue, five miles north-west of Mueng Ton and the other, the Namm Kaung Narlue hydropower project is 10 mi from Mueng Ton–Mae Kin Road and 22 mi south of Mueng Ton.

Myanmar Times, 24/07/06. [Issue 326 of the MT is not available on-line.]

YESB is installing electricity meters in houses which currently have no connection, as part of a project launched in August last year to install 100,000 meter boxes across Yangon division. "So far, we have installed more than 90,000 new electric meters and plan to install more if they are needed," said U Tun Aye, chief engineer of YESB. "We've finished 95pc of the downtown area and now need to install them in the outskirt townships of Yangon."

NLM, 17/09/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030917.htm>

At the power station in Tachilek, Gen Aung Htwe of MoD was briefed on the power production capacity of the station and progress in the installation of the unit system. He gave instructions to provide power to the villages round the clock and to extend installation of meter boxes. The station is situated on a 24-acre site on Polo [Ponglo] Street in Haungleik village-tract in Tachilek. A project for ensuring all-day power supply to the town was launched on 17 April 2003. Up to 9 September, 528 meter boxes have been installed. Arrangements are being made to generate electricity using the current of Mehok Creek 20 km from Tachilek.

Shan Herald, 30/04/03. http://www.shanland.org/general/2003/few_buy_new_electricity_meters.htm

Since an official announcement was made in Tachilek on 1 April that meter boxes from Thailand would be replaced by those from a company contracted to supply electricity to the border city, not more than 30 have been purchased by townspeople, according to several local sources. The announcement by the township council stated that U Tar Wai, an ethnic Chinese partner of the Hongpang Co, had been engaged to provide electricity to the city. According to the notice, U Tar Wai has obtained 3,000 meter boxes that will have to be purchased at Bt35,000 each to connect to the service. U Tar Wai will be using three diesel-run generators during the day time and another three at night. The charge for the service is to be eight baht per kWh. Sources say most residents are reluctant to procure the new meter boxes because the service charge is much higher than the five-baht rate previously charged by Thailand and because the boxes will have to be replaced after only two years. Many have also bought their own generators since Burma cut off service from Thailand during a border confrontation between the two countries in 2002.

MYANMAR CASHES UP ON ENERGY, BUT LOCALS IN THE DARK

Hla Hla Htay, AFP, 15/04/07. www.burmanet.org/news/2007/04/16/

Military-ruled Myanmar has recently signed off on a raft of energy deals with its power-hungry neighbours, winning the junta a desperately needed income stream. But Chinese and Thai dams to be built on Myanmar's rivers to power their own economies and Asian companies drilling for natural gas off the coast to boost fuel exports are cold comfort for impoverished locals. Most have been left in the dark as blackouts stretch through most of the day, even as reclusive officials in Naypyitaw, the new administrative capital in central Myanmar, enjoy an abundance of energy. The sprawling capital, once a mountainous backwater and home to government and military offices since last year, boasts 24-hour electricity, amply lit streets with few cars and fairy lights that twinkle around ministry buildings.

That contrasts starkly with Yangon, the nation's biggest city, where people and businesses do without electricity for most of the day. They are hurting. "Now we average about four hours per day with power in our industrial zone, about a 50pc decline from eight hours per day in March," a businessman, who spoke on condition of anonymity, told AFP. "Many factory owners have mostly to rely on their own generators. The price of diesel is also going up now. But we have no choice," he added. "We were informed that the electricity distribution department has some technical problems. But we don't know when it will be in normal condition."

As of September last year, Myanmar had an installed capacity of 1,775 MW. Just one of the dams Thailand is building on the Salween river has a capacity to produce three times that amount.

Myanmar's official energy statistics provide some insight though many questions are left unanswered by bureaucrats responsible for administering one of the world's most isolated states. According to MEPE, 40pc of the electricity generated in 2005 was never sold to consumers or businesses. While some electricity is normally lost during transmission and distribution, the enormous shortfall has never been explained and electricity officials could not be reached for comment.

In Yangon, the nation's former capital and commercial hub, the power shortage is hammering a moribund economy and for many, the lack of power also means a lack of water as most pumps are electric. "We normally get power about six hours per day, but we can't do anything since it usually comes on at night," said Htwe Htwe, a 50-year-old Yangon housewife, who complained that the outages prevent her from cooking or cleaning. "My family has to eat leftover rice and curry. Our first priority is to get water when the power returns," she said. "For the last two weeks, we only get three hours a day."

Residents are especially chafed over the outages because the government hiked electricity charges 10-fold last year, earning authorities an extra eight million dollars in the first half of the 2006 fiscal year.

For those who can afford it, generators have become a necessity. But soaring demand for fuel has sent prices surging and created further shortages in an already unstable market, petrol dealers said. This has forced frustrated consumers onto the black market where prices are up about seven percent for petrol and diesel -- when it is available at all. Otherwise, people go without. "Many residents come to buy for their generators. But sometimes we have no petrol to sell," one black market dealer said.

Additional references

See other entries under the category 'Consumer Concerns and Power Shortages' [PS](#)

MYANMAR LEARNS TO LIVE WITH THE [LIGHTS OUT](#)

Aung Hla Tun, Reuters, 09/04/07. <http://www.burmanet.org/news/2007/04/09/>

Chronic power shortages in Myanmar are leaving cities shrouded in almost permanent blackout, driving its citizens to despair and crippling an economy reeling from decades of military misrule. "We've had only nine hours of electricity in the last three days," lamented Yi Yi Soe, a resident of the leafy colonial-era capital, Yangon. "Some of our neighbours have completely run out of water."

As with other problems in the once-prosperous ex-British colony, there is little explanation in the state-controlled media, which abound with pictures of generals inaugurating new hydropower projects and promising sufficient power "next year". Few people believe them. Instead, with a stoicism born of 45 years under military rule, they have learnt to live with the privations. "We haven't been able to use the washing machine for ages as the power never lasts long enough. It now serves as a laundry basket," said Yangon housewife Hla Myint, adding that all her other electrical goods were virtually worthless. "We recently decided to retire the rice cooker and we use the fridge as a cupboard. We've unplugged the cable and keep the crockery and glassware inside."

According to official data, in 2006 Myanmar could generate 1,775 megawatts of electricity for a population of 53 million. By contrast, neighbouring Thailand produces 26,000 MW for its 65 million people -- more than 12 times the power per capita. Small businesses such as photo-processing shops or Internet cafes need portable generators to get by and have to hike prices to reflect the high cost of diesel, nearly all of which is imported. "I now charge two different prices for photocopying: 20 kyat per page with government-supplied power and 50 kyat with my own generator," photocopy shopowner Kyi Aung said.

But the use of generators comes with hidden costs for the wider population, mainly in the form of noise and air pollution. "With all the blackouts, generator noise, diesel fumes and flash floods in the rainy season due to the choked drains, life here has become horrible," said Ba Tin, a retired civil servant. "My whole family

has developed a sort of migraine. We often get headaches and nausea, especially when the big diesel generators in the restaurants next door are running," he said.

Doctors and psychiatrists say they have had to treat an increased number of respiratory ailments and stress-related conditions, which they attribute to the noise and fumes. The situation grew so acute in February with the start of the hot season, when temperatures soar to 40°C (104° F), that a small group Yangon residents staged a rare anti-government protest. "Our cause is for 24-hour electricity" the protesters chanted before they were arrested.

The widespread use of generators also creates a massive fire hazard, and local papers are full of reports of neighbourhoods or blocks burnt to the ground due to an unattended generator overheating.

Beyond Myanmar's commercial centre, conditions appear to be even worse. Residents of Sittwe, the capital of the north-western state of Rakhine which is home to Myanmar's vast off-shore natural gas reserves, say they have not received any state electricity for a decade. Private companies sell power at K300 (US\$0.24) a unit, compared with K25 in Yangon, and even then the lights are only on from 7pm. to 10pm -- just long enough for the junta's propaganda blitz on state-run MRTV. "As soon as MRTV's evening news ends, the blackout starts," Sittwe resident Ko Aung Khine told Reuters.

The only place not suffering is Naypyitaw, the secretive junta's brand new administrative capital, purpose-built in hills and scrubland about 240 mi (385 km) north of Yangon. Many in Yangon believe the blackouts are a deliberate ploy to make the port city iso insufferable that government workers and others will be happy to move to the Naypyitaw, which remains little more than a building site. "It's very strange that all the roads are brightly lit even though they are almost deserted day and night, while the crowded roads in Yangon have no lights," economics student Saw Lwin said. "You can't help wondering if the government is forcing all of us to go and settle in Naypyitaw," added his father, Ba Tin. "With the blackouts here every day, we can't do anything."

Additional references

See other entries under the category 'Consumer Concerns and Power Shortages'. [PS](#)

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MOU ON [UPPER THANLWIN](#) HYDROPOWER PROJECT INKED

NLM, 07/04/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nln/n070407.htm>

EPM-1 Zaw Min received V-P Zheng Yuewen and party of the All China Federation of Industry and Commerce (ACFIC) of the PRC at his office, here yesterday. Also present at the call were DepMin Myo Myint, directors-general, Ch Li Hejun and officials of the ACFIC, MD Tun Myint Naing of Asia World Co and officials. They discussed implementation of the Upper Thanlwin hydropower project.

In the evening, a ceremony to sign an MoU on implementation of the project in northern Shan state between HPID and the Farsighted Investment Group Co Ltd and Gold Water Resources Ltd of the PRC was held at EPM No 1. In the presence of both electric power ministers Myint, and departmental officials V-P Zheng Yuewen and party of ACFIC and officials of Farsighted Investment Group Co Ltd and Gold Water Resources Ltd, MD Tun Myint Naing of Asia World Co and officials, D-G Aung Koe Shwe of HPID and CEO Li Hejun of ACFIC signed the MoU and exchanged notes.

HPID and Farsighted Investment Group Co Ltd will jointly implement Upper Thanlwin Hydro-power Project to generate about 2,400 MW.

Website

For a profile in English of the Hanergy Holdings Group, formerly known as Farsighted Investment Group Co, see <http://www.hanergy.com/en/ContentDir/999/2606.aspx>. According to the website, it is Hanergy's policy to acquire investment in its projects through the international capital markets. Foreign projects are under

consideration and subsidiaries involving companies or investors in foreign countries will be set up. One such company, Europe China Power BV, is mentioned and its wind and hydropower projects in the PRC are described. No mention is made of the hydro project on the Upper Thanlwin in Burma/Myanmar.

The following reference to the Jin'an Qiao hydropower station built by Hanergy Holdings near the border between Yunnan and Sichuan was posted by Dan Siekman on the GoYunnan website on 28/03/11. Information in the blog was attributed to the government-run Yunnan website. Condensed.

http://gokunming.com/en/blog/item/2134/construction_of_dam_on_jinsha_river_completed

The 2,400-megawatt Jin'an Qiao (金安桥) hydropower station on the Jinsha River downstream from Lijiang officially opened Sunday [27/03/11]. It is the largest hydropower dam ever built entirely with private investment, according to Yunnan Net. It was built by Hanergy Holding Group, a Beijing-based energy company that has also been involved in a dam project on the Salween River in Myanmar. The Jinsha is a major headwater of the Yangtze that flows out of Tibet, through Yunnan and to Yibin, Sichuan, where it joins the Min River to form the Yangtze. Located about 30 kilometers east-southeast from Lijiang, the Jin'an Qiao dam is part of an eight-step cascading hydropower project on the section of the Jinsha downstream from Lijiang. The other seven dams are presumed to still be under various stages of construction. Progress has continued on dam projects on the Jinsha despite environmental concerns and accusations that the companies building them began construction without first gaining government approval.

Map references

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-02: Hsenwi upstream from the Tarpa bridge dam near Ta-hö-hkao (23° 51' N, 98° 25' E), grid square reference 7\7, 39\3, and a mile above the Kunlong bridge, near Man Tongkep (23° 25' N, 98° 36' E), grid square reference 7\1, 39\6. <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-2.jpg>

http://www.burmariversnetwork.org/images/stories/publications/english/salween_watch_vol2.pdf

A map showing the location of the Ton Gyap hydropower project can be found in Vol 2, No 1, of the Salween Watch Newsletter, p 3. The accompanying comment on this project makes no reference to the original proposal to construct a second dam and power station at a location upstream from the Ton Gyap site.

Additional References

Data summary: [Kunlong](#)
[Tapar](#)

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

From a report to a meeting of the Special Projects Implementation Cte: The EPM-1 has the Upper Thanlwin (Kunlong) hydropower project that will generate 1400 megawatts under planning and development.

NLM, 26/02/10. <http://www.burmalibrary.org/docs08/NLM2010-02-26.pdf>

Hanergy Holding Group Limited (Hanergy) and Goldwater Resources Limited (GRL) of the PRC signed a Memorandum of Agreement with the Dept of Hydropower Planning of EPM-1 on 25/02/10. Following an address by EPM-1 Zaw Min, Chairman & CEO of the Hanergy Holding Group Ltd, Li Hejun spoke words of thanks. Among those present on the occasion was Director Chua Chay Jin of Goldwater Resources Ltd. Signing the agreement were D-G Kyee Soe of the Dept of Hydropower Planning and Hanenergy Chairman Li Hejun.

Shan Sapawa Environment Organization, *Roots and Resilience*, p 44 (July 2009).

<http://salweenwatch.org/images/stories/downloads/campaigns/rootsandresilienceenglish.pdf>

The Upper Kunlong dam site is on the mainstream of the Salween at Ton Gyap village in Kunlong township about 25 km from the Yunnan border. A team of Chinese and Burmese technicians has been conducting feasibility studies including the collection of geological samples,

CHECC Website, 11 March 2008. http://www.checc.cn/news/news.jsp?type=100&new_id=7254&target=

China Hydropower Engineering Consulting Group Co (CHECC), Kunming Hydroelectric Investigation Design & Research Institute (KHIDI), and China Hanergy Holdings Group (CHHG, formerly China Farsighted

Investment Group) met in Beijing in March 2008 to discuss the feasibility of the Kunlon dam project on the mainstream of the Salween River approximately 25 km from the Chinese border at Qingshuihe Port [Chinshwehaw]. [The text is in Chinese characters. This reference and translation was made available courtesy of the Burma team of Earthrights International. For more information see ERI's *China in Burma: The increasing investment of Chinese multinational corporations in Burma's hydropower, oil and natural gas, and mining sectors* (September 2008).]

<http://www.earthrights.org/files/Reports/China%20in%20Burma%20-%20BACKGROUND%20-%202008%20Update%20-%20FINAL.pdf>

Yunnan Province Overseas Operations Statistics Jan – Sep 2007). Department of Commerce of Yunnan Province Website, 22 October 2007.

<http://www.bofcom.gov.cn/bofcom/433477000347254784/20071022/167375.html>

The Department of Commerce of Yunnan Province reports that the Kunming Hydroelectric Investigation Design & Research Institute (KHIDI) signed agreements with Burma's Ministry of Electric Power for US\$ 5,270,000 in September 2007. The reference is in Chinese characters. For further information see ERI's *China in Burma: The increasing investment of Chinese multinational corporation in Burma's hydropower, oil and natural gas, and mining sectors* (September 2008).

NLM, 13/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070613.htm>

While in the PRC, EPM No 1 Zaw Min and EPM No 2 Khin Maung Myint visited the 2400-MW Gingchaung hydro-power project being implemented by the Farsighted Co in Lijiang, Yunnan province, where they met with Chairman Li Hejun and discussed matters related to the upper Thanlwin hydropower project and the connection of power lines.

NLM, 20/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070520.htm>

At Kunlon, Gen Kyaw Win of the MoD meets senior military officers of Kunlon and Laukkai Stations, local leaders and Chinese technicians conducting a feasibility study for the Upper Thanlwin hydropower project. North-east Commander Gen Aung Than Htut reports on a scale model of the 2,400-MW hydropower station and Lt-Col Maung Maung Myint of Kunlon Station on the choice of site for the project.

Kyaw Thu, Myanmar Times, 14/05/07. [Issue 366 of the MT is not available on-line.]

A decision on whether one or two hydropower projects will be built on the upper Thanlwin River in Myanmar will be made when a feasibility report is completed in 2008, an official from the EPM-1 said on May 8. The MoU signed on April 5 was to build a hydropower dam that will produce 2400 MW of electricity. But the ministry official said it remained to be decided if the groups would go ahead with a second dam, as the number of dams was not specified in the original MoU. "We will make a decision after finishing the report," he said, adding that this would be about a year away. The Chinese side had already proposed two projects between the towns of Konkyan and Kunlon in Shan State, one capable of generating 1160 MW and the other 1240 MW, the ministry official said.

NLM, 20/04/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070420.htm>

General Than Shwe stresses the need to implement the Upper Thanlwin project in the Kunlon region of Shan state as soon as possible.

NLM, 25/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070325.htm>

Report to the SPIC: The Upper Thanlwin hydel power project will be carried out in two phases. The first phase will be implemented on the Thanlwin river, a mile upstream of the Tarpa bridge in Kunlon township with a power plant of 1,160 MW. The second phases will be upstream of the confluence of Nanin creek and the Thanlwin. The power plant there will generate 1,240 MW.

China Southern Power Grid website, 28/12/06. <http://www.yndw.com/showinfo.asp?id=37407>

Message in Chinese characters under the heading: 'Survey Group Completes On-site Upper Salween River Survey'. Text of the message: Yunnan Power Grid Co. and Mid-South Design and Research Institute (CHECC) surveyed a 147-km section of the upper Salween River in December, 2006 .

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MYANMAR, THAILAND BEGIN WORK ON [CONTROVERSIAL TASANG DAM](#)

AFP, 05/04/07. www.burmanet.org/news/2007/04/05/

Myanmar and Thailand have begun building a controversial hydro-power dam on the Salween River, the as yet longest undammed waterway in south-east Asia, official media reported Thursday. Thailand's MDX Group Co Ltd has invested about six billion dollars in the Tasang project in eastern Shan State, which is the biggest of four planned dams on the Salween. The state-run *New Light of Myanmar* said construction began on March 30 -- a move likely to dismay environmentalists who had called for a delay to allow a public consultation on the project.

Activists say the dams could prove disastrous to Salween's delicate ecosystem and accuse Myanmar's military junta of using the dams as an excuse to evict thousands of ethnic minority villagers from their land. NLM said the dam, located about 45 miles (75km) from the Thai border in southern Shan state, would be 2,848 ft (868 m) long and 746 ft (227 m) high. "On completion, generators to be installed at the power station will have a total capacity of 7,110 MW and the project is expected to produce 35,446 million kWh yearly, the newspaper said. Senior officials from Myanmar's state-run energy firms and MDX Group attended an official opening ceremony.

Three more dams on the Salween near the Thai-Myanmar border are in the pipeline, mostly backed by Chinese state-owned energy companies. The United States and Europe have economic sanctions against military-run Myanmar to punish them for the ongoing detention of democracy leader Aung San Suu Kyi and other human rights abuses. But energy-hungry neighbours like Thailand, China and India are keen to exploit the country's abundant natural resources including energy, natural gas and timber, throwing an economic lifeline to the military junta.

Website references:

Aaron T. Wolf and Joshua T. Newton, *Case Study of Transboundary Dispute Resolution: Salween River*, (Oregon State University, 2007)

http://www.transboundarywaters.orst.edu/research/case_studies/Salween_New.htm

"China, Myanmar, and Thailand do not yet have an agreement on the use of the Nu/ Salween river, thus allowing each of them free use of the river. Each of these countries has unilateral plans to construct dams and development projects along the Salween, but these sets of plans are not compatible." Includes a case summary, a brief presentation of the problem, a statement on the issues involved, a map of the Nu/Salween river basin, a table on features of the river. Especially useful is a timeline section summarizing plans by the three countries to develop hydropower projects on the Nu/Salween.

<http://www.gzbgj.com/english/article.asp?id=823>

This website provides a brief introduction to the China Gezhouba Group Corporation which has been involved in the construction of over 100 large hydroelectric projects in the PRC and in many parts of the developing world, as well as nuclear and thermal power projects and other engineering and construction projects for almost forty years.

Map references:

Several maps of the area where the Tasang dam will be located are available in *Warning Signs: An Update on Plans to Dam the Salween in Shan State*, (Shan Sapawa Environmental Organization [SAPAWA], 2006). See the maps on pp 7, 11, 16, 22, 23 and especially 24 which shows the area that will be flooded if the dam is built to the proposed height of 224m. <http://salweenwatch.org/downloads/warning%20sign.pdf>

See also the map on the Shanland website:

http://www.shanland.org/environment/2004/Dam_on_the_Salween_definitely_on.htm

Burma 1:250,000: Series U542, U.S. Army Map: NF 47-14: Mong Pan
Tasang dam, near Wan Kawpa [20° 31' N, 98° 38' E], grid square reference: 11\8, 28\4
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-14.jpg>

Additional references

Data summary: [Tasang](#)

See above: 'Chinese [firm takes 51% interest in Tasang](#) hydropower project' (MT: 19/11/07)
 'EGAT [agreed only](#) to study feasibility of Salween project' (BKBP: 10/06/07)

Thailand Burma Border Consortium, Internal Displacement in Eastern Burma: 2007 Survey, October 2007.
<http://www.tbbsc.org/idps/2007-idp-english.pdf> [doc 38]

The Ta Hsang dam in Mong Pan remains the largest single project to have caused development-induced displacement in southern Shan State, given that 30,000 people have already been forced to leave their homes.

Platts Myanmar Country Energy Profile [mid-2007]. For access information, see [Power Profile](#).

In April 1998, Germany's Lahmeyer International finished a project pre-feasibility study for the Tasang dam and hydroelectric project on the Salween (Thanlwin) River. In December 1998, Japan's Electric Power Development Co (EPDC) (now J-Power) received a \$796,000 contract from GMS Power Public Co Ltd (GMS) for a feasibility study of what was then planned as a 3,300-MW plant. This study was finished at the end of 2000. In May 2002, it was reported that a soil survey team from Thailand's MDX Co, the parent of GMS, was working in the Tasang area. With a proposed height of 230m, the 870-m- long dam would be the highest in southeast Asia and the first dam to be built on the mainstream of the Salween. It is opposed by both environmental groups and human rights activists. In April 2006, the Myanmar EPM signed a development agreement for the US\$ 6-billion project with MDX with completion scheduled around 2020. In April 2007, the official Myanmar media reported that implementation was underway for Tasang, now listed at 7,110 MW. The site in southern Shan state is 53 km west of Mongton and 480 km northeast of Yangon. Tasang is a joint venture of Myanmar's EPM, together with MDX, Ratchaburi Co, and CH.Karnchang Co of Thailand and China's Gezhouba Water and Power Group Co Ltd. Annual output is expected to be 35 TWh. Electricity from the plant is mostly designated for export to Thailand with some to be supplied in Myanmar. The actual status of plant construction is unknown.

Shan Herald, 05/07/07 http://www.bnionline.net/index.php?option=com_content&task=view&id=1977&Itemid=6

Construction of the Salween-Tasang dam by the MDX Co has ground to a halt because of incessant rain which began with the onset of monsoon in early June. The Salween has overflowed its banks leading to the stoppage. Twenty on-site construction workers have not gone back home. They are housed along with construction materials in two big warehouses on Tang Pa Laung hill, 50 yds east of the construction site. "Bamboos and pipes have been put under the digging hole near both sides of the Salween River bank." Soil from the digs is brought by boat to Tasang. The construction site in Tang Pa Laung port is 15 minutes from Salween-Tasang bridge by boat and 20 minutes from Ta Hsar Lar village on the east side of the Salween by car. Loi Hsai mountain is located on the west side of the Salween opposite Tang Pa Laung.

Michael Casey, AP, 12/04/07. <http://salween-watch2.livejournal.com/2007/04/12/>

Thousands of villagers could be displaced and a fragile ecosystem destroyed by Tasang hydropower project on Salween River, the World Wildlife Foundation (WWF) said today. WWF claims damming the Salween will 'displace and negatively impact upon tens of thousands of poor and marginalized people from ethnic minorities in that country'. "The Salween is the only free-flowing river linking the Himalayan glaciers to the coastline of the Andaman Sea," said a statement from Robert Mather of the WWF's Living Mekong Program. "We are destroying the Salween before we even know what we're losing," Mather said. "From what little we do know about its large number of endemic fish species and abundance of freshwater turtles, we can conclude it is likely to be globally exceptional." A Myanmar gov't spokesman, Ye Htut, said the dam site is in a remote area and "very few people will need to be relocated for the hydro project." "The Myanmar government will use every means to limit (the) environmental effect," he said. "But we should not forget that industrialized countries have caused more damage to the environment than developing countries and have given very little assistance to environmental conservation works in developing countries."

International Waterpower & Dam Construction, 11/04/07. <http://www.waterpowermagazine.com/story.asp?sectioncode=130&storyCode=2043576>

Construction works on the project will involve building a 876m long, 230m high concrete dam, and two 8m diameter tunnels the longest of which will be 1.2km long.

NLM, 05/04/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nln/n070405.htm>

A ground breaking ceremony for the Tar-hsan hydropower project on the Thanlwin [Salween] river in eastern Shan state took place on 30 March. HPID and MDX Group Co Ltd are implementing the project, 33 miles west of Mongton, in a joint venture. Deputy EPM No 1 Myo Myint, Deputy D-G of HPID Win Kyi and Dr Subin Pinkayan of MDX cut the ribbon to launch the project. The concrete dam will be 2,848 ft long and 746 ft high. The generators installed at the power station will have a total capacity of 7,110 MW and the project is expected to produce 35,446 million kWh yearly. Also present on the occasion were officials of Ratchaburi Co [Egat Holding Plc], <http://www.ratch.co.th/eng/home.aspx>, CH.Karnchang Plc <http://www.ch-karnchang.co.th/> and China Gezhouba Water & Power Group Co Ltd <http://www.gzbgj.com/> that hold shares in the project.

Shan Sapawa Environmental Organization, 29/03/07.

http://www.salweenwatch.org/March29_SAPAWA_PressRelease_Eng.html

At least 400 villagers, including schoolchildren, from Mongton and Mongpan are being trucked to a ceremony to launch construction of the Tasang Dam at the dam-site, where they are being forced to welcome high-ranking Burmese military officials arriving by helicopter. Those attending the 'celebration' include villagers already forcibly relocated from their homes north of the dam-site. In the past ten years, the Burma Army has relocated over 60,000 villagers from areas adjoining the dam site and the projected flood zone. "These villagers have already been driven at gunpoint from their homes and lands. Now they are being forced to clap and cheer while MDX joins hands with their oppressors to construct a dam that will flood their homes for ever," said Sapawa spokesperson Sai Sai. "MDX has been working in this area for almost ten years. How can they be so blinded by profit that they don't see the abuses going on around them?" MDX has turned to China for investors in the project. Increased Chinese involvement was highlighted earlier this month, when the China Gezhouba Group announced on March 15 that it had won a contract for part of the initial dam construction. Recent reports have indicated that the Yunnan Power Grid Corp has also visited the dam site.

China Gezhouba Co website information, 15/03/07 <http://www.gzbgj.com/article.asp?id=749>

A four-line news release in Mandarin titled: 'News of Victory from Burmese Market Developments'. The China Gezhouba (Group) Co (CGGC) received a notice from the Burma Tasang Hydropower Co stating that CGGC had won a bid to construct the diversion tunnel for the Tasang C2R hydropower plant. Since its 2005 entry into the Burmese market, the China Gezhouba (Group) Co. has relied on its strength, outstanding achievement, and good reputation, to win a succession of bidding projects and become Burma's most welcomed Chinese company. The Tasang 7260-MW C2R hydropower plant diversion tunnel project follows CGGC's work on the Yeywa and Piaoliang projects. This project is located at the middle section of the Salween River, and over the course of 32 months will involve the construction of two 8m diameter tunnels for a total length of 1,200m. This project is wholly undertaken by the company.

Myanmar Times, 02/10/06. [Issue 336 of the MT is not available on-line.]

Myanmar's HPID and Thailand's MDX Group will form a J-V to undertake construction of the Tasang hydropower project, an official from EPM No 1 said last week. "We expect to form a J-V before the end of the year," said the official, who requested not to be named. The Tasang project, to be built on the Thanlwin River in Shan State, will be the largest hydroelectric power plant in Myanmar and the biggest Thai investment in the country. The ministry official said plans for the power plant had been finalised and tenders from companies seeking to provide construction materials for the project would be called for as soon as the joint venture company was formed. Myanmar's Hongpang General Trading Co Ltd had already expressed interest in participating in the project, the official said. HPID was currently building accommodation for workers employed on the project, he said, adding that the project would employ some 15,000 people over the course of its construction. The Tasang project would take place in several phases, with a 200-MW plant being built first. "Firstly we will build diversion channels from the Thanlwin River and we will produce 200 MW from this," he said, adding that this approach of building a smaller power plant first was very rare in such projects. The smaller power plant would be operational in two or three years, he said. Work on the Tasang project started a decade ago and a pre-feasibility study commenced in October 1997 with Lahmeyer International GmbH of Germany as consultant.

Warning Signs: An Update on Plans to Dam the Salween in Shan State, (Shan Sapawa Environmental Organization [SAPAWA], 2006). <http://salweenwatch.org/images/stories/downloads/publications/warning%20sign.pdf>

This 32-page booklet provides useful background for an understanding of the area in which the Tasang dam will be built and developments prior to publication in 2006. It includes details about the military build-up and security operations, logging operations, forced removal of villages and environmental issues related to the proposed construction of the dam. Maps and pictures accompany the text.

AP, 20/05/06. http://thestandard.com.hk/news_detail.asp?we_cat=9&art_id=19647&sid=8151732&con_type=1&d_str=20060530

In 2002, the ADB studied the Tasang dam as part of a master plan for a regional power grid. But it backed away, voicing "serious socio-environmental concerns." Rajat Nag, who heads the bank's Mekong Dept, says: "It didn't pass our first filter. The dam would have a profound impact on the Salween river. The project would fragment a fragile river ecosystem, reduce the flow of nutrients and water downstream and reduce the biodiversity. Deforestation is likely and would lead to soil erosion in the rainy season which would exacerbate flood damage."

NLM, 21/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060621.htm>

At the site of the Tarhsan hydel power project on the Thanlwin River between Mongpan and Mongton townships, V-P Noppon Prapaitrakul of the MDX Group reported to EPM No 1 Zaw Min on progress of the project and future tasks. The minister gave instructions on environmental conservation, the health and social needs of local employees and worksite safety. Then the minister inspected a scale model of the project site and the sites for the embankment, two diversion tunnels and the hydel power plants, as well as construction of the staff quarters, offices and the road. Next, the minister and party oversaw completion of a 150-kW hydel power station near Wamsala Village. The preliminary engineering works of the project commenced in the early 2004. The plan includes construction of a 200-MW power plant in the first phase, three 771-MW plants in the second phase, and seven 771-MW plants in the third phase. On completion, the project will generate 7,310 megawatts.

NLM, 04/04/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060404.htm>

A joint-venture agreement on the Tasang hydropower project between the DHP of the EPM and the MDX Group of Thailand was signed in Yangon today (03/04/06). The project will be implemented on the Thanlwin [Salween] river in southern Shan state. About US\$6,000 million will be injected into the project which is expected to have a generating capacity of 7,110 MW. "It will supply a certain amount of electricity free to areas in Myanmar and the rest will be sold to Thailand." D-G Win Kyaw of the DHP and ED Roy Jutabha of the MDX Group inked the agreement on the joint venture. Pre-engineering tasks of the project, which is expected to completed within 15 years, started in early 2004.

NLM, 21/12/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n021221.htm>

An agreement between the Dept of Hydel Power of the MEP and the MDX Group of Thailand on construction of the Tasang hydel power plant on the Thanlwin river was signed at the International Business Centre in Yangon this morning (20/12/02). Director-General U Win Kyaw of HPD and Managing Director Swarnng Champa of MDX explained matters related to the project. The plant, which will be capable of generating 7,110 megawatts on completion, is to be constructed on the Thanlwin river. The first phase of the project includes installation of three 711-MW generators with other equipment to be installed every year. Electricity generated from the plant is to be sold to Thailand and the south-east Asia region. Power will be supplied for local use in accord with the ratio of shares held by Myanmar. The agreement to set up a joint-venture company is an important step in the implementation of the project.

BKK Post, 18/12/02. www.burmalibrary.org/TinKyi/archives/2002-12/msg00021.html

The Thai Senate foreign affairs panel has called on EGAT and MDX Plc, a construction group, to scrap projects to build dams on the Salween river in Burma, citing concerns for national security and image. Panel chairman Kraisak Choonhavan said the projects would lead to more human rights violations in Burma, thus forcing more oppressed Burmese people to seek refuge in Thailand. Thailand already had to deal with more than four million illegal Burmese immigrants. If the government gave the projects the go-ahead, the problem of illegal labour and refugees would worsen, the senator said. The Senate would raise the issue with PM

Thaksin Shinawatra, the Foreign Ministry and EGAT, he added. Nassir Archwarin, of the Thai Action Committee for Democracy in Burma, said the dams would destroy one of south-east Asia's richest river ecosystems. The Salween was the lifeline of more than 10 million people in 13 ethnic groups, he added. Mr Nassir yesterday handed a petition to Mr Kraissak calling on the Senate to stop the government and agencies concerned from supporting the projects. The petition was backed by Burma's opposition NLD party led by Aung San Suu Kyi, as well as 69 Thai and Burmese NGOs working on environment and human rights issues.

Shan Herald, 25/05/02.

http://www.shanland.org/environment/2002/dam_on_the_salween_project_reviv.htm/

The New Era Journal, in its May issue, reports the revival of the Tasang hydroelectric dam on the Salween. It said that a soil survey team from Thailand's MDX Co was in Tasang on 16 April. A recent report reaching the S.H.A.N. supports this claim. It told of the arrival of a Myanmar-Thai Joint River-course Survey Project in Mongton, 60-miles north of the Chiangmai border on 16 April. The 36-man team brought 3 motor vehicles, 146 items of equipment and 10 ICOM radio transmitters with them. Two LIBs have been assigned for security. Another source confirmed that the MDX had "indeed returned" after securing the assistance of Somkid Onman (aka Sia Ord) of the Thai Saward Co, whose 13 year experience of working in the area were considered to be an asset. Exploration of the Salween began in 1997 by GMS Power, a subsidiary of MDX, and continued until the end of 2000.

Snow Mountains Engineering Corp (SMEC) website.

http://www.smec.com.au/countryexp/pdf/Myanmar_Burma.pdf

Between 2002 – 2003, SMEC undertook the design and documentation of the electrical and mechanical works for a low head plant which had been investigated in earlier studies as an early generation facility to utilise water from the diversion tunnels during construction of the Ta Sang project. Services included detailed design of the E&M plant for a 4 x 50 MW low head plant, including optimisation of project layout; determination of design parameters and selection of main plant items; concept design of a 132-kV GIS switchyard; preparation of tender documents and drawings for all E&M works; and liaison with associate firm (Colenco) on civil works design and drawings.

Snow Mountains Engineering Corp (SMEC) website.

http://www.smec.com.au/countryexp/pdf/Myanmar_Burma.pdf

Consulting services for tender design and documentation of the 6,400-MW Tasang hydropower project was awarded by Siam Power and Electric Co Ltd to the association of Colenco Power Engineering Ltd and SMEC, with SMEC primarily responsible for the power station, covering both the civil works and electrical and mechanical plant. From 2001-2004, services provided included a review of the feasibility study, power system studies encompassing both the Thailand and Myanmar HV electrical transmission systems, preparation of an Inception Report, reservoir operation studies, preparation of Interim Report detailing conceptual design and recommended development, and preparation of tender design, specifications and tender documentation for the power station civil works and electrical and mechanical plant including turbines, generators, and electrical and mechanical auxiliary plant.

Images Asia, November 1999. www.ibiblio.org/obl/docs/SW03.htm

Tasang hydropower project studies have been carried out by GMS Power Plc and consultants working for it. GMS Power is a subsidiary of the MDX Group, an influential Thai holding company that includes former senior MP's and ex-directors of EGAT. MDX is also involved in dam projects in Laos, Cambodia and Yunnan. According to leaked documents, GMS signed a contract with the Myanmar Economic Corp (MEC) in September 1997. It then subcontracted Lahmeyer International, a German consulting engineering firm, to assist with a pre-feasibility study. The GMS reps are quoted as saying the desk, reconnaissance and pre-feasibility studies were done at the same time, starting from November 1997. This study was completed and submitted in April 1998. The Electric Power Development Corp of Japan (EPDC) was contracted to carry out (or assist with) a feasibility study. According to GMS sources, this feasibility study was done between Oct 1998 and Mar 1999. This is borne out by local and NGO observers who reported that Thai, Japanese and other foreigners visited the Tasang site and carried out sampling activities during this time, although they did not stay long.

Images Asia, 12/01/99. [not available on-line]

Surveying for the Tasang dam on the Salween River in Shan State is seriously underway. The first reports started arriving in Oct 1998. The main company involved is MDX Power, whose staff were crossed the Thai border at Nong Ook (up from Chiang Dao in northern Chiang Mai prov) and travelled by road to the Salween River north-west of Mongton. Further reports received in Dec 1998 and early Jan 1999 have confirmed that the dam is being planned for the Tasang area above the place where a major bridge is being built across the river at Tasang. There is a heavy Burmese military presence in the area. The survey area covers a distance about one-and-a-half hours by boat south of the confluence of the Nam Hsim river with the Salween and north of the village of Wansala. The site where most of the survey activities are being carried out is where the Salween passes through a steep gorge. The surveyors, assisted by Burmese army engineers have begun dynamiting and drilling a number of deep holes into the rocks at the base of the gorge and along the river. Teams including about 20 Japanese have been travelling together with Thai staff from MDX by road and boat to the dam site. Security is provided by the Burmese army. The dam is ostensibly being planned to divert water from the Salween into Thailand, as well as to produce electricity for Thailand and Burma. It is said that it could produce an estimated 3,700 megawatts of electricity. Dr Subin Pinkayan, a senior MDX advisor and former government minister, has approached the Shan opposition not to obstruct the survey activities. The logging company Thai Sawat, which has held concessions in the area since the late '80's, is closely co-operating with MDX in the survey.

LOW WATER LEVELS HINDER POWER DISTRIBUTION

Ye Lwin, Myanmar Times, 02/04/07. [Issue 361 of the MT is not available on-line.]

Although Myanmar increased its potential electricity output to 1572 MW last month, only about 70pc of this total is currently being distributed because low water levels are forcing hydropower projects to operate below capacity, EPM No 2 Khin Maung Myint said last month. The completion of the Yenwe hydropower project in Bago division in February boosted total electricity output from 1546 MW to 1572 MW, he told a meeting of industrialists at the office of the Hlaingthaya IZ Management Cte. However, he said that although it was possible to supply 24-hour electricity from July to December due to abundant rainfall, low water levels in reservoirs at hydropower projects from January to June made it difficult to deliver regular power supplies throughout the country.

The minister also said electricity demand has exceeded supplies because of residential and industrial development since 1988, and because of increased use of air conditioners and refrigerators in recent years. In 2006, about 410 MW of power was distributed to Yangon division, while the rest of the country shared about 600 MW, he said.

The Ministry of Electricity was split into two separate entities last May, with the EPM No 1 responsible for hydropower projects and the EPM No 2 overseeing the transmission and distribution of electricity, in addition to managing the generation of electricity by natural gas supplied by a pipeline from the offshore Kanbauk field.

"EPM No 2 has been collecting about K10 billion to K13 billion a month in electricity charges so far this year, a dramatic decline from the K16 billion it was bringing in last year during the football World Cup," the Minister said. The government provides a subsidy of K25 per kWh for electricity consumption by the public. The industrial sector, which is not subsidised, is charged K50 a unit. The government has said it plans to supply 24-hour, year-round electricity throughout the country in 2008 and boost electricity output to 5,000 MW sometime in the future.

Additional references

See above: ['Full reservoirs to boost hydropower'](#) (MT: 19/11/07)

See also other articles under the category 'Overview'. [OV](#)

INDUSTRIAL ZONES TO RUN AT NIGHT

Ye Lwin, Myanmar Times, 26/03/07. [Issue 360 of the MT is not available on-line.]

All private factories in Yangon industrial zones from April 1 will be allowed to operate at night in order to raise the industrial sector's output, according to an order from a senior government official. Gen Myint Swe of the MoD informed the Yangon IZ's Management Cte of the decision to extend operating hours from next month during a meeting at the Hlaingthaya IZ on March 11. Currently, private factories are only permitted to operate from 8am to 6pm.

"The economic development of the country depends on progress made by Yangon's economy. Only when the economy of Yangon is successful will the economy of the country be strong. Next to Naypyitaw, Yangon will remain as country's main commercial city," Lt Gen Myint Swe said when announcing the decision. Employers would need to reach their own agreements with staff for operating a nightshift, he added. The decision affects more than 1,500 factories and 120,000 workers.

U Myat Thin Aung, president of the Hlaingthaya IZ Management Cte, told the Myanmar Times that extended factory hours would be beneficial for "all parties – labourers, employers and the country". "By operating a nightshift, there will be more working hours and the labourers will earn more wages than usual," U Myat Thin Aung said.

Lt Gen Myint Swe's pledge that electricity would be supplied at night would also benefit companies because their production costs would fall as their consumption of diesel used to run generators would be reduced. EPM No 2 Khin Maung Myint, said at the March 11 meeting that the industrial zones would have priority in Yangon's electricity distribution in order to strengthen the sector and raise the division's gross domestic product.

U Myat Thin Aung said channelling more electricity to industry would generate more revenue for the YESB since factories pay twice as much per unit as households do. Yangon's GDP in the 2007-08 financial year, starting April 1, is targeted to reach K2.38 trillion, Lt-Gen Myint Swe said. Yangon's GDP was K790 billion in 2005-06, according to the Yangon DPDC. The regular working week for factory employees is currently considered to be 48 hrs/wk, with a maximum additional 28 hours of overtime.

Additional references

Ye Lwin, Myanmar Times, 24/09/07. http://www.mmtimes.com/no385/b_brief.htm

In September, the YESB increased power supplies to all industrial zones in the city, said U Myat Thin Aung, president of the Hlaingthayar IZ Management Cte. All IZs in Yangon are receiving 24-electricity every third day and 18 hours of power on other days. The increased supplies "will be very convenient for manufacturers as it significantly saves on production costs", he said, alluding to factories' frequent use of more expensive diesel-powered generators during blackouts. There are some 1,500 factories in Yangon industrial zones which pay K50 per unit of electricity, compared with K25 for residential users. "If the factory uses diesel to generate electricity, per unit costs are much higher than what the YESB charges," U Myat Thin Aung said. The YESB is expected to cut back electricity supplies again when lake levels at the country's hydropower stations fall after monsoon.

Ye Lwin, Myanmar Times, 09/01/06. [Issue 299 of the MT is not available on-line.]

The industrial sector has been urged by the Government to advance its position alongside other economic sectors, such as the agricultural and service sector, and play a more dominant role in Myanmar's economic growth. Speaking at the 12th annual general meeting of the Myanmar Industrial Association (MIA) in December, Lieutenant General Myint Swe, chairman of Yangon Division Peace and Development Council, said diversifying Myanmar's economic base was a key platform to growth. "At present, the most important thing for the industrial zone is to get an adequate electricity and fuel supply," Lieutenant General Myint Swe said. More than 450 MW of electricity are needed for the 10 industrial zones as well as for residents in the Yangon vicinity but only 420 MW is currently being provided, of which 380 MW can be applied at a time. "Projects are underway to provide 5000 MW (nationwide), not only for consumption by the industrial sector

but also for domestic, personal consumption. So far, more than 840 MW can be provided across the country," Lieutenant General Myint Swe said.

See also other articles under the category 'Industrial Use'. [IU](#)

NATURAL GAS WELLS SUPPLYING POWER IN KAYAN TOWNSHIP

NLM, 26/03/07. <http://burmalibrary.org/docs2/NLM2007-03-26.pdf>

During an inspection tour of Thanlyin, Kayan and Thongwa townships in Yangon South District, Lt-Gen Myint Swe of the MoD together with Maj-Gen Hla Htay Win and Col Thaung Win of Yangon Division Renewable Energy Research and Development Technology Committee attended a ceremony to open a natural gas-run power supply project in Kayan township.

In his remarks, Chairman Hla Htay Win said that implementation of natural gas-fired power supply in Daepauk model village said his committee had made field trips to Daepauk model village on two occasions with the intention of testing natural gas wells there. The committee had submitted reports showing that enough natural gas could be generated to supply power for the area. As a result Yangon DPDC had spent over K 20 million to implement the power supply task. Now, people from over a thousand houses in four villages were enjoying the fruits of this endeavour. He urged all to participate in rural power supply task.

Lt-Gen Myint Swe and party inspected the generation of natural gas-fired power to the people, lamp posts and gas tanks. A total of 526 two-foot fluorescent tubes in houses, 12 TVs and 147 two-foot fluorescent tubes in [street] lamp posts in Daepauk Model Village are being supplied 36 kwh through 12 generators fed by 29 gas wells. A total of 84 fluorescent tubes and two TVs in Dawbonsu Village are being supplied 7.5 kwh through one generator fed by three gas wells. A total of 285 fluorescent tubes and five TVs in Gwaybinchaung Village are being supplied 15 kwh through five generators fed by 10 gas wells. A total of 22 fluorescent tubes and one TV set in Shwebosu Village are being supplied 3 kwh through one generator fed by two gas wells.

Arrangements are also being made to supply power to cottage industries in the villages.

Compiler's note: As far as I can discover, this is the only published reference to the small-scale generation of electric power from natural-gas fired generators in rural Myanmar.

ADVANCED INSULATOR FACTORY PLANNED FOR CHAUK

The entries included under this heading in previous editions of the compendium can be found under 'Advanced [insulator factory](#) opened in Chauk township' (NLM: 04/09/10)

YANGON INDUSTRIALISTS URGED TO INCREASE PRODUCTION

NLM, 12/03/07 <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070312.htm>

Lt-Gen Myint Swe of the MoD met with chairmen of IZ management ctes and industrialists from the IZs of Yangon North at Kanaung Hall in Hlinethaya township this afternoon. The chairman of Yangon North District IZ Management Cte, U Thein Naing, and other management cte chairs reported on investment and other matters in their zones.

EPM No 2 Khin Maung Myint presented reports on the generating of power in the entire nation and the supply of power to Yangon City and IZs. Chairman Hla Htay Win of the Yangon DPDC explained that 30pc of the net production of Yangon division comes through the industrial sector. Due to increased power this

year, industrial zones have been able to boost their production. He said industrialists should use websites to announce matters related to the products of their factories with a view to attracting local and foreign consumers.

D-G Aung Win of the Dept of Human Settlement and Housing Development submitted reports on arrangements for setting up Thilawa IZ and maintenance of roads in the zone.

In his instructions, Gen Myint Swe said that as Yangon is a commercial centre, the economic development of Yangon division reflects the growth of the national economy. Industrialists should assume their role in making the economy boom and, for its part, the government would respond to their requirements. He stressed the need to manufacture import-substitute products and to penetrate foreign markets.

Additional references

See above: 'Industrial zones to run [at night](#)' (MT: 26/03/07)

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HOMEGROWN SOFTWARE INDUSTRY STRUGGLES ON

Ye Kaung Myint Maung, Myanmar Times Supplement, 12/03/07

<http://www.mmtimes.com/feature/electronic/e019.htm>

Producers of computer software in Myanmar have battled hard to forge an industry for themselves in the last decade as the country has slowly been pulled into the digital revolution. A narrow market, widespread piracy, negative attitudes to locally made products and the lack of a reliable network infrastructure have forced developers to work hard for every inch of market share they have gained.

Software developers classify their products into either ready-made or tailor-made programs. Readymade software is developed to satisfy a wide ranging market – dealing with issues faced by many people in different places. But tailormade software is made to fill a specific gap. This usually requires the user – after the software has been developed – to undergo training just to be able to use it.

Ko Saing Nay Htut, marketing manager of iNTEGRA Systems Company, said the most popular markets for software were the accounting, sales and human resources sectors. iNTEGRA Systems has produced a widely known program called “iLedger”. It combines accounting software, human resources management software and the “iStock” sales control system in one handy package. Myanmar’s software industry enjoyed a small time of prosperity in the years leading up to the banking crisis in 2002. In that ‘boom’ time the international delivery service company DHL and several up-and-coming banks ordered a number of tailormade programs. But the banking crisis put an end to that prosperity and some of the foreign banks closed shop and left Myanmar.

The condition of the country’s marketplace today has led software development companies to focus on small and medium enterprises, according to Ko Saing Nay Htut. “We developed some readymade software but we market and sell in tailormade form,” said Ko Saing Nay Htut. “For example, iLedger covers all common processes in accounting but we can also modify it and add additional features when users give us specific requirements,” he said.

Local software programmers face a constant struggle against illegal pirate software CDs. These discs are imported and duplicated in Myanmar. They are available on the market for about K1,000 (less than US\$1) and only require installation in the computer. These illegal products have heavily influenced user attitudes toward software. But locally made products have continued to survive in competition against illegal imports by being cheap and by offering special features and handy maintenance services. “Even if the foreign-made software programs were perfect, there would be still a place for local developers who know exactly what the users need and can tailor programs to suit. We often include Myanmar language font systems that foreign programs don’t bother with.”

INTEGRA Systems has also begun planning for future product needs. "We are now upgrading our products to be compatible with Window's Vista platform. But until now, there have been few Vista users," Ko Saing Nay Htut said.

Recently, some local companies have begun importing foreign software and penetrating local markets by providing additional services – just like local software developers. Daw Lwin Lwin Myint, manager of IT Myanmar, a local company that markets the Malaysian-made software, Mr Accounting, said the company has been providing services similar to local software developers. "Mr Accounting focuses on business procedures in countries like Myanmar. It includes user-friendly interfacing systems, multicurrency systems and an automatic depreciation function. It can be used on either client-server types or stand-alone types. We provide free service for six months and allow two staff members from the buyer's company to join the computer accounting courses we have," Daw Lwin Lwin Myint said.

U Ye Myat Thu, from Mandalay Computer Industry Ass'n, said people's attitudes were vital for the development of IT businesses. "Most Myanmar people have no idea about the value of computer software, many think they will only pay for the hardware and get the software for free. Entrepreneurs want to spend their money on advertisements and promotion instead of investing in software for the long term," he said. "Information technology is just a tool to assist, not a solution. That's what IT technicians always say. Some of them think it makes no difference using better software. But others overestimate software and think it will solve everything. I think the truth is somewhere in the middle of those two viewpoints," U Ye Myat Thu said

Additional references

See also other articles in the 'Electronics' supplement of the Myanmar Times edition of 12/03/07
<http://mmtimes.com/feature/electronic/feamain.htm>.

See above: 'Yadanabon cyber city slated for soft opening in September' (MT: 24/09/07)

See below: 'Collaborate on contracts, ICT sector urged' (MT: 12/12/05)

'Electronics industry spreading roots in industrial sector' (NLM: 06/06/04)

'Software growth badly in need of human touch' (MT: 16/10/00)

ASIAN ELECTRICAL APPLIANCES VIE FOR MARKET SHARE IN MYANMAR

Ye Lwin, Myanmar Times Supplement, 12/03/07. <http://www.mmtimes.com/feature/electronic/e015.htm>

Sales of electrical appliances have risen steadily in recent years and become one of Myanmar's main imports, according to figures released by the Commerce Ministry. Electrical appliances imported through border trade from China and Thailand have gained a foothold in the market and are competing against well-known brands from Japan and South Korea, said retailers and distributors. Consumers can choose from among about 20 brands of imported appliances, of which up to 90pc are from Asian countries. About a third are from China and the balance from other countries, mainly South Korea and Japan. Televisions and MP3 or MP4 portable music players which are made in China and imported through the border checkpoint at Muse have a strong share of the market.

But refrigerators and DVD and VCD players are mainly imported from Thailand through the Myawaddy border checkpoint, said U Htay Aung, manager of the Advance Electronic Retail Shop in downtown Yangon. "The prices of electronic goods from China and Thailand are relatively low compared with other brands and are within the reach of ordinary people," he said, adding that most consumers opted for Chinese products. U Htay Aung said televisions and DVD players were the top sellers in the electronics market. "Sales of DVD players are rising at an unprecedented rate compared to other electronic goods," he said. However, sales of televisions had declined and were averaging about 150 units a month, about half that in 2006, U Htay Aung said.

Meanwhile, Samsung has launched a campaign to promote sales in Myanmar of its high-tech televisions, said U Myat Thin Aung, the chairman of AA Electronics Co Ltd, the South Korean company's sole distributor

in Myanmar. The campaign follows a survey by Samsung which found that sales of televisions with liquid crystal display or plasma screens were increasing throughout the world. However, there was consumer resistance in Myanmar because the televisions were about 10 times more expensive than models using tube-type screens, U Myat Thin Aung said.

Televisions were once considered a luxury in Myanmar but have come to be regarded as an essential for providing entertainment and information, said U Than Win Aung, the managing director of the Star TV factory in the Hlaingthaya industrial zone. The growing demand for electrical appliances co-incided with the rise in living standards, said U Than Win Aung. Consumers with disposable incomes opted to buy televisions for entertainment, information and education, he said. It is estimated that nearly all households in Yangon and about 60 per cent of those in rural areas have a television.

Additional references

See below: [‘Local TV manufacturer’](#) takes on international competitors’ (BT: March 2004)

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WIND ENERGY BOOSTS RURAL DEVELOPMENT

Kyaw Thu, Myanmar Times, 05/03/07.

(Compiler's note: Issue 357 of the Myanmar Times is not available on-line.)

In an important development to promote the use of alternative energy sources, the Dept of Development Affairs has begun producing wind turbines to supply power to villages not connected to the national grid. The decision to make the turbines followed the successful development of prototypes made at the department's research centre in Yangon under a project begun in July 2005. The supervisor of the research team, U Thein Shwe, said turbines capable of generating 300 and 750 watts had gone on the market. The 300-watt turbine costs K450,000 and the 750-watt model retails for about K1 million. A 300-watt turbine is capable of supplying enough power to illuminate ten 36-watt fluorescent lights for five hours.

U Thein Shwe said one advantage of using the turbines in remote areas was that it would make it easier for students to study at night. He said the department needed to conduct more research on prevailing wind speeds in various parts of the country to determine which areas are best suited to benefiting from the alternative energy source.

U Soe Ko Ko of the Development Affairs Department said it planned to eventually sell turbines capable of generating between 700 watts and 1000 watts. As well as wind turbines, the dept is also conducting research into the use of mini-hydropower projects throughout the country.

The secretary of the Renewable Energy Ass'n, U Aung Myint, said 300-watt and 1000-watt wind generators were ideal for rural communities because they were easy to maintain. He also said the association was planning four mini-hydropower projects in Shan State.

Myanmar is among many countries throughout the world which are exploring the use of alternative energy sources because of the rising price of fossil fuels and their impact on global warming. At the ASEAN summit in the Philippines in January, Myanmar and its nine partners in the regional grouping, along with Australia, China, India, Japan, New Zealand and South Korea signed the Cebu declaration on energy security which provides for increased efforts to promote the use of alternate energy.

A former executive director of the ADB, U Hla Maung, said at the launch of his book *The World and the Energy Crisis* on February 27 that more subsidies were needed to support research into the use of renewable energy sources in Myanmar. U Hla Maung, who is also a former director general of the Ministry of Planning and Finance and a former ambassador, referred to the example set by Brazil, which provided tax exemptions for companies making alternative energy technology. He also urged the private sector to become more involved in the renewable energy sector.

Compiler's note: A good photo showing the testing of wind turbines under production at a research centre in Yangon accompanies the original article.

Website information:

<http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>

Information presented by the Energy Planning Dept of the Myanmar Ministry of Energy at the Second subregional energy forum in Ho Chi Minh city on 22/11/08 indicates that the installed electrification capacity of renewable energy sources at the end of 2008 was as follows: Solar power: 0.1157 MW, Wind power: 0.5194 MW, Mini hydro power: 8.3530 MW, Bio-mass power: 18.1942 MW; Biogas power 1.5993 MW.

Additional references

See below: 'Wind power [system ideal](#) for villages, says engineer' (MT: 05/12/05)

See also the section on wind energy in '[Electricity potential](#) of energy sources available in Myanmar'.

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[TURBINE FACTORY](#) PLANNED FOR THAGARA INDUSTRIAL REGION

NLM, 25/02/07. <http://burmalibrary.org/docs2/NLM2007-02-25.pdf>

General Than Shwe and party arrived at Thagara Industrial Region of Ministry of Industry No 2 in Yedashe township. At the briefing hall, Minister Saw Lwin reported that three projects were being implemented in the region. The first is a plant that will produce various kinds of multipurpose diesel engines, the second is a plant to produce bulldozers and excavators at the rate of 100 bulldozers and of 200 excavators per year. The third is a plant that will produce turbines and hydel power engines. This plant will produce Francis turbines of 100 kW, 500 kW, 2,000 kW and 5,000 kW at the rate of 50 per year. Minister Saw Lwin presented the aims, signing of the contracts, investment involved, acquisition of technology and progress of the project.

Afterwards, Gen Than Shwe gave guidance, saying that the various plants established in the Thagara region will contribute to industrial development and to the national economy. Innovative efforts are needed to produce better engines, turbines and machinery than those currently under production. It is not good to be complacent about the current situation. The Ministry of Industry No 2 is responsible to develop the industrial sector of the state. It should be playing a greater role in industrial development.

[Video footage of this visit with brief glimpses of the layout of the industrial estate and some of buildings is available at <http://video.google.com/videoplay?docid=-7694807271238560047>. Commentary is in English.]

Additional references

NLM: 21/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-21.pdf>

Ind-2Min Soe Thein inspects manufacturing of 2000 kW Francis turbines and generators, boilers and 300 KVA generators at No. 26 General Heavy Factory in Thagara Industrial Region.

NLM, 18/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-17.pdf>

Ind-2Min Soe Thein announces at a SPIC meeting that extended production of hydraulic presses essential for manufacturing industrial goods in the State and private sectors will be undertaken at the hydropower turbine factory in the Thagara Industrial Region. 100 hydraulic presses ranging from 100, 150, 300, 500, 800 to 1000 tons will be produced each year.

NLM, 25/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-25.pdf>

An excellent photo of the turbine-generator factory is included in the print edition of NLM.

NLM, 01/01/10. <http://www.burmalibrary.org/docs08/NLM2010-01-01.pdf>

Ceremonies to open the multi-purpose diesel engine factory and the hydropower turbine and generator factory of the Ministry of Industry-2 were held at Thagara Industrial Region near Thagara in Yedashe township on 31/12/09. Officials viewed the operation of high tech machinery in the punching, the assembly and the rivet welding shops and a display of hydropower turbines, generators and machine parts manufactured by the factory. Construction of the hydropower turbine and generator factory started in May 2007. Construction work, installation of the machinery and test-run operations have been completed at the factory. It will produce 50 pairs of 100-kilowatt, 500-kilowatt and 2000-kilowatt Francis turbines and generators yearly. They will be used to fill the demand for hydropower turbines and generators at water resource locations throughout the country. [Several photos of the turbine and generator factory and of the units produced there are included in the print edition of NLM.]

NLM, 10/09/09. <http://www.burmalibrary.org/docs6/NLM2009-09-10.pdf>

Industry-2 Minister Soe Thein inspects the hydroelectric turbine and generator factory project at the Thagara industrial estate. He urges the staff of the factory to become familiar with the machines already installed and to get the remaining machinery installed as soon as possible. He also checks on the machinery installed at the multi-purpose diesel engine factory project and visits the industrial training centre at Thagara.

NLM, 12/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-12.pdf>

Machinery for the hydropower turbine and generator factory has arrived and the foundations are being put in place for its installation at the factory site in the Thagara industrial park. Work is proceeding on the installation of machinery at the machine shops and on the foundation for a 16-ton press machine at the forge shop.

NLM, 03/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-03.pdf>

A photo of what is described as the 'heavy machinery factory' of MADEI at Thagara is included in the print edition of NLM. Presumably, this is the multi-purpose diesel engine factory which is the most advanced of the three manufacturing facilities at Thagara.

NLM, 28/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-28.pdf>

On a visit to the Thagara industrial park Minister Soe Thein instructs officials to finish construction of the buildings for the technical training school by Jan 2009. At the building site of the hydropower turbine and generator factory he checks ongoing work at the machine, metal machining and assembly, rivet welding and punching and heat treatment workshops. He also looks into construction of shops at the multi-purpose diesel engine and bulldozer and excavator factories.

NLM, 26/11/08. <http://www.burmalibrary.org/docs6/NLM2008-11-26.pdf>

Industry No 2 Minister Soe Thein checks on construction activities at the Thagara technical training school and at the hydropower turbine and generator factory, as well as installation of machinery at the iron foundry of the diesel engine factory. Chinese technicians are on the job.

NLM, 13/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-13.pdf>

Industry No 2 Minister Soe Thein checks on the construction of the technical training school, the multipurpose diesel engine factory and the hydropower turbine and generator factory and the installation of machinery at the Thagara Industrial Region in Yedashe township.

NLM, 31/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071231.htm>

On a visit to the Thagara industrial region, PM Thein Sein checks the site where a turbine and generator factory will be built. The government has set a target of an annual average growth rate of 25pc in the industrial sector. Electric power plays an important role in the development of this sector. Despite generating over 770 [1770?] MW, Myanmar's electric power plants cannot meet the demand. Fifteen hydropower projects are being implemented simultaneously. When completed, they will add 10,000 MW to the system. The hydropower turbines and generators to be manufactured at Thagara will make a significant contribution to the development of the electric power sector of the State.

NLM, 05/09/07. www.myanmargeneva.org/07nlm/n070905.htm

Machinery to be installed in the factories that will produce diesel engines, heavy machinery, turbines and generators has arrived at the project site of the IZ four miles from Thagara. Arrangements are being made for the supply of electricity to the zone. Foreign experts are on hand assisting with the construction of the factories.

NLM, 06/11/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061106.htm>

In Nanning in the PRC Minister for Industry No 2 Saw Lwin received Ch Tang Yi of the China National Machinery (I&E) Corp and party. They discussed construction of the hydro-turbine and generator factory in Thagara.

Additional references

See below: [‘Manufacture of small hydro turbines](#) in Myanmar’ (JICA: Sept 2003)

ACUTE SHORTAGE OF ELECTRICITY DISAPPOINTS MON RESIDENTS

IMNA, 21/02/07. <http://www.monnews-imna.com/2007/febupdate.php?ID=534>

Despite the promise of the Energy Ministry that it would try hard to provide smooth and efficient service, residents in Mon State are sorely disappointed. They have been waiting since last year to receive proper electricity supply. "Power supply is available when people sleep. It is not available when people need it most," a resident in Mon State said. Moulmein in Mon state, and Pego town in Pego division only get power supply a few days a week. But in some quarters where the power supply is connected to government offices people are lucky and get better electricity supply.

Sometimes, when power comes for a few hours the residents cook rice but often it goes off before the rice is fully boiled. That is the reason why rice is wasted many a time, said a Thanbyuzayart resident. Given the rise in consumption of electricity, when power comes to their quarters it is only for a short time. Many home owners have bought generators, so they can watch movies.

The military government has extended electricity supply to model villages and put a banner at the entrance to the villages which says: "Villages and townships must develop quickly". Even Kawbein village in Kawkaik township, Karen state, gets regular electricity. Some houses in Karoat-pi village, Thanbyuzayart township have increased consumption to about 15 kWh but others have not increased even by one unit after the extension two months ago. A Mudon resident said, "Electricity consumption has gone up in every household." They get the supply by rotation from one quarter to another.

Residents into business do not rely on the government's electricity supply and have bought generators made in China. They are available on the market. Some small business outfits are spending more money because they use petrol and diesel to run the generators. Some people subscribe to private electricity supply companies, but their services are expensive. That is why some whose children are not students are not buying electricity from the private sector. "Eat dinner before dusk because candles are expensive. That's why I eat dinner and sleep early," a Mudon resident said.

Additional references

See above: [‘Chaungzon supplied with electricity at a big loss’](#) (NLM: 29/03/11)
[‘Regular power service restored in Mon and Karen states’](#) (IMNA: 22/10/09)
[‘Premium rates](#) for electricity in Mon villages’ (IMNA: 03/08/07)
[‘Electricity metering](#) program taking root’ (IMNA, 11/05/07)

IMNA, 06/08/08. http://bnionline.net/index.php?option=com_content&task=view&id=4659&Itemid=99999999

Authorities have cut off the supply of electricity to the villages of We-kalaung, An-Khae, Hitn-yu and Kaw-lay in Thanpyuzayart township. Power had been supplied to the villages from the central station in Moulmein [Mawlamyaing] since January. A villager from An-Khae said the supply had been cut at the transformer

because the state office of electric power had made the connection without waiting for permission from Naypyidaw. A Hitn-yu villager complained that he had had to pay a million kyat to get the service. Each of the four villages with between five hundred and a thousand households had to pay about K 100 million to get the power lines and a transformer set up in each village. In addition, each household had to pay between K0.7 to K1 million for meter boxes and other costs. A power line committee [Me Lin Ye committee] was set up by VPDC members and villagers had to bribe the committee to get the service. Power was only supplied about twice a week. A source close to the committee said that they were arranging to bribe the ministry of electric power in Moulmein to get the service restored.

IMNA, 24/12/07. http://www.bnionline.net/index.php?option=com_content&task=view&id=3238&Itemid=6
Residents of Mon state are complaining that they are being supplied with power on rotation. A housewife from Kyat Khine Ye quarter in Thanphyuzayart town said it is no use to them when it comes on in the daytime because they can't even cook rice and iron clothes. She said that is because everybody is using inverters to store electricity. "Most houses have bought inverters, so that when electricity is available the supply is so low they can't use it properly," a Mudon resident said. People get power about twice a week in rotation in each quarter in the towns during the daytime. But mostly they get electricity during the nights. But it is not for a full 48 hours.

IMNA, 31/08/07. <http://www.monnews-imna.com/newsupdate.php?ID=736>
The military junta increased electric charges from K2.5 to K25 per kWh in 2006. Although the fees are supposed to cover maintenance costs, there always additional charges for repairing transformers or transmission lines. "The authorities collected K5,000 per house in our quarter and other quarters paid K10,000 per house to repair a transformer which broke down in town and to buy a larger transformer," said a Mudon resident.

See below: ['Private operators' meet need for alternative power service'](#) (MT: 03/02/02)

COMPLETION OF HYDROPOWER PLANTS ASSIGNED [HIGHEST PRIORITY](#)

Kyaw Thu, Myanmar Times, 12/02/07.

(Compiler's note: Issue 354 of the Myanmar Times is not available on-line.)

The completion of planned hydropower projects in Myanmar has been given priority over all other government projects, an official from the EPM-1 said February 2. The ministry was pushing to finish all 13 hydropower projects scheduled for completion between 2007 and 2009 on time, said the official who requested not to be named. "We (EPM-1) will be given sufficient funding to finish the existing hydropower projects," he told The Myanmar Times.

The ministry has started work on 15 hydro-electric projects that are due to be finished before the end of 2020. Four are scheduled to be finished in 2007, four in 2008, five in 2009, one in 2010 and one in 2020. The 13 targeted for completion from 2007 to 2009 – with a combined output of more than 2000 MW – have been given priority over other ministries' projects, the official said. The Yenwe power plant, which was delayed due to the late arrival of a turbine from China, is not included among the 13 to open by 2009. Yenwe was set to open in February 10, the official said.

The Hutgyi and Tasang plants on the Thanlwin River are not included in the government's priority list as they are Thai and Chinese projects whose output will mostly be diverted abroad.

The ministry said it would use foreign and local technicians to help meet target dates. "We hired about 40 Myanmar engineers last November and we are now giving them training at the ministry-owned training school in Hlaingthaya township," the official said. Japan's Kansai Electric Power Co is designing and supervising construction of all but one of the ministry's projects – the 790-megawatt Yeywa power plant in Mandalay division. Switzerland's Colenco Power Engineering Ltd is serving as technical consultant for Yeywa, which is due to open in December 2009.

Additional references

See above: 'National [hydropower project schedule updated](#)' (MT: 21/07/08)
 See below: 'Government will [prioritize hydropower](#) projects over gas' (MT: 10/07/06)

NLM, 17/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071117.htm>

Gen Than Shwe at the annual general meeting of USDA: At present, 1616 MW of electricity is produced compared to only 568 MW [in 1988]. On completion, the 23 hydroelectric power projects currently under construction will increase power generated by 11,000 MW. Although hydroelectric power projects are long-term, the government is striving hard to fulfill the needs of the populace within the shortest period. To ensure a smooth supply and distribution of electricity, extremely high voltage transmission lines have been erected or expanded.

NLM, 28/10/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071028.htm>

Gen Thein Sein: The implementation of 17 hydroelectric power projects that can generate 10,000 MW is well under way.

Myanmar Times Energy Supplement, 20/08/07. <http://mmtimes.com/feature/energy/06.htm>

Current hydropower electricity production stands at 745.68 megawatts (MW), some 43pc of total electricity production. However, government figures show an additional 2034.2 MW are expected to come online at the end of 2009 when several hydropower plants should be finished. A total of 13 plants are included in this list and range from 2.2 to 790MW in capacity. By the end of 2007 about 686 MW from four projects should become available for the national grid, while 247MW will theoretically come on-line in 2008, but 2009 is expected to show a considerable increase – with more than 1,100MW expected. In addition to the projects intended to be operational by the end of 2009, another 11 plants are slated for the future. These projects are expected to generate up to 15,725 MW and should be finished by 2015.

Myanmar Times, 13/11/06. [Issue 342 of the Myanmar Times is not available on-line.]

Completion of several hydropower projects in 2009 is expected to more than double production of electricity in Myanmar from 1667 to 4000 MW, an official from the EPM No 1 said last week. Among the hydropower projects expected to be finished in 2009 are those at Yeywa in Mandalay Division and Shweli in Shan State. The official also said the HPID is conducting a feasibility study for a hydropower station about 16 km (10 miles) upstream from the village of Ann in Rakhine State. "The department is building camps and roads to facilitate the project," the official said, adding that the station will include three turbines capable of producing a total of 15 MW. Hydropower currently supplies 38.5pc of Myanmar's electricity output, with gas turbines producing another 48.44pc, coal-fired steam turbines 12.5pc and diesel engines 0.5pc.

See below: 'Government will [prioritize hydropower](#) projects over gas' (MT: 10/07/06)
 'Hydropower project [nearing completion](#)' (MT: 28/06/04)
 'Generation facilities scheduled for [commissioning in 2002-2004](#)' (MT 07/01/02)
 'More inputs needed to power a [hydro future](#)' (MT: 04/06/01)

YENWE HYDROPOWER STATION INAUGURATED

NLM, 11/02/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070211.htm>

Yenwe hydro-electric power station was inaugurated in Kyaukdaga township this morning (10/02/07), with an address by Ch of Work Cte for Development of Electric Power Projects PM Soe Win. The PM said in his address Yenwe multi-purpose project is one of thirteen Sittoung Basin development projects including Paunglaung, Upper Paunglaung, Nancho, Thaukyehkat 1, Thaukyehkat 2, Bawgata, Khabaung, Kunchaung, Pyu, Shwegyin, Zaungtu, Pathi, and Yenwe. Of these three projects --Yenwe, Paunglaung and Zaungtu -- have been completed.

In addition to the hydro projects of the EPM No 1, the A&I Ministry is also undertaking projects to supply electric power. Altogether nine hydro-electric power projects are under construction in Bago division. He

also spoke about four projects in the upper region of the Ayeyawady River. A feasibility study is being conducted for the Ayeyawady confluence project and the Tappain project. Preparations are underway for similar projects in the Chindwin and Thanlwin basin regions.

Yenwe Dam can generate only 25 MW, but good experiences can be gained from it for construction of other similar dams. Good experiences have also been gained from the hydel power projects such as Zaungtu on the Bago river, Zawgyi on the Zawgyi river and Thapansaik on the Mu river, and the Mone hydel power station project on Mone creek where a variety of natural barriers had to be overcome. That led to the implementation of greater hydel power station projects such as Yeywa on the Myitnge and Htamanthi on the Chindwin. Other hydel power projects as Kengtaung, Shweli and Kyee-ohn Kyee-wa will be finished before long.

EPM No 1 Zaw Min said Yenwe hydro-electric power station is the 45th project implemented by the Hydropower Dept. Currently, the ministry has 16 hydro-electric power projects underway. Of the remaining 15 projects, the Khabaung, Kengtung, Shweli, Kunchaung, Pyuchaung, Shwegyin and Yeywa projects will be completed in the period from 2007 to 2010. The minister thanked CITIC and CNEEC* of the PRC and service personnel and all responsible persons for efforts to complete the project in time.

Afterwards, the PM presented a basket of fruits to V-P Liao Shengsong of China National Electric Equipment Corp and inspected the station and storage of water in Yenwe Dam.

Yenwe hydro-electric power project was implemented on Yenwe creek about two miles from Myochaung village in Kyaukdaga township. The earth dam is 1,050 ft long and 251 ft high. The intake structure, which is 48 ft long and 40 ft high, is of reinforced concrete. The power station is 128 ft long, 82 ft wide and 85 ft high. It will be able to generate 123 million kWh annually. The dam will irrigate 118,500 acres of farmland. The project was implemented by Construction Group No 4 of HPID and the ID. It was built at a cost of K 5,322 million plus US\$ 8.47 million.

* The Hunan Savoo Overseas Water and Engineering Co was also among the PRC companies that participated in the construction of the Yenwe dam and powerhouse, probably as a sub-contractor to CNEEC for hydraulic steel equipment. See pictures and text in Chinese on the Hunan Savoo website. <http://www.hhpdi.com/hhpdi/ShowArticle.asp?ArticleID=113>

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-15: Toungoo
 Yenwe dam near Myogyaung village [18° 04' N, 96° 28' E], grid square reference: 8\9, 25\9
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-5.jpg>

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Data summary: [Yenwe](#)

Khin Maung Than (Sethmu), NLM, 11/06/10. Extract.
<http://www.burmalibrary.org/docs09/NLM2010-06-11.pdf>

Yenwe dam can store 931,800 acre-feet of water at full brim. It is estimated that on average about 861,000 acre-feet of water flow into the dam annually. Plans call for the two 12.5 MW generators in the power plant at the dam to produce approximately 123 million kilowatt hours annually. In the first full year operation in 2008 151.68 million kWh were generated and in 2009, 142.30 million, thus exceeding the target in both years.

NLM, 26/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-26.pdf>

Yenwe diversion weir near Hsihsongon village in Kyauktaga township was opened On 25/03/10. The facility diverts the flow of water from the turbine-run of Yenwe hydropower dam upstream for irrigation and supplies water to tributary canals in the fields through its left-side main canal. (Photos of the diversion weir and gates are included in the print edition of NLM.)

NLM, 15/10/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n081015.htm>

On a tour of the Ye Nwe hydropower station, EPM No 1 Zaw Min checks on the flow of water into the dam, the tail race channel, maintenance of the sluice gate, operation of the turbines and the two generators and the switching yard.

NLM, 22/06/08. <http://myanmargeneva.org/NLM2008/eng/6June/n080622.pdf>

EPM No 1 Zaw Min is briefed on the supply of electricity, storage of water and maintenance of machines at Yenwe hydropower plant near Myo Chaung village by plant manager Tun Chit and Superintending Engineer Khin Maung Oo of the Hydropower Generating Enterprise. Two 12.5-MW generators are installed at the plant which generates 123 million kWh yearly.

Naw Say Phaw, DVB, 20/02/08. <http://www.burmanet.org/news/2008/02/20/dvb-water-project-destroys-farmlands-%e2%80%93-naw-say-phaw/>

Seventy acres of bean crops were destroyed when heavy machinery from the Yenwe hydropower station were driven across cropland to get to a project site where a sluice gate is to be installed. According to a Nyaunglebin resident, local farmers have been badly hit by the destruction of their land. "An acre of farmland can produce up to 20 or 30 tins [80 to 120 litres] of beans, and each tin can fetch about 20,000 kyat, so the destruction cost farmers around 400,000 to 600,000 kyat," the resident said. "Some farmers own more than 10 acres and have invested up to K 150,000 per acre where the crop has all been destroyed." The damage was caused when the construction vehicles took a shortcut across the farmlands rather than driving round them. "Local farmers asked the drivers why they were cutting across the farmlands, and they said they didn't want to waste a lot of fuel," the informant said.

NLM, 27/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061227.htm>

GM Kyi Tha and Director Khin Maung Win of HPGE conduct EPM No 1 Zaw Min and party around the underground power station at Yenwe dam. The minister inspects the running of No 1 turbine and the installation of No 2 turbine.

Kyaw Thu, Myanmar Times, 16/10/06 [Issue 338 of the MT is not available on-line.]

Myanmar power supplies will get a welcome boost with the start of production at the Yenwe hydropower plant in Kyauktaga township at the end of the month, an official at the EPM No 1 said. The Yenwe plant is equipped with two turbines each capable of generating 12.5 MW. It is predicted to generate 125 million kWh a year, which will be fed into the national grid. The project was designed with a multi-purpose dam – measuring 320 metres (1,050 ft) wide by 76.5 metres (251 ft) high – which can supply water to 118,500 acres of farmland. Construction on the project started in 2000 and cost about K 13.8 billion. About 38.5pc of Myanmar's electricity is generated by hydropower plants, with the remainder coming from gas (48.5pc), steam turbines (12.5pc) and diesel (0.5pc).

NLM, 23/03/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060323.htm>

Yenwe multi-purpose dam was inaugurated in Kyauktaga township. It is an important part of the Sittaung valley development project and was implemented as a result of damage to the Pagaing embankment. The Pyundaza and Bago plains became wetlands and the streams and canals were silted up. So major sluice gates have been built on the Yenwe, Baingda and Kawliya streams. With the building of the Yenwe and other dams, the wetlands will be turned into valuable and arable farmlands. Thanks to the construction of the dam, two main canals stretching 7.1 miles and canals stretching for 309 miles (sic) will irrigate 118,500 acres of monsoon and summer paddy, edible oil crops, vegetables and sesame plantations in the region. The Government spent K16,165 million on construction of the 251-ft high, 1,050-foot long dam which is capable of storing up to 931,800 acre-feet of water. Laying of concrete for the steel pipelines is continuing, as well as construction of the power station which is expected to start operations at the end of May 2006.

NLM, 01/01/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060101.htm>

EPM Tin Htut oversees completion of the power station at Yenwe hydel power project, installation of the steel pipeline, dredging of the inlet water tunnel, building of the main embankment, sluice gate tasks and flow of water into the dam. Afterwards, he checks the project site of the 230-kV Thayagon (Kyaukdaga) sub-power station.

NLM, 16/03/05. <http://www.ibiblio.org/obl/docs2/NLM2005-03-16.pdf>

General Than Shwe accompanied by an official party visits the Ye Nwe multipurpose dam project in Kyauktaga township. They are briefed by cabinet ministers and officials of the Irrigation Dept and the HEPD on construction work, on the tender process for machinery that will be used, on flooding of the Yangon-Mandalay highway, on the supply of fuel, Aung, on forest conditions. Construction Group-1 of the ID and Construction Group-4 of the HEPD are working on the project which will be able eventually irrigate 118,500 acres and generate 25 megawatts. Ye New is part of a cluster on the Pyundaza Plain that also includes Baidah, Kawliya, Bawni and Pyinpongyi dams. [Two photos of the dam site are included in the print edition of NLM]

NLM, 29/12/04. <http://www.ibiblio.org/obl/docs/NLM2004-02-29.pdf>

Yenwe Dam will have a water storage capacity of 1,212,600 acre feet.

NLM, 22/09/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030922.htm>

PM Khin Nyunt and party visit Yenwe multi-purpose dam project where they are briefed by the A&IM Nyunt Tin and the D-G Kyaw San Win of the ID on the annual rainfall, water storage capacity of the dam, geological condition of the region and construction of the temporary sluice gate and diversion tunnel and spillway. D-G Win Kyaw of HPD provides details on the construction of the power intake, the gate shaft and the installation of the gates and trash racks, the digging of the intake tunnel and installation of reinforced concrete liners and steel pipe liners, the penstock tunnel and the construction of the hydel-power station. Two 12.5-megawatt generators will generate 123 million kilowatt hours per year.

NLM, 18/01/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010118.htm>

Gen Than Shwe inspects the project on Yenwe Creek, 2.5 miles south of Myochaung village. The dam will be 1,050 feet long, 251 feet high. The project is being jointly undertaken by the ID and MEPE. It will irrigate 118,500 acres and benefit 237,000 acres and will generate 20 MW.

MEPE website information, [circa 2001]. [no longer available on-line]

The feasibility study and design for the Yenwe dam and hydropower project was done by the Kansai Electric Power Co. It is scheduled for completion in 2006.

NLM, 28/12/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n001228.htm>

A&IM Nyunt Tin is briefed on the geological feasibility survey of dam site; a design engineer reports on soil layers and rocks, as well as work on construction of the spillway, the main structure of the dam and ground clearing work.

WPD, 15/09/90. <http://www.ibiblio.org/obl/docs3/BPS90-09.pdf>

SPIC, chaired by SLORC V-C General Than Shwe, met to review hydel power and energy projects. Among the projects planned for later implementation are the Ye-nwe multipurpose dam project in Kyauktaga township. It is expected to generate 16.2 MW and irrigate 40,000 acres.

WPD, 04/08/90. <http://www.ibiblio.org/obl/docs3/BPS90-08.pdf>

At a mtg of SPIC, General Than Shwe outlines major irrigation projects, notably the Mu river valley project, the Sittoung river valley project, the Mon, Man and Salin reservoir project, and the Yinchaung valley basin tank series. At present, only 13pc of Myanmar is irrigated, priority will be given to the Mu river valley project and the multi-purpose Ye Nwe dam project. **Compiler's note:** maps available in the print edition of the WPD.

YWAMA POWER STATION DEPENDENT ON GAS DISTRIBUTION SYSTEM

NLM, 01/02/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070201.htm>

EPM No 2 Khin Maung Myint inspected Thakayta, Hlawga and Ywama power stations and attended to needs for the stations to run at full capacity. On his inspection tour of Thakayta power station, the minister called for the timely completion of the replacement of machinery at the station to ensure the running of the

station at full capacity. At Hlawga power station, the minister inspected the installation of pipelines and refinement of natural gas supplied to the station.

At Ywama power station, the minister met with officials and heard reports on the arrangements for refinement of natural gas and supply of gas to the station. He gave instructions on extended supply of power to Yangon. Afterwards, the minister went to the natural gas store/distribution station (Ywama) of the EM where the engineer in-charge, U Ye Myint, reported on the system of gas pipelines linking offshore and inland gas fields. After hearing the reports, the minister and party inspected the supply of natural gas to the power stations.

Additional references

Data summary: [Ywama](#)

See above: 'More [gas to be diverted](#) from Yadana for national use' (MT: 14/01/08)

See below: '[Pipeline to solve](#) electricity shortages' (MT: 16/09/02)

'Use of [Yadana gas for power generation](#) and industry: Chronology (Appendix 6)

NLM, 13/06/10. <http://www.burmalibrary.org/docs09/NLM2010-06-13.pdf>

A golden valve on the 24-inch natural gas pipeline from the Yadana natural gas platform is opened at the natural gas distribution centre in Ywama and a stone plaque unveiled, to mark launching of sending natural gas through the new pipeline. [A photo is included in the print edition of NLM.]

Kyaw Kyaw Hlaing NLM, 05/06/10. Rewritten and condensed.

<http://www.burmalibrary.org/docs09/NLM2010-06-05.pdf>

The upgraded Ywama gas distribution station is 100% complete and will be opened soon. It already distributes natural gas to four power plants in Yangon with a total generating capacity of about 340MW. These plants consume about 153 million cubic feet of natural gas daily, while natural gas-fueled vehicles use about 20 million cubic feet. MOGE has been supplying natural gas from the Yadana offshore natural gas region through a 20-inch diameter pipe that was connected from Kanbaw to Myaingale in 2000 and extended from Myaingale to Yangon in 2006. Some gas for Yangon is also received from the Nyaungdon and Maubin natural gas fields. Gas supplied through the new 24-inch pipeline will be distributed to the four power stations at Hlawga, Ywama, Thaketa, and Ahlone to fire electric turbines there, as well as to state and privately-owned factories that use natural gas. It will also be supplied to the Pinpek steel plant in Taunggyi, cement plants in the Pyinayung region of Thazi township, the Taungphila, Yeni and Mindon cement plants in Nay Pyi Taw, as well as to other factories. The offshore Yadana gas platform will pipe 150 million cubic feet of natural gas per day at 1400 pressure psi to the pipeline center in Daw Nyein village in Pyapon district from where it will be piped to Yangon at 800 pressure psi. The new 24-inch diameter pipeline is of international standard with a 30-year life span. A world-famous oil and gas company had proposed to erect the new pipeline at a cost of US\$ 760 million in a three-year period. But, MOGE has constructed it in just 15 months at a cost of only US\$275 and K 4111 million. The 24-inch diameter natural gas pipeline is laid on the floor of sea underwater along a 94-mile route from the Yadana natural gas platform to Daw Nyein village in Pyapon District. TL Geohydrographic Co of Malaysia and privately-owned SMART Technical Services of Myanmar surveyed the 85-mile-long land route from Daw Nyein to the Ywama gas supply station. [The article provides much more detail about the laying of the pipe-line. Several photos and a diagram are included in the print edition of NLM.]

NLM, 01/06/10. <http://www.burmalibrary.org/docs09/NLM2010-06-01.pdf>

Energy Minister Lun Thi visits the natural gas control and distribution station in Ywama and gives detailed instructions on the systematic distribution of natural gas from the 24-inch pipeline that will connect the station with the Yadana natural gas platform in the Gulf of Mottama. [Photo in print edition of NLM.]

NLM, 06/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-06.pdf>

EPM-2 Khin Maung Myint reports to the SPIC that major repairs to the generators in the Hlawga, Ywama, Ahlon and Thakayta gas-fired power plants in Yangon and at the Kunchaung, Mann and Shwedaung gas-fired power stations.

NLM, 12/03/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080312.htm>

Necessary maintenance was carried out on the NEDO turbine at the gas power plant in Ywama. The technicians responsible received a special cash award of K 100,000.

Country Report on Infrastructure Development with a Focus on Public Private Partnerships (PPP), July 2007, p 25 [doc 26]. http://www.unescap.org/ttdw/ppp/reports/Myanmar_6july2007.pdf

A NEDO[-financed] gas turbine power plant with a capacity of 24 MW was installed [at Ywama in 2004], bringing the total number of gas turbine stations in Myanmar to ten. At the same time a NEDO combined cycle model project was successfully implemented adding another 9.4 MW to the generating capacity of the station.

Platts Myanmar Country Energy Profile. [mid-2007]. For access information, see [Power Profile](#).

Ywama power station in Yangon has a generating capacity of 90 MW including oil- and gas-fired steam and gas turbines

Myanmar Times, 02/10/06. <http://www.myanmar.com/myanmartimes/MyanmarTimes17-336/n003.htm>

Repairs have been completed on a pipeline that supplies natural gas to four power plants in Yangon; problems with the pipeline were blamed for blackouts in Yangon. The 320-km (199-mile) pipeline carries 3.1 million cu m (110 million cu ft) of gas a day to the Ywama gas control station from Yandana gas project in Tanintharyi division.

NLM, 26/04/05. <http://www.ibiblio.org/obl/docs3/NLM2005-04-26.pdf>

NLM, 27/04/05. <http://www.ibiblio.org/obl/docs3/NLM2005-04-27.pdf>

Myanmar launched the first-ever drive to distribute electricity to the people in the post-independence period with the use of two coal-fired power plants -- a coal-fired power plant (30 MW) in Yangon, and the other in Ywama. At that time, the plants were installed with the turbines, each of which could generate only 10 MW.

NLM, 04/05/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040504.htm>

At the main natural gas station (Ywama) of MOGE in Insein township, EM Lun Thi lays down plans for the distribution of natural gas to power stations, factories and plants in Yangon and other regions. A 14-inch natural gas pipeline has been connected and greater quantities of natural gas produced in the Nyaungdon region can be distributed to the factories and plants in Yangon.

NLM, 31/01/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040131.htm>

Officials of MOGE brief DepMin EPM Than Htay on the installation of a 14-inch gas pipeline leading from the Nyaungdon oil and gas field to Ywama.

Myanmar Times, 28-07-03. [not available on-line]

MEPE is expected to begin work soon on building a 33-MW power station in Insein tsp that will have one gas-powered turbine and another that uses steam; most of the project funding is to be provided by the Japanese government.

U.N.O Consultant Geotechnical Engineering Group, [undated].

http://www.consultantgeotech.net/our_project.htm

The company carried out a survey for a proposed No 3 gas turbine project site in the compound of the Ywama power station at Insein. The client was the MEPE.

Myanmar Ministry of Energy, [circa 2001]. http://www.energy.gov.mm/MEP_1.htm

Ywama gas turbine power station has a generating capacity of 66.90 MW

Salween Watch, November 1999. <http://www.ibiblio.org/obl/docs/SW03.htm>

Ywama thermal power station opened in 1958 and was equipped with steam driven turbines having a capacity of 30 MW. In 1975 additional gas turbines capable of generating 37 MW were added.

Tin Maung Maung Than, "Burma's Energy Use: Perils and Promises" in *Southeast Asian Affairs 1986*, Institute of Southeast Asian Studies, 1986, p. 84. [not available on-line]
 Among the gas turbine power stations commissioned in recent years, those at Mann, Ywama and Prome, started in fiscal year 1978/79, were financed partly by loans and grants (mainly for turbo-generators and control/switching elements) from the United Kingdom.

World Bank, *Burma: Issues and Options in the Energy Sector*, June 1985, p 54. [doc, p 75]

http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1999/09/17/000009265_3970723102606/Rendered/PDF/multi_page.pdf

Future increases in consumption of [of natural gas] will be dominated by a small number of big users: a new glass factory at Chauk (2 billion cu ft per annum), the conversion of the Sittang paper factory to use natural gas (2 billion cu ft), a new fertilizer factory at Kyaw Zwa (5.5 billion cu ft), a methanol plant at Seiktha (5.5 billion cu ft), and the conversion to gas of the Ywama power station (1.5 billion cu ft).

World Bank, *Burma: Issues and Options in the Energy Sector*, June, 1985, p 53. [doc, p 74] [see URL above]

Natural gas from the Payagon field in Bogalay township is currently being used to substitute for fuel oil consumption (1,500 b/d) in power generation at Ywama; 30 million cf/d is being supplied through a 10-inch pipeline, 47 miles long.

www.transelektro.hu/letoltes/referencelist/reference_list_2002_edition.pdf

In 1971/72, in collaboration with Investimport, Beograd, the Hungarian company, Transelektro, delivered steam turbines (29 atm., 415oC, 11.3 MW), generators (14.3 MVA, 11 kV) and complete electrical equipment to the Ywama steam power station in Rangoon.

www.unithistories.com/officers/IndianArmy_officers_D01.html

After independence in 1948, R.M. Duffy stayed back in Burma and was appointed construction engineer to build the Ywama power station at Insein, Rangoon, 1958-62. When it came into operation he was appointed power station engineer.

http://maureenb.myphotoalbum.com/view_photo.php

Rangoon Electric Tramway and Supply Company (incorporated in England) issued a certificate to R.M. Duffy who had been in the employ of the company from 1925 to September 30, 1953 when the company was nationalized. At the time of termination he was the assistant superintendent of the Ahlone power station. Several pictures of the Ahlone and Ywama power stations and staff feature on the website.

ARAKAN OFFSHORE GAS FIND TO MEET NATIONAL DEMAND IN MYANMAR

Press Trust India, 19/01/07. http://www.outlookindia.com/pti_news.asp?id=444772

The proposed Rs 8,500-crore (US\$ 2 billion) gas pipeline from Burma to India may never come to pass as Rangoon has discovered that reserves in its offshore area do not support export pipelines. "Current estimate of reserves in Block A-1 is not enough to meet the demand of an export pipeline to India," said U Soe Myint, D-G, Ministry of Energy, Myanmar.

UK-based Gaffney Cline and Associates has certified the 'best' estimate of recoverable reserves at A-1, where ONGC Videsh Ltd and GAIL together hold 30pc, at four trillion cubic feet. Production estimates are being put at 18 million standard cu m/d, 40pc of volumes needed to support investment in a transnational pipeline.

"Gas found in Block A-1 and in its adjacent block A-3 will first be used to meet local demand in Myanmar and if there is surplus, we will look at export options," he said, adding Burma needs 200-300 million standard cubic feet per day (8.5 million standard cubic meters per day) of gas.

Burma plans to tie-up volumes in Block A-1 and A-3, which also has equity pattern similar to A-1, and explore development options -- a pipeline to India, China or Thailand or liquefied natural gas (LNG) to South Korea, Japan or India. "We know for sure the volumes do not support multiple export options," Myint said, adding reserve estimates in A-3 would be known by second half of 2007 after completing an appraisal programme.

Myanmar, he said, believes the blocks together hold an in-place reserve of 20 trillion cubic feet and can produce 2 billion cubic feet (56.6 million standard cu m/d) of gas for 25 years. "We need third party certification of reserves to establish our belief," he said.

Additional references

Xinhua, 20/06/08. http://news.xinhuanet.com/english/2008-06/20/content_8410027.htm

The China National Petroleum Corporation (CNPC), Myanmar and a consortium, led by the Daewoo International Group Corporation, signed a memorandum of understanding (MoU) in Nay Pyi Taw Friday on sale and transport of natural gas from the offshore blocks A-1 and A-3. The Daewoo consortium comprises South Korea Gas Corporation and India's ONGC Videsh Ltd and Gas Authority of India Ltd. (GAIL). The three parties also inked an agreement on launching joint feasibility study on onshore natural gas pipeline involving six companies of China, Myanmar South Korea and India, and an agreement contract on entrusting the planning department of the CNPC by the six companies to implement the feasibility study. The signing of the MoU signified the overall launching of cooperation in natural gas project between Myanmar and the four countries, officials said. **(Compiler's note:** The signing of the MoU and later agreements on the construction of the gas pipeline have effectively shut off any discussion about the use of the gas produced in blocks A-1 and A-3 for the production of electricity or other industrial projects in Myanmar)

Bloomberg/AFP, Myanmar Times, 03/09/07. <http://www.mmtimes.com/no382/b006.htm>

The Myanmar government will sell natural gas from from the A-1 and A-3 areas in the Bay of Bengal to the highest bidder among China, India, Bangladesh and Thailand, U Soe Myint, D-G of the Energy Planning Dept at the Myanmar EM, said in Singapore, dismissing reports that China had won the contract. "We have not concluded any deal with China," U Soe Myint said. "The price of gas is very much undervalued." Thailand is [currently] buying Myanmar's gas at about US\$40 a barrel for the equivalent amount of oil by energy content, compared with about \$69 [a barrel] in global markets, he said. Myanmar prefers to send the gas via a pipeline in the first phase before considering an LNG plant, U Soe Myint said. A Daewoo spokesman told AFP the company hopes to supply 600 million cu ft/d of gas, or 3.7 million tonnes of liquefied natural gas per year [from the two blocks] for up to 25 years. The Seoul government would like the gas to be liquefied and delivered to South Korea, which imports most of its oil and gas. But Daewoo has acknowledged it would be cheaper and quicker to pipe the gas to neighbouring countries.

Reuters, 16/08/07 <http://asia.news.yahoo.com/070816/3/36hf0.html>

Burma has agreed to sell gas from its A-1 and A-3 blocks to China, a major ally but not a stakeholder in the blocks, a senior EM official said in Yangon. "We have decided to sell the gas from A-1 and A-3 to China and details are under negotiation. Once we reach an agreement, we will go ahead," the official, who asked not to be named, told Reuters. "If everything goes well, the gas from these offshore blocks will be sold to China through a pipeline," he added. Thursday's comments were the first confirmation of that from Burma. The A-1 and A-3 fields off the Rakhine coast have proven reserves of 5.7 to 10 trillion cubic feet with up to 8.6 trillion cu ft recoverable, according to assessments by the U.S.-based international certification agency GCA.

Dow Jones, as reported in the Myanmar Times, 05/12/05. [Issue 295 of the MT is not available on-line.]

State-run MOGE is likely to conduct a feasibility study on a China-Myanmar gas pipeline soon, MD San Lwin said on the sidelines of the 8th ASEAN Council on Petroleum conference in Manila. "Our company has signed an MoU with China on the pipeline and we hope we'll conduct a feasibility study very soon." U San Lwin said Myanmar is also considering building a liquefied natural gas terminal in the future, because "we have a new discovery in the western part of our country." If approved, the pipeline would be built by a consortium, including South Korea's Daewoo International Corp, he said. However, no time-frame had been set for the project. "Based on the reserves and feasibility study, we will decide whether we should go ahead (with our plans)," he said.

Pradeep Puri, Business Standard (New Delhi), 17/01/04

<http://groups.yahoo.com/group/IFI-Burma/message/194>

The recoverable reserve of natural gas from a recently discovered off-shore gas field in north-west Myanmar is in the range of 4 to 6 trillion cubic feet (TCF) of gas, which is equivalent to 700 million to 1.1 billion barrels of oil. GAIL, which is part of Indo-Korean consortium, comprising ONGC Videsh Ltd, GAIL (India) Ltd, Daewoo International Ltd and Kogas that discovered the field, has already announced plans to invest around Rs 4,000 crore (US\$1 billion) to transport the gas from this field to India. Under the production sharing contract, MOGE, a dept of the government of Myanmar, has a 65pc share of the production, while the consortium reserves the right to market the remaining 35pc.

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AGREEMENT SIGNED FOR UPPER KACHIN HYDEL PROJECTS (MYITSON)

NLM, 02/01/07 <http://burmalibrary.org/docs2/NLM2007-01-02.pdf>

EPM-1 Zaw Min met with V-P Shi Chongliang of the China Power Investment Corp (CPIC) at his office here on 28 December. Also present at the call were Dep EPM No 1 Myo Myint, directors-general of enterprises under the the ministry, V-P of the Dept of Planning and Development Wang Xian Chun and responsible persons of CPI Corp, and MD Tun Myint Naing of Asia World Co Ltd. They discussed matters related to the implementation of the Maykha-Malikhya valley region hydel power project and the Ayeyawady confluence hydel power project.

Next, officials of HPID and personnel of CPI Corp signed an MoU for the Maykha-Malikhya Water Resources and Ayeyawady Confluence Hydel Power Project. After the signing ceremony, D-G Aung Koe Shwe of HPID and V-P Wang Xian Chun of CPI exchanged documents and had a documentary photo taken.

HPID and CPI will build the 2000-MW Chibwe hydel power project on the Maykha river and the 3,600-megawatt Ayeyawady Hydel Power Project at the confluence of the Maykha and Malikhya.

Website Information:

Kachin Development Networking Group, *Damming the Irrawaddy*, (October 2007).

<http://www.burmariversnetwork.org/images/stories/publications/english/dammingtheirrawaddy.pdf>

With maps, pictures, charts and a well-researched text, this is the best report currently available on the Myitsone dam near the confluence of the Malikhya and N'maikha. Sections of the report are included at various places below.

Kachin Development Networking Group, *Resisting the Flood*, (October 2009).

<http://www.burmariversnetwork.org/images/stories/publications/english/ResistingtheFlood-1.pdf>

This report updates developments since 2007 at the Myitsone and Chibwe project sites. Parts of the report are included below.

China Power Investment Corporation. <http://eng.cpicorp.com.cn/>

China Power Investment Corporation (CPIC) was set up from some of the constituent businesses of the former State Power Corp of China. With a registered capital of 12 billion RMB, CPIC has been approved as a state-authorized investment entity and state-owned holding corporation. By the end of 2005, the total assets of CPI amounted to 138.342 billion RMB. The installed capacity under CPIC's control total is 32,386 MW and its equity capacity is 24,294 MW. CPI has 169 member companies/ institutions and 15 participating companies with 84,527 employees in total. CPIC owns assets in 23 provinces, autonomous regions and municipalities in the PRC.

Compiler's note: Information under this key article in the first and second editions of the compendium also included the CPIC projects in N'maihka and Malihka valleys and the Chipwenge project. These can now be under '[Chipwi creek plant](#) to power huge hydel project in Kachin state' (MT: 24/03/08). For information on

power transmission from the Myitson project see [Chinese engineers planning](#) grid connection with Burma projects (IRROL: 23/01/10).

Map references:

A good set of maps for understanding the context in which the Maykha-Malikha valley series of dams will be built is to be found in *Damming the Irrawaddy*. The locations of the major dams are tentatively pinpointed on doc p 17. The maps on doc pp 28 and 62 show the estimated flood area of the Myitsone dam near the confluence of the N'mai and Mali rivers.

<http://www.burmariversnetwork.org/images/stories/publications/english/dammingtheirrawaddy.pdf>

These maps may be usefully compared with the older U.S. Army topographical series listed below.

Burma 1:250,000: Series U542, NG 47-09: Myitkyina

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ng47-9.jpg>

China 1:250,000: Series L 500, NG 47-10: T'eng Ch'ung

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-10.jpg>

The location of the Myitson or Confluence dam and power station is to be found at a point where these two maps join. See grid square 38\2, 9\2 on both maps.

The best map for understanding how the river will be dammed up and rechanneled at the confluence is to be found in *Resisting the Flood* on p A 10.

<http://www.burmariversnetwork.org/images/stories/publications/english/ResistingtheFlood-1.pdf>

See also Google Earth for a bird's-eye view of how the two rivers meet at the confluence. The Myitson river bend is easily located by a pop-up tag at 25°42.38' N, 97°29.54' E.

Additional references

Data summary: [Myitson](#)

See above: 'Prime minister [updated on the Myitson](#) hydropower project' (NLM: 25/01/11)

NLM, 07/10/10. <http://www.burmalibrary.org/docs09/NLM2010-10-06.pdf>

Maj-Gen Myint Soe of the MoD inspects the construction of the main dam of the Myitsone hydropower project. Preparations are underway for construction of the spillway. [A photo shows the dam site in the distance across the river but there is little evidence of the construction activity mentioned in the news item.]

Irish Times, 19/06/10. Excerpt.

<http://www.irishtimes.com/newspaper/weekend/2010/0619/1224272838627.html>

As part of a resettlement plan for those affected by construction of the Myitsone dam, two new villages of 500 houses each are being built by Asia World Co. People from 47 isolated farming communities will be squeezed into these two small towns. People were told to be ready to move by May or June of 2010, but contractors appear to have fallen behind schedule.

KNG, 09/06/10. Edited and condensed.

<http://www.kachinnews.com/News/Three-more-villages-being-shifted-from-Myitsone-dam-site.html>

Residents of three more villages have been relocated from their homes in the Myitsone dam site area. Over 100 villagers from Dawng Pan, Sut Ngai Yang and Shoi Ba villages near the dam have been moved since early June, said local sources. At least 40 families were shifted from their homes where they have lived for decades. They were moved to Lungga Zup village about 18 miles from Myitkyina where small new houses have been constructed for them. They were prohibited from taking along their cattle and other domestic animals to the new place, said the villagers. However, a few families with farms on the mountain side are still left in these villages. This is the second move at relocating villages after Mazup village was shifted on May 28 by the junta. "People (workers) came from Myitkyina and pitched in to relocate the villages," said a source.

KNG, 28/05/10. Edited and condensed.

<http://www.kachinnews.com/News/First-village-forcibly-relocated-for-Irrawaddy-dam-project.html>

The first of the ethnic Kachin villages in the Myitsone dam construction area has been moved to a new location, said village sources. In a surprise move, the axe fell on Mazup Village, (Mazup Mare in Kachin), which houses 63 households, with over 150 people. All the villagers were shifted to new houses (40 x 60 sq ft) constructed by the authorities in Lungga Zup village, 18 miles north of Myitkyina. Mazup village was located in the area between the Mali N'Mai rivers, near the confluence of the two rivers, 28 miles north of Myitkyina. The soil here is fertile and yields good crops, said villagers. About 200 people including government employees from different departments in Myitkyina, members of the junta-backed USDA, Burmese Army officers and civilians who had been ordered to help in the relocation, participated in the relocation activities. 600 houses have already been built in Lungga Zup for villagers to be relocated from the project site, said residents in the dam area. [Photo showing new houses in Lungga Zup village]

AKT, Democratic Voice of Burma, 26/05/10. Condensed.

<http://www.dvb.no/news/60-arrested-over-kachin-dam-bombs/9176>

A major police operation in Burma's northernmost Kachin state netted around 60 people last night suspected to have been involved in the bombing of the Myitsone dam in April. A resident of Myitkyina told DVB that the operation involved police, ward officials and anti-narcotics agents, as well as the tactical operations commander of the Burmese army's Northern Command. At least three bombs exploded at the controversial Myitsone dam site, killing three and injuring 20. The explosions occurred in the compounds of Asia World Co Ltd, which is building the dam. All three victims were company employees. The compound is located 18 miles north of Myitkyina. Posters were placed around Myitkyina displaying sketches of the suspects and announcing rewards for their capture. Some of the detainees were freed later, according to the resident. He added that authorities were "taking advantage of the bombings" to arrest people who had protested the construction of the dam which is likely to displace up to 10,000 people and has been strongly opposed by Kachin locals.

Kyaw Thein Kha, IRROL, 25/05/10. Edited and condensed.

http://www.irrawaddy.org/article.php?art_id=18552

The Kachin Independence Organization (KIO) met with the commander of the Northern Military Regional Command (NRMCM) to discuss the border guard force (BGF) issue and the bomb blasts at Myitsone Dam, a KIO source told The Irrawaddy on Tuesday. KIO officials said that during their meeting, they also discussed the youth detained by the government as suspects in the Myitsone bomb blasts. The authorities had arrested several youth suspects in Myitkyina, but they were released after interrogation, according to sources in Kachin State. Other youth suspects, including a Kachin youth leader, were arrested on Monday. "One or two of them have been released, but the authorities arrested more youths on Monday," said the KIO official. Most of the arrested youths are not KIO members, but some have attended social work training, the official said. Following a series of bomb blasts on April 17, local authorities interrogated local residents in the Myitsone Dam area, about 25 miles north of Myitkyina. The Myitsone Dam project is a joint operation of Asia World, the main Burmese contractor, and a state-run Chinese company, the China Power Investment Corporation.

KNG, 20/05/10. Edited and condensed.

<http://www.kachinnews.com/News/Fresh-batch-of-300-Chinese-dam-workers-arrive-in-Myitkyina.html>

A fresh batch of over 300 Chinese dam construction workers arrived in Myitkyina to replace an earlier lot, who fled to mainland China in the wake of serial bomb blasts on April 17, said eyewitnesses. The new arrivals belong to the Chinese state-owned China Power Investment Corporation (CPI). "At least 30 trucks arrived in Myitkyina today transporting over 300 Chinese workers and construction materials like cement and steel," the eyewitnesses said. With the arrival of the fresh batch of Chinese workers local people will be under severe pressure from the regime to relocate from their homes, where they have been living for decades. It will also usher in demographic changes in the region. Local authorities and township leaders held a meeting on May 16 in Tang Hpre village at the Myitsone 27 miles from Myitkyina to formulate a strategy to shift residents, who are still resisting relocation. Meanwhile authorities continue arresting and investigating residents over the bomb blasts but are yet to find the perpetrators.

Ko Htwe, IRROL, 22/04/10. http://www.irrawaddy.org/article.php?art_id=18297

The owner of a rubber plantation near the Myitsone dam project and four employees were arrested on 19/04/10 by township police, according to the Kachin News Group (KNG). Two employees were later

released. The man was identified as Ze Lum of Chyinghkrange village. According to Lapai Naw Din, the editor of the Thailand-based KNG, Ze Lum's rubber plantation was burned down to make way for construction activities when the dam project was started. When he asked for compensation from Asia World co, they refused to give him anything.

Kyaw Thein Kha, IRROL, 17/04/10. http://www.irrawaddy.org/article.php?art_id=18266

A series of bombs exploded early on 17/04/10 around the area of the Myitsone dam project in Kachin State, according to residents of Myitkyina, the Kachin state capital. "At least, seven bombs exploded in three places in and around the Myitsone dam project this morning," a source told The Irrawaddy. "Two cars were destroyed, but I heard that nobody was killed in the blasts." However, the Kachin News Group based in Thailand reported on Saturday that four people had died and 12 were injured in the blasts, the majority of whom were Chinese workers. There are currently around 300 workers from China employed by the China Power Investment Corporation at the dam site. At least three bombs reportedly exploded in front of the offices of the Asia World Company, the main Burmese contractor at the project. The controversial dam project has been condemned by human rights groups and environmentalists. About 15,000 local people are due to be relocated to make way for construction of the dam.

David Paquette, *Irrawaddy*, April 2010 (Vol 18, No 4). Excerpt.

http://www.irrawaddy.org/article.php?art_id=18217

Plans were hatched quietly in 2006 between Burma's Ministry of Electric Power and the state-run China Power Investment Corporation (CPI) to clear the way for seven mega-dams in Kachin State in northern Burma. However, it was not until June 16, 2009, that the Burmese state media reported that the government had signed an MoU with CPI on the project. In a leaked memo obtained by The Irrawaddy, CPI confirmed it had met with representatives from the Yunnan Power Grid Company on March 7, 2007, and negotiated a deal whereby "electricity yielding from Myanmar [Burmese] hydropower projects [will] be transmitted back to China via the Yunnan power network." In other words, CPI is providing most of the financing for the dam projects, along with a handful of other Chinese investors, while Yunnan Power is building the transmission lines to transfer the electricity to southwestern China. This fits in with China's West-to-East Power Transmission Policy, a wider initiative that aims to supersede the country's reliance on coal mining in its industrial east. . . . In the January [2010] issue of China Investment, a state-run magazine, Zhou Jiachong, the director of China International Engineering Consulting Corporation, one of the Chinese state enterprises involved in the Kachin State dam projects, confirmed that companies representing the two governments had made an agreement in 2009 for hydroelectric development along the Irrawaddy River that would have a combined electricity generating capacity of 16,000 megawatts—about two-thirds the entire capacity of neighboring Thailand and more than 10 times Burma's current supply. **[Compiler's note:** The information provided by David Paquette in the article 'Dam Nation' is clearly at variance with the facts. There was nothing "secret" about the deal by CPI to develop hydropower resources in upper Kachin state. As noted in the edition of the New Light of Myanmar of 02/01/07, an MoU on the development of the "Maykha-Malikha Water Resources and Ayeyawady Confluence Hydel Power Project" was signed between CPI and Hydropower Implementation Dept of EPM-1 on the 28th of December 2006 (see the lead article above). According to the New Light of Myanmar of 20/06/09, a final agreement on the development, operation and transfer of the Maykha – Malikha and Myitson project (commonly known as a B.O.T. agreement) was signed on the 16th of June 2009 during a visit of the SPDC's Gen Maung Aye to Beijing. In the time between these two events a whole series of signing ceremonies related to the mega-hydropower project, all publicly itemized in NLM and other news publications (as cited below), took place. The details of the B.O.T. agreement signed in Beijing have not been made public, but it seems safe to assume that they provide for some of the power that is produced in the Upper Kachin area to be made available for use inside Myanmar, as in the case of the Shweli-1 hydropower development]

Salai Han Thar San, Mizzima, 04/03/10. Edited and condensed. <http://www.mizzima.com/news/inside-burma/3610-junta-forcibly-acquires-relocation-consent-for-myitsone-dam.html>

Myitkyina township PDC members forced Chairman Aung Bahn of Tan Hte VPDC to give his consent to the relocation of the village by signing on a consent paper on 07/02/10. TPDC members told him that they acting on orders of the Home Ministry. He was threatened with arrest and imprisonment if he refused, according to Chairman Awng Wah of the Kachin Democratic Network Group (KDNG). Local authorities are

currently preparing to relocate about 60 villages in preparation for the construction of the Myitsone hydropower dam.

NLM, 26/12/09. <http://www.burmalibrary.org/docs08/NLM2009-12-26.pdf>

EPM-1 Zaw Min and President Lu Qizhou of China Power Investment Corporation and officials attend a ceremony to launch Myitsone dam project near Tanphe Village in Myitkyina township, downstream of the confluence of the Maykha and Malikha rivers. They are briefed by the director and officials of No 5 Construction Group of the Hydropower Dept about ongoing pre-engineering work. They also visit the site of the Chibwenge dam project in Chibwe township.

KNG, 24/12/09. Edited and condensed.

<http://www.kachinnews.com/News/First-500-households-await-relocation-from-Irrawaddy-dam-site.html>

Relocation has been ordered for 500 households in the Myitsone dam project site, according to military officers attending the inaugural ceremony. The villagers will be moved to a site between Chyinghkrang and Lungga Zup villages about 18 - 20 miles north of Myitkyina. The site is currently being levelled by a bulldozer of Asia World Co which will construct the homes for those to be relocated. Each household is also to be provided with a one-time grant including a sack of milled-rice and a viss of edible oil, said villagers who attended the ceremony.

KNG, 21/12/09. Edited and condensed.

<http://www.bnionline.net/news/kng/7591-inauguration-of-dam-construction-marred-by-anti-dam-posters-.html>

Construction of the dam at the confluence of the Irrawaddy River was inaugurated today at the construction site near Lahpe, 22 miles north of Myitkyina. The ceremony was held a week earlier than originally scheduled. Officials of Asia World Co and China's state-owned China Power Investment Corporation (CPI) along with EPM-1 Zaw Min, CPT Minister Thein Zaw and the Northern Regional Commander Soe Win attended the ceremony, said company sources. About a hundred people from Lahpe and Tang Hpre attended the ceremony. Meanwhile students have put up 500 anti-dam posters in Myitkyina and the dam project sites. The hand-written posters calling for the scrapping of the Myitsone dam were pasted on walls near high schools and in other public places in Myitkyina, according to students who took part. They were also posted in the villages close to the dam site such as Tang Hpre, Ubyit, Dum Gan, Alam and Lungga Zup, said student leader Zau Shawng.

Amy Smith, John Campbell, IRROL, 19/11/09. http://www.irrawaddy.org/article.php?art_id=17247

Protests by villagers at Tang Hpre near the Myitsone dam site in October appear to have resulted in a delay in the arrival of 20,000 Chinese construction workers waiting to be transferred to the area. Many villagers have said they would rather die in their villages than leave the confluence. The tension has been ratcheted up and support for opposition has increased among the villagers. The KIO has been unusually silent on the issue of the dam.

Kachin Development Networking Group, *Resisting the Flood*, (October 2009).

<http://www.burmariversnetwork.org/images/stories/publications/english/ResistingtheFlood-1.pdf>

A photograph of a diagram map showing the layout for the Myitsone dam, diversion channel and power house which is on display at the project camp near the dam site, is included on p 10 of the report. It shows that the project has been designed to take advantage of the 'big bend' in the Irrawaddy at the confluence of the Malikha and N'maikha. The map was prepared by the Changjiang Institute of Surveying, Planning, Design, and Research (CISPDR) from China which is responsible for the detailed design of the project

According to the report, sixty villages in the flood plain of the Myitsone dam which are home to 15,000 people are going to be relocated over a period of six months beginning in October 2009. Local officials have been going from house to house since September getting residents to sign 'compensation' agreements that detail the size and composition of their landholdings. The process was begun in the villages of Tanghpre, Chyinghkrang, Njip, Nsawp, Lahpa, Layen, Nawngkhkying, and N-gan. Chyinghkrang village, for example, has a population of approximately 350, most of whom are farmers. The village has 2,000 acres of rubber

plantations, 300 acres of mixed fruit orchards and an additional 200 acres of orange orchards that have been established for over twenty years. All of these will have to be abandoned.

Villagers in the Myitsone dam area are firmly opposed to the project. Numerous public prayer services against the dam have been held, including one in early Oct-09 when 300 persons from several villages and faith groups assembled at Tanghphe near the confluence. In a letter to the Northern Commander, dated 09/10/09, the Tanghphe village women's group publicly appealed to him to bring their objections to the construction of the dam at the confluence to the attention of the authorities in Nay Pyi Taw.

KNG, 24/08/09. <http://www.kachinnews.com/index.php/news/1054-irrawaddy-hydropower-project-to-displace-many-kachin-villagers.html>

On 05/08/09 officials from the Myitkyina Administrative Office and government departments held a meeting with villagers of Chyinghkrang in the area to be cleared for dam construction about 17 miles north of Myitkyina and told them their village would have to be moved. The next day, Northern Region commander Maj-Gen Soe Win also met with the same villagers and told them they could farm just as well in the hills as in the river valley. The meetings followed a visit by the military junta's Gen Maung Aye to the confluence town of Tang Hpre on July 19, said local residents. Soon after Snr-Gen Maung Aye's visit to the hydropower project site, each family in the villages around the dam project site were required to sign a special form regarding displacement provided by the Asia World Co. A Tang Hpre resident said they had to provide a list of family members, and information about their homes, number of fruit trees on their lot, the size of their family- owned land and plantation. The villagers around the hydropower project site have yet to be instructed to move to new areas. They have not been offered any compensation by either the Asia World Co or the government.

NLM, 21/06/09. <http://www.burmalibrary.org/docs07/NLM2009-06-21.pdf>

[During a visit to the PRC by SPDC Vice-Chairman Gen Maung Aye, . . . Myanmar Ambassador U Thein Lwin and President of China Power Investment Corporation Lu Qizhou signed a MoA between the Dept of Hydropower Implementation and China Power Investment Corp for the Development, Operation and Transfer of the Hydropower Projects in Maykha, Malikha and Upstream of Ayeyawady-Myitsone River Basins and exchanged notes" on 16/06/09.

NLM, 02/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-02.pdf>

Officials of China Power Investment Co Ltd (CPIC) led by PRC Minister of Energy Zhang Guobao together with Deputy EPM-1 Myo Myint visited the Ayeyawady confluence hydropower site on 29/03/09. They were briefed on the implementation of the Confluence and the Chibwaynge hydropower projects by Engineer Shi Su Byan of CPIC.

Xinhua, 27/03/09. <http://english.cri.cn/6826/2009/03/27/1721s468995.htm>

Li Changchun, a member of the Standing Committee of the Political Bureau of the CPC Central Committee, of the PRC, met with Myanmar's Prime Minister Thein Sein Thursday amidst his on-going visit to Myanmar. During his visit, China and Myanmar . . . agreed to support the development of hydropower resources in Maykha, Malikha and up-stream of Ayeyawady-Myitsone river basins. Commenting on the agreement Li said, "In recent years, China and Myanmar have carried out fruitful cooperation in energy, hydropower, infrastructure and other areas, bringing real benefits to the two peoples." All these big projects "can lay a solid foundation for the future economy," Li said, adding that he hoped the two sides would "continue to explore new areas and new ways for common development."

NLM, 27/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-27.pdf>

A ceremony to sign agreements between Myanmar and the PRC was held at the hall of the SPDC Office in Nay Pyi Taw. . . . EPM-1 Zaw Min and Head of China's National Energy Administration Zhang Guobao of the PRC signed the 'Framework Agreement on Development of Hydropower Resources in the Union of Myanmar' between the two government bodies. Deputy Minister for Finance and Revenue Hla Thein Swe and Governor Li Ruogu of Export-Import Bank of China inked an MoU 'Regarding Buyer's Credit for

Construction Projects between the Export- Import Bank of China and the Myanmar Ministry of Finance and Revenue’.

KNG, 14/03/09. http://www.kachinnews.com/index.php?option=com_content&task=view&id=742

Villagers in Dumgan, 14 miles north of Myitkyina, have been told by Asia World Co employees that Chinese labourers coming to work on a hydropower project there will be based in the vicinity of the village. Hundreds of Chinese engineers and workers are expected to arrive at the project site in October this year to start construction of Myitsone dam, according to sources in the company.. Several houses for Chinese engineers and camp required for 15,000 Chinese labourers are being constructed at three main places in the project site by the Asia World Company, said local eyewitnesses. [A good aerial photo of the confluence of the Mali and N'mai rivers is included with the article, which includes considerable background information from the local communities in the Myitsone area.]

KNG, 12/03/09. <http://www.bnionline.net/news/kng/5966-explosives-to-be-used-on-irrawaddy-river-bed.html>

Explosives are in place on the bed of the Irrawaddy river two miles below the confluence of Mali and N'Mai rivers, close to the site of the proposed dam there, according to Chinese engineers at the project site. Yesterday evening, the sound of two explosions from the project site was heard by residents of Tang Hpre, the large Kachin village at the confluence. Meanwhile, local Kachin gold miners near the river are being expelled by Burmese Army soldiers and Asia World Co, the prime contractor for the project, said local short-time workers of Asia World Co. The miners said a group of Burmese soldiers from Northern Command headquarters in Myitkyina had seized engines, tools and equipment used for gold mining operations in the Irrawaddy at the project site.

KNG, 04/03/09. <http://www.bnionline.net/news/kng/5917-camps-for-15000-chinese-labourers-at-irrawaddy-river-hydropower-project.html>

Labour and construction machinery camps for CPIC's Upper Kachin hydropower projects are being built close to where the confluence of the N'Maikha and Malikha forms the beginning of the Irrawaddy river. One is at a place along the Irrawaddy called Lungga Zup in Kachin where Kahpre village is situated [about 16 miles north of Myitkyina], according to residents in the project area. They said that Asia World Co Ltd owns five acres of land in Kahpre village where it has already built new labour camps. The camps are meant to accommodate 15,000 Chinese construction workers and labourers who are expected to arrive in October this year. Presently, a hundred Chinese inspectors and labourers are working at the project site day and night.

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

At a co-ordination meeting (1/2008) of the Special Projects Implementation Committee in the office of the Commander-in-Chief (Army), EPM-1 Zaw Min gave a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the Committee. [Among the the fifteen are] the Yi Nan (1200 megawatts), Khaung-lanphu (2700 megawatts), Phizaw (2000 megawatts), Wuhsauk (1800 megawatts), Chiphwe (2800 megawatts), Chiphwenge (99 megawatts), and Laikzar (1900 megawatts) hydropower projects in Kachin state.

[Compiler's note: There are significant differences in the list of projects noted above and those published in NLM on 02/01/07 and 05/05/07. It would seem that the new list reflects the results of two years of research by field teams financed by the China Power Investment Corp. As indicated in a news report of the Myanmar Times (24/03/08), a feasibility study of the proposed projects in northern Kachin state was expected to be delivered by year's end, and the list provided by EPM-1 to the SPIC meeting would appear to be in line with what that report will recommend. Notably, the proposed outputs of several power plants including those at Khaung-lanphu, at Phizaw, at Chiphwe, at Chiphwenge and at Laikzar have been increased. The projects at Pashe and Lakin creek have disappeared, probably in favour of the one announced for Wuhsauk on the N'maikha which is somewhat to the north of the Lakin site. The location of the Yi Nan project here mentioned for the first time has yet to be identified. The revised list was still on the official books in March 2010 (ELOV015).

KNG, 11/11/08. http://bnionline.net/index.php?option=com_content&task=view&id=5342&Itemid=1

About a hundred Chinese workers have arrived back in groups at camps of the Myitson dam project beside the Myitkyina-Sumprabum car road since the beginning of November, residents near the hydropower project

site said. According to a source close to the camps, hundreds of labourers from villages [near the site] will be recruited for work on the project.

Violet Cho, IRROL, 19/08/08. http://www.irrawaddy.org/article.php?art_id=13944

A 5.3 magnitude earthquake struck near the Burma-China border on 19/08/08, according to the US Geological Survey (USGS). No deaths were reported. The quake was located 224 km from Dali in southwest China and 65 km from Myitkyina in Burma [and the location of the proposed 3,500-MW Myitsone dam on the upper Irrawaddy]. China's Xinhua News Agency said the tremor destroyed buildings and about 1,200 people were forced to evacuate their homes near the epicenter, an area populated by large numbers of ethnic minorities. According to the report, "Damming the Irrawaddy," the Myitsone dam is located less than 100 km from a fault line where the Eurasia and India tectonic plates meet. "If the Myitsone dam is built and breached by an earthquake, Myitkyina, with more than 140,000 people, will be at risk and hundreds of thousands of people in Waingmaw, Sinbo and Bhamo townships along the Irrawaddy will be under water," said Naw Lar, co-ordinator of the Kachin Network Development Group.

KNG, 07/06/08.

http://bnionline.net/index.php?option=com_content&task=view&id=4277&Itemid=6

Testing activities at the Myitsone dam site have been temporarily suspended with the onset of the monsoon season but will be stepped up when winter season arrives, according to sources close to Asia World Co.

Kyaw Thu, Myanmar Times, 24/03/08. <http://mmtimes.com/no411/b002.htm>

A feasibility study that will pave the way for the construction of seven mega-hydropower projects in Kachin state is expected to be finished by the end of 2008, according to an energy expert close to EPM No 1. The planned projects will theoretically produce a total of 16,500 megawatts of electricity and are expected to take 15 years to build. Experts from both countries have been conducting surveys to produce the feasibility report for the projects. The reports will likely determine whether Myanmar's government gives the projects a green light.

NLM, 03/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080203.htm>

EPM No 1 Zaw Min meets with D-G Cao Baojun of China Power Investment (CPI) in Nay Pyi Taw to discuss bilateral co-operation in the production of hydropower.

Saw Yan Naing, IRROL, 29/01/08. http://www.irrawaddy.org/article.php?art_id=10064

According to a source who recently observed the Myitsone dam site, about 20 Chinese and a handful of Burmese engineers and 300 construction works of the Asia World Co are currently working at the site of the hydropower project, 26 miles (42 km) north of Myitkyina. The workers have built shelters in the area by the site and are currently tasked with detonating dynamite underneath the Irrawaddy River to break up the rocks and create space for the dam. The project is being implemented under an agreement signed in late 2006 with the state-owned China Power Investment Corporation (CPI) and the EPM-1. Meanwhile soldiers of LIB 121, which has been assigned to provide security at the dam site, have taken over a library building at Tanghpore village some 3 miles (5 km) away, where they are extorting money from local merchants and taking materials from the shops in the village. They are also reported to be taking vegetables, pigs and chickens from local farms. Naw La, coordinator of the Chiang Mai-based Kachin Environmental Organization, claims that more than 40 villages near the dam site will be flooded when the dam is finished.

KNG, 16/11/07. http://www.bnionline.net/index.php?option=com_content&task=view&id=3015&Itemid=6

Release of four women and an elderly man arrested for opposing Myitsone dam project; had been held for two days in No. 1 Police Station in Myitkyina; arrests were related to signature campaign in Myitkyina against the Myitsone dam; detainees were interrogated by members of the Special Branch (SB) and Military Affairs Security Unit (Sa-Ya-Pha); release was conditional on a guarantee by respected persons in the community that the detainees would cease the signature campaign. The previous week anti-dam wall writings saying "No Dam Myitsone: Than Shwe killer" had been spray painted at key places in Myitkyina where there are always crowds. The wall writings were the handiwork of university students owing allegiance to the All Kachin Students Union (AKSU).

Kachin Development Networking Group, *Damming the Irrawaddy*, October 2007.

<http://www.burmariversnetwork.org/images/stories/publications/english/dammingtheirrawaddy.pdf>

A preliminary study of the Myitsone [confluence] dam (*Irrawaddy Myitsone Dam Multi-purpose Water Utilizing Project*, prepared by MEPE and the A&IM in 2001-02, estimated the maximum height above sea level of the dam reservoir at 290 metres (p 23). Using contours derived from a digital elevation model database of the Upper Kachin region, KONG projects a flood zone of 766 sq km (map, p 22), inundation of 47 villages (map, p 58) and the displacement of an estimated 10,000 people, if the project proceeds as planned. Many other villages will be impacted by a reduction in available land for farming, loss of forests and an influx by those displaced by the flood in other villages. The main roads from Myitkyina north to Putao and northeast to the Chibwe area will also be cut off. The report presents valuable insights into the traditional patterns of life in the confluence area, much of which it claims will be severely disturbed or lost completely, should the dam plans go ahead (pp 25 – 32). Safety concerns involving the recent collapse of two dams in the area are cited (see below, 'KIO promises better power supply for [Kachin state](#)'). Detailed information is provided on the threatened loss of biodiversity in the Mali and N'mai river basins and on probable health risks resulting from the proposed dam scheme. Extensive gold mining along the beds and banks of both the Malikha and N'maikha in recent years has produced high levels of mercury in 22 fish species along the Irrawaddy. "Any mercury accumulated in the area will be trapped behind the [Myitsone] reservoir where it will be transformed to methylmercury. When the water is released . . . millions living along the Irrawaddy throughout Burma will be affected" (pp 42-3). Two maps showing the projected flood area and the villages affected are included. Colourful photos illustrating the traditional life patterns in the area accompany the text.

Inc-Global website information, September 2007.

http://inc-global.com/index.php?option=com_content&task=view&id=41&Itemid=55

Yu Pei Geng, GM & Chief Engineer of China Power Investment Corp, addresses an international seminar in Beijing on the subject of Myanmar-China hydro-power projects, including updates and developments on the Maykha river project, the Maykha-Ayeyawady project and the Myanmar Hydropower Dept.

Mizzima, 01/08/07. <http://www.mizzima.com/MizzimaNews/News/2007/Aug/01-Aug-2007.html>

Kachin activists who staged a rally in New Delhi to demand a halt to a planned hydro power project involving the construction of several dams in northern Burma, claimed that at least 50,000 villagers around the dam sites will be displaced because their villages will be inundated. They said over 100 Chinese workers have already been brought into Kachin state to work on the project and that there are plans to bring in at least 40,000 labourers from China.

KNG, 28/06/07. http://www.bnionline.net/index.php?option=com_content&task=view&id=1930&Itemid=6

Myitsone residents told KNG that the number of Chinese visitors has increased significantly following pre-testing activities for the Myitsone hydropower project which began last year. Recently, a group of Chinese inspectors led by Zhou Chuan-song, the Deputy Chief Engineer of the Space Surveying Company under the Changjiang (Yangtze River) Institute of Surveying, Planning, Design and Research, completed five months of inspection in Myitsone. A Chinese news story published on 30 May 2007 provides further details. <http://www.cjw.com.cn/index/civilization/detail/20070530/88736.asp> **Compiler's note:** According to *Damming the Irrawaddy* (p 15), following the signing of the MoU between CPI and HPID (see lead article above), Chiangjiang teams carried out geological and hydrological surveys at the Myitsone site from Jan to May 2007. CISPDR is the largest engineering institute involved with planning, designing and supervising large-scale water conservancy and hydropower projects in the PRC. (*Damming the Irrawaddy*, p 19).

Kun Sam, IRRROL, 22/06/07. http://www.irrawaddy.org/article.php?art_id=7619

The Kachin Consultative Assembly (KCA) has sent a letter of complaint to Burma's military gov't asking it not to build a dam at the Irrawaddy confluence. The complaint followed a report in NLM on 5 May, 2007 that seven hydropower dams that would generate 13,360 MW were to be built in Kachin state. The largest of these is a 3,600-MW facility at the Irrawaddy confluence, 26 miles north of Myitkyina. According to the KCA, nine villages, including Tanghpore and nine villages in N'Jang Yang township would be flooded out if the dam is built. Tanghpore alone has 178 households and more than 1,000 residents, a primary school and a high school. The letter said the dam would destroy the lives and property of local people, damage natural resources and cause the loss of irreplaceable natural habitat. The gov't has not responded to the letter. **Compiler's note:** A translation of the letter can be found on pp 54-56 of *Damming the Irrawaddy*. The letter emphasizes the fact that much smaller hydropower projects would be able to provide the electricity needed

for the development of Kachin state. It calls upon the Asia World Co to inform the PRC companies collaborating in the project about the "grievous impacts" resulting from the building of the Myitsone dam.

NLM, 13/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070613.htm>

While in Beijing, EPM-1 Zaw Min met with V-Cs Deng Zon Zi and Jin Shoar Lu of China Power Investment Corp at the hall of Grand Hotel Beijing on 07/06/07. They discussed work on the hydropower projects at the Ayeyawady confluence and Chibwe creek and future tasks to be carried out in those places.

China Power Investment Corp website information, 21/05/07.

<http://eng.cpicorp.com.cn/news.do?cmd=show&id=24580>

On 21 May 2007, CPI South China Branch signed a co-operation agreement on co-development of hydropower projects in the N'mai Hka River, Mali Hka River and Irrawaddy river basins in Myanmar with South China Grid Corp (CSG). The two companies have become strategic partners in the project.

Compiler's note: CSG operates in the five southern provinces of the PRC where it assumes responsibility for the construction and management of cross-regional power transmission as well as the purchase and sale of power and the financing of power projects "at home and abroad". According to the company website, there is a total installed capacity of 79,540 MW in the region with transmission lines of 229 kV and higher spanning 41,005 km and substation capacity of 138,400,000 kVA. CSG says it has been particularly active in promoting the process of Greater Mekong Sub-region power co-operation.

<http://eng.csg.cn/topic.php?channelID=1&topicID=1> Without providing verification, *Damming the Irrawaddy* (p 11) cites a report of the Myanmar Hydropower Dept of CPI's South China Branch which claims that Yunnan Power Grid Co, a wholly owned subsidiary of CSG, will be responsible for transmission of electric power produced by the project to the region.

NLM, 07/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070507.htm>

Opening of a project office for the Maykha and Malikha Valley and Confluence Region and Chibwe Creek hydropower projects, in Sitapu ward of Myitkyina. EPM No 1 Zaw Min, V-P Shi Chengliang of CPI, Project Manager Niu Xinqiang of Chiangjiang Design Institute (CISPDR), MD Tun Myint Naing of Asia World Co and an official of CPI Southern Branch participated.

KNG, 07/05/07. http://www.bnionline.net/index.php?option=com_content&task=view&id=1651&Itemid=6

A Kachin Anti-Dam Committee (KADC) has been formed by four Kachin organizations -- Kachin Labour Union (KLU), All Kachin Students and Youth Union (AKSYU), Kachin Development Networking Group (KDNG) and the Kachin Environment Organization (KEO). KADC was formed after work started on a 65-MW hydroelectric power project on Chibwi creek in Kachin state on April 30. KADC aims to raise awareness both in Kachin state and internationally that will bring a halt to the project. It will have branch offices in Thailand and India.

NLM, 05/05/07 <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070505.htm> (CB)

HPID and the China Power Investment Corp (CPI) of the PRC started construction of a hydropower plant on Chebwe Creek in Kachin State on 30 April. The project, which is expected to generate 65 MW is being built to supply power for seven other hydropower projects to be built on the Maykha and Malikha (rivers) and at the confluence of the Ayeyawady. The seven other projects include the dam at the Ayeyawady confluence (3,600 MW), a 2000-MW project in the Chibwe area, a 1,600-MW-project at Pashe, a 1,400-MW project at Lakin, a 1,500-MW project at Phizaw, a 1,700-MW project at Khaunglanphu and a 1,560-MW project at Laiza, all in Kachin state. Together the projects are expected to generate 13,360 MW. Participants in the ground breaking ceremony included Maj-Gen Ohn Myint, EPM Zaw Min and CPI V-P Shi Chengliang.

KNG, 13/04/07. <http://www.kachinnews.com/read.asp?CatId=14&NewsId=158&>

On 24/03/07, Myawaddy TV reported that the government plans to construct a huge hydropower project on the Ayeyawaddy river (known to locals as Mali Hka) about 25 miles north of the state capital, Myitkyina. Locals say that Asia World Co Ltd has been carrying out pre-testing activities a mile below Myitsone since 2006. Several houses have been built at the site and others are under construction at riverside, but to date there is no sign that dam construction has started, according to residents of Tang Hpre village near Myitsone.

Compiler's note: a good map of the proposed location accompanies this KNG news item.

NLM, 25/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070325.htm>

A 3,600-MW generator that “will generate at least 2,090 megawatts” will be installed in the power plant of the Ayeyawady Confluence hydel power project. **Compiler's note:** The estimated average annual production figure of 16,634 million kWh cited in *Damming the Irrawaddy* (p 12) seems far closer to the mark. KNDG cites “project engineers” as the source of its estimate, but does not provide verification.

NLM, 06/11/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061106.htm>

In Nanning, EPM-1 Zaw Min meets with the V-C of China Power Investment Corp and China CAMC Engineering Co Ltd about surveying and implementation of hydel power projects at the confluence of the Ayeyawady, Maykha (N'maihka) and Malikha rivers.

NLM, 01/12/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051202.htm>

A Myanmar delegation led by EPM Tin Htut returns after signing an MoU between the HPD and YMEC in the PRC. **Compiler's note:** *Damming the Irrawaddy* (p 20) cites a report in the Yunnan Daily News of 01/12/05 that the MoU signed in Kunming on 30/11/05 had to do with the “N'mai Hka Basin Development Co-operation” (www.yndaily.com.cn/en/about.htm). In the months prior to the signing of the MoU with YMEC, Suntac Technologies, a Yangon firm that specializes in digital mapping, and Kunming Hydropower Design Institute both carried out survey work at the Myitsone dam site apparently under contract with YMEC (*Damming the Irrawaddy*, p 14). Up to the present, there is nothing to indicate that YMEC is involved in the Maykha (N'mai) - Malikha valley region hydropower project of the China Power Investment Corp.

Mizzima, 11/06/04. <http://www.mizzima.com/archives/news-in-2004/news-in-jun/11-jun04-19.htm>

Rangoon's plan to proceed with a dam at the Irrawaddy River confluence, in spite of a letter of objection from Kachin locals, has stirred anger. On 1 February, villagers from the N'Hkai bum area submitted a letter of objection outlining the negative impacts on their communities of the project. These include damage to 5,000 houses in over 20 villages and 18,000 acres of farm land, as well as to natural resources, wild life and valuable forest products in the N'hai bum area. Historic Christian missionary monuments will also be affected. The letter was sent to the SPDC's divisional commander, with copies to the KIO and the NDA-K. No reply was received from the authorities. A survey team from a Japanese company, Kang Seng [Kansai], visited the area twice in 2003. **Compiler's note:** A translation of this letter can be found on p 57 of *Damming the Irrawaddy*. There are some notable discrepancies between the translated version and the Mizzima news report.

Kachin Development Networking Group, *Damming the Irrawaddy*, October 2007, p. 11.

<http://www.burmariversnetwork.org/images/stories/publications/english/dammingtheirrawaddy.pdf>

A document titled “Irrawaddy Myitsone Dam Multi-purpose Water Utilizing Project”, prepared by MEPE and the Ag & Irrig Ministry and dated February 2002, provides the initial specifications of the Myitsone dam project. According to this document, the dam would be rock-filled, with a concrete face, 152 metres high and 152 metres long. The reservoir level at full brim would be 290 metres and the power house would have an installed capacity of 3,200 MW.

CHINA'S FIRST BOT HYDRO POWER PROJECT IN MYANMAR REVS UP

Yunnan Channel (Kunming), 30/12/06. (Source: Xinhua)

www.newsmekong.org/chinas_1st_hydro_bot_project_in_burma_revs_up

The Build-Operate-Transfer (BOT) agreement for the Ruili (Shweli) River I hydropower station, signed in Myanmar's capital, Naypyidaw, on Dec. 30, 2006 is China's first hydropower BOT project in its neighbouring country. The agreement was signed by the Yunnan Joint Power Development Co [YUPD] and HPID of Myanmar's EPM No 1. The project owner will be Ruili (Shweli) River I Power Station Co Ltd, which was formed by the above two parties. The Yunnan company, which was formed by Yunnan Huaneng Lancang River Hydropower Co, Yunnan Power Grid Co and Yunnan Machinery Equipment (E & I) Co Ltd, is dedicated to developing hydropower resources in Myanmar and southeast Asia. Shweli River I power station will also be the company's first hydropower project outside of mainland China.

The Yunnan company which owns 80pc of the Sino-Myanmar joint-venture will be fully in charge of the project construction, operation and management. The company will run the power station for 40 years after its completion, and then transfer it to the Myanmar government. The Ruili (Shweli) River I power station is located inside Shan state in northern Burma, 90 km from China's border city of Ruili. This will be a run-of-river hydropower station, which involves no resettlement, little land inundation and environmental impact. The installed capacity is 600 MW. The actual power supply will be 174.8 MW, and the annual power output will be 4,033 GWh. The electricity will be transmitted to both Myanmar and China through 230 kV and 220 kV cables.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-01: Mong Mit Shweli no 1 hydropower project near Man Tat village [23° 41' N, 97° 29' E], grid square reference: 38\3, 7\4 <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-1.jpg>

See also maps in *Under the Boot*, published by the Palaung (Ta'ang) Youth Network Group, Dec 2007, pp 11, 14, <http://www.salweenwatch.org/downloads/UndertheBootEnglish.pdf>

Dore, John and Yu Xiaogang, *Yunnan Hydropower Expansion*, March, 2004. See especially pp 20-21. http://www.mpowernet.org/download_pubdoc.php?doc=2586

Yunnan Huaneng Lancang River Hydropower Company Ltd (YHLHC) was one of five major generating companies formed when the PRC's State Power Corp was broken up at the end of 2002 and the SPC's assets were transferred to five independent electricity generating, two transmission and four consultant/construction companies. YHLHC became the dominant actor in the operation and development of the hydropower resources of the Lancang (Mekhong) and upper Jinsha (Yangtse) rivers in Yunnan, having acquired the already constructed Manwan and Dachosasan dams and power plants on the Lancang and the rights to develop six others including the 4200-MW Xiaowan dam. By February 2003, the shareholders in YHLHC were Huaneng Power International (HPI) (56%), Yunnan Development Investment Company (31.4%) and Yunnan Hongta Investment (12.4%). HPI, originally the largest independent power producer in the PRC, was listed on the New York exchange shortly after incorporation in 1994 and on the Hong Kong exchange in 1998. According to an article in the China Daily (24/09/03), Li Xiaopeng, chairman of the Huaneng Group, wants Huaneng to become the world's leading electricity producer, aiming to double its generating capacity by 2010 to 60,000 megawatts, and make it into the Fortune 500 list of the world's largest companies. To fund the Xiaowan dam alone, YHLHC has been able to borrow over US\$ 3 billion from three Chinese banks. Compiler's comment: It would appear that the development of 600-MW Shweli No 1, the 460-MW Shweli No 2 and the 360-MW Shweli No. 3 projects fit in well with the ambitious plans of Li Xiaoping's 60,000-MW empire. There can be little doubt that HPI's credit standing and its appeal to international investors will play a large role in seeing the Shweli projects through to completion.

Additional references

Data summary: [Shweli-1](#) [Shweli-2](#) [Shweli-3](#)

See above: '[Shweli-1 hydropower plant](#) officially inaugurated' (NLM: 17/05/09)

See below: '[Shweli transmission](#) line contract Signed' (People's Daily Online: 10/10/03)

'Contract for Shweli hydropower project [signed with YMEC](#)' (NLM: 09/08/03)

NLM, 27/11/10. <http://www.burmalibrary.org/docs09/NLM2010-11-27.pdf>

A three-part agreement on consulting services for the proposed Shweli-3 hydropower project was signed between the government's Hydropower Implementation Dept and AF-Colenco Ltd of Switzerland on Nov 25. Among those present were CEO Roberto Gerosa and VP Jean-Francois Belin of Colenco.

NLM, 26/11/10. <http://www.burmalibrary.org/docs09/NLM2010-11-26.pdf>

An MoA was signed with Huaneng Lancang River Hydropower Co and Asia World Co Ltd on the Shweli-2 hydropower project. The Shweli-2 project is designed to generate 520 MW and will be developed as a joint venture on the B.O.T system. D-G Kyee Soe signed for the Hydropower Planning Dept of EPM-1, President Yuan Xianghua signed for Huaneng Lancang and Chairman Tun Myint Naing signed for Asia World.

International Crisis Group, *China's Myanmar Strategy: Elections, Ethnic Politics and Economics*, p. 8 (Beijing, 21/09/10)

China Power Investment Corporation is investing \$30 billion in the Shweli-2 hydropower facility. [In support of this statement a footnote cites 于洪海 [Yu Honghai], 《开发东南亚水电，助力西电东送》，[“Develop Southeast Asian hydropower, support transferring power from Western China to Eastern China”], in 《中国能源报》 [China Energy], 12 May 2010.] **Compiler's note:** This is almost certainly an error. China Power Investment Corp is developing a network of dams and power plants on rivers in the upper part of Kachin state. An MoU for the Shweli-2 hydropower project was signed with the Huaneng Lancang River Hydropower Co Ltd in November 2009. There is no reason to believe that there has been a change in the plans to have Huaneng develop Shweli-2 or that the costs of this project would come anywhere close to \$ 30 billion.

NLM, 22/04/10. <http://www.burmalibrary.org/docs08/NLM2010-04-22.pdf>

Gen Than Shwe visits the site of Shweli-3 hydropower project in Momeik township where he is briefed by EPM-1 Zaw Min on the feasibility study for the main embankment, and work on the approach roads of the project as well as plans for building the main embankment, spillway, power intake structure, temporary embankment, saddle dyke and conduit and the arrangements for implementation of the project tasks. EPM-2 Khin Maung Myint reports on plans to supply electricity to the power grid network and installation of power lines. Shweli-1 power plant is generating 600 MW and Shweli-2 is expected to generate 640 MW. [A photo of the site of Shweli-3 is included in the print edition of NLM.]

NLM, 10/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-10.pdf>

Shweli-3 dam project will be implemented in Momeik township of Shan State North. On 7 March, EPM-1 Zaw Min, accompanied by Deputy Minister Myo Myint, visits the site where they are briefed by officials. Director Nay Myo Win of No 2 construction group reports to the minister on maintenance of the Twinnge-Momeik road, construction of a road to the dam site, road maintenance in Kyauktaung village, condition of the bridges on Mandalay-Wapyutaung-Momeik road and the road linking Momeik to the dam site. He also reports to him on sites chosen for construction of the project and other hydropower projects on the Shweli river. Geology Director Kyaw Nyein submits a report on geological conditions in the project area, feasibility tests and future plans. Afterwards, they inspect the dam site from a viewing deck on the left bank of the Shweli. (Photos are included in both the print and on-line editions of NLM.)

NLM, 18/02/10. <http://www.burmalibrary.org/docs08/NLM2010-02-18.pdf>

Agreement signed for consulting services for Shweli-3 hydropower project between the Hydropower Planning Dept of EPM-1 and Colenco Power Engineering Ltd (CPE) of Switzerland and Aung Pyi Tan Co. Signing for Colenco was Executive Vice-President Jean Francois Belin.

NLM, 31/12/09. Excerpt. http://www.burmalibrary.org/docs08/Electricity_article-NLM2009-12-31.pdf

Shweli-2 hydropower project will have a generating capacity of 640 MW and is expected to produce 3310 GWh annually; Shweli-3 hydropower project will have a generating capacity of 800 MW and is expected to produce 3995 GWh annually.

NLM, 16/11/09. <http://www.burmalibrary.org/docs08/NLM2009-11-16.pdf>

A ceremony to sign an MoU on Shweli-2 hydropower project to be jointly implemented by Hydropower Administration Department under EPM-1, Huaneng Lancang River Hydropower Co Ltd of China and Asia World Co Ltd was held at the hall of the ministry. EPM-1 Zaw Min delivered an address. The Executive Vice-Chairman and Managing Director of Asia World Co Tun Myint Naing spoke words of thanks. Also present at the ceremony were Executive Vice-Chairman Wang Yongxiang, Executive Vice-President Huang Guangming and party of Huaneng Lancang River Hydropower Co Ltd.

NLM, 18/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-18.pdf>

EPM-1 Zaw Min visited the Shweli hydropower plant on 15 April and inspected operation of the turbines. No 6 machine is currently under installation. The system is monitored through computers set up in the central control room of the plant. Installation of machines in the gas-insulated switching gear room continues. Distribution of the electricity produced will be managed through a GIS [geographic information system]. Work on the protection room and switch yard is still underway. The minister looked into construction of the regulating dam, spillways and afflux dam from the briefing hall of the project. The regulating dam is still under construction. The power plant will be officially opened soon.

Xinhua, 06/12/08. http://www.yn.xinhuanet.com/newscenter/2008-12/06/content_15112250.htm

The Shweli-1 power station, China's biggest hydropower project in Myanmar, has begun to supply power to China. No 2 generating turbine officially started operations on 04/12/08. The BOT (Build-Operate-Transfer) project is the first power station outside the country to supply electricity to China. The hydropower station, located on Myanmar's Shweli (Ruili) river, is equipped with six 100-MW generating turbines. It is being jointly built by Huaneng Lancang River Hydropower Co, Yunnan Hexing Investment and Development Co, and Yunnan Machinery and Equipment (I-E) Co. The BOT contract will last for 40 years. The generating station is connected to China's power grid, which serves the mission of China's "West-to-East Power Transmission". [Original in Chinese. Translation: Kevin Li]

Aung Gyi, Aung Shin, Myanmar Times, 01/09/08. <http://mmtimes.com/no434/n008.htm>

One of six hydraulic generators at the Shweli-1 hydropower project started producing electricity in the first week of August, according to U Win Kyi, director-general of HPID. The other five generators are expected to come on line one after the other and the plant will be inaugurated by the end of the year. It is being built under a joint venture with a consortium of Chinese companies and Myanmar's Dept of Hydroelectric Power. The Chinese consortium, known as the Yunnan United Power Development Co Ltd (YUPD), includes Yunnan Huaneng Lancang River Hydropower Co, Yunnan Power Grid Co and Yunnan Machinery and Equipment (I&E) Co Ltd. "The second generator started operating in the last week of August; the third one will commence in October; the fourth in December; the fifth in February next year and the last one should start in April," a YUPD representative in Yangon said last week. A 288km-long powerline links the Shweli plant to Mandalay where it will be wired into the national grid. According to an agreement signed with the consortium, Myanmar will get 15pc of the electricity generated by the plant for free and the rest will be sold to China. However, what price the electricity will be sold for remains unclear. "Detailed cost plans have been under negotiation but no decisions have yet been made," the representative said. The Chinese side has supplied the hydraulic steel structure and electromechanical equipment including turbine generators and transformers for the project.

NLM, 10/08/08. <http://www.myanmargeneva.org/08nlm/n080810.htm>

EPM-1 Zaw Min received Chairman Huang Guangmin of Yunnan United Power Development Co Ltd (YUPD) and party at the ministry in Nay Pyi Taw on 08/08/08. They discussed matters related to Shweli-1 hydro-electric power project.

NLM, 15/05/08. <http://burmalibrary.org/docs4/NLM2008-05-15.pdf>

The Hydropower Dept of EPM-1 and the Yunnan United Power Development Co Ltd of the PRC signed an MoU on Hydropower projects Shweli-2 and Shweli-3 to be carried out on the Shweli river. The agreement was signed in Nay Pyi Taw by the D-G of the Hydropower Dept and the vice-president of YUPD Co on 12/05/08. The Shweli-2 hydropower plant will be able to generate 460 MW [640 MW?], and Shweli-3 will generate 360 MW.

Hseng Khio Fah, SHAN, 30/04/08.

<http://www.shanland.org/humanrights/2008/villagers-forced-to-do-repairs-on-the-hydropower-dam-project>

On 21 April, Capt Kyaw Than, commander of LIB 144 based at Mantat in Namkham township, ordered villagers from Wangmeng, Hangkarm, Hinlong, Kawngkart and Wiangkang village tracts to repair a collapsed river bank at the Shweli hydropower project, according to a reliable local source. Each village tract had to supply 70 people to carry out the work. On 24 April, a villager from Kawngkart village tract ran away but the authorities caught him and beat him until his body was covered with blood. Afterwards, other villagers were also beaten and given punishments. "We did nothing wrong and we did not run away, but we were beaten too," said a villager who requested anonymity. "If we don't provide people from our family to work there, we have to pay K 10,000."

Li Chengyu, Sinohydro release, 21/04/08.

<http://www.sinohydro.com/servlet/Report?node=56644&language=1>

Sinohydro's 14th Bureau has completed the concrete gravity dam at the Ruili (Shweli) river project to a height of 735 meters. Work on other parts of the project including the 44-metre-long overfall dam is

proceeding. The design proposal for the dam has changed many times during construction and the supply of cement and steel products has been interrupted several times. However, the heavy machinery group has been able to make a technological breakthrough by improving the design of the leather conveyer belt so that it can operate with reduced power and lighter dead weight and transport all kinds of concrete with different ratio mixtures. This has solved the problem of having insufficient equipment for the storage of concrete and alleviated the pressure enormously.

Website of the Dali sub-bureau of Sinohydro's 14th Engineering Bureau, March 2008.

<http://www.fcbdl.com/bencandy.php?fid=61&id=394>

This is a collection of over 100 photos published by the Dali office of Sinhydro's 14th Engineering Bureau showing construction activities at the Shweli No 1 hydropower project site between June 2007 and March 2008. Captions are in Chinese. The pictures show the concrete barrier at the dam site, the underground area of the generating plant and the diversion tunnels in various stages of development. Some very good close-ups of the installation and assembly of the hydroturbine generators. Obviously Sinohydro is the key player in construction activities. The text is in Chinese characters. This reference and translation was made available through the courtesy of the Burma team of Earthrights International. For more information see ERI's publication: *China in Burma: The increasing investment of Chinese multinational corporations in Burma's hydropower, oil and natural gas, and mining sectors* (September, 2008).

<http://www.earthrights.org/files/Reports/China%20in%20Burma%20-%20BACKGROUND%20-%202008%20Update%20-%20FINAL.pdf>

NLM, 27/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080227.htm>

The construction tasks of the Shweli hydropower project are 79.48pc complete.

MT, 29/10/07. <http://mmtimes.com/no390/n006.htm>

According to EPM-1, Shweli No 1 hydropower project will generate 600 MW when it goes on-line by the end of 2007. It is a joint venture project with China, with about 85pc of the electricity generated expected to be exported to that country.

NLM, 07/09/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070907.htm>

EPM No 1 and the NE Cmndr are briefed on construction of Shweli hydropower project by officials and President Huang Guangming of YUPD Co of the PRC and D-G U Aung Koe Shwe of HPID. The whole project is 65.75pc complete.

Sinohydro, Zhang Runliang, 20/08/07. [http://www.sinohydro.com/english/portlet?](http://www.sinohydro.com/english/portlet?pm_pl_id=7&pm_pp_id=13&ARTICLEID=11881812170001&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1)

[pm_pl_id=7&pm_pp_id=13&ARTICLEID=11881812170001&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1](http://www.sinohydro.com/english/portlet?pm_pl_id=7&pm_pp_id=13&ARTICLEID=11881812170001&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1)

Sinohydro's 14th Bureau linked two parts of the 1~2 intake tunnels. The main intake tunnel is 2,850 meters long, and a sub-tunnel is 1,200 meters long. Due to the poor geological condition of tunnels 1 and 2, (most of which are IV and V type dangerous rocks, and some of which are VI and VII type), the tunnels have become the key line which will influence electricity generation of the entire power plant. The excavation of No.2 tunnel has been especially difficult.

NLM, 25/08/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070825.htm>

Ass't Director U Nay Lin of HPID briefs Lt-Gen Kyaw Win on the Shweli project; it will be equipped with a 610-MW generator and is expected to produce 4,022 million kilowatt hours annually..

Platts Myanmar Country Energy Profile. [mid-2007] [edited] For access information, see [Power Profile](#)

In August 2003, YMEC signed a US\$ 150 million turnkey contract to build the first 200-MW phase of what was then planned as a 400-MW plant called Shweli-1. In January 2007, MEP and Yunnan United Power Development Co signed a joint-venture agreement for what was now a 600-MW plant, which, as of April 2007 was said to be 50% complete. The project site is in Namkham township, Shan state, 710km north of Yangon. A 288-km-long [230-kv power line] will link the plant to Mandalay. Other Chinese companies participating in the scheme include Yunnan Lancang River Hydropower Co and Yunnan Power Grid Corp.

Sinohydro's 14th Bureau. 05/07/07.

<http://www.fcbmis.com/news/jnyw/2007/75/0775101710K58IHJ2120G3BDAJ06D1.html>

According to this news item, Sinohydro's 14th Engineering Bureau signed additional construction contracts for the Shweli-1 hydropower project early in July 2007. Plans now call for the completion of hydropower plant by June 30, 2009. The Kunming Hydroelectric Investigation, Design and Research Institute ((KHIDI) continues to provide quality control and consultancy services to the project. The text is in Chinese characters. This reference and translation was made available through the courtesy of the Burma team of Earthrights International. For more information see ERI's publication: *China in Burma: The increasing investment of Chinese multinational corporations in Burma's hydropower, oil and natural gas, and mining sectors* (September, 2008). <http://www.earthrights.org/files/Reports/China%20in%20Burma%20-%20BACKGROUND%20-%202008%20Update%20-%20FINAL.pdf>

NLM, 20/04/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070420.htm>

Gen Than Shwe visits Shweli No 1 project; he is told that it will generate 600 MW; currently under construction are the concrete embankment, diversion tunnel, pilot channel, power intake building, and approach tunnel. He is also briefed on the installation of the 180 mi-long 230-kv power line from Shweli to Mansan and Shwesaryan near Mandalay. Than Shwe wants the project finished up as quickly as possible. He presents a fruit basket to Exec V-P MA Lipeng of YUPD Co and V-P He Wen of YMEC Co. The project is currently 51pc complete. The general is briefed on arrangements for the 460-megawatt Shweli No 2 and the 360-megawatt Shweli No. 3 projects that will be built in Momeik township.

NLM, 25/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070325.htm>

From a report of a meeting of SPIC: Shweli No 2 hydel power plant in Momeik township, 12.5 miles downstream from Shweli No 1, will be implemented. It will be installed with a 460-megawatt generator. EPM No 1 will implement Shweli No. 3 hydel power project, 30 miles downstream from Shweli No 2. The power plant will produce 360 megawatts.

NLM, 01/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070101.htm>

A J-V agreement on the Shweli hydropower project is signed by D-G U Aung Koe Shwe of HPID and Chairman Huang Guangming of Yunnan United Power Development Co. "Under the agreement, a dam will be built on Shweli River 17 miles southwest of Namhkam, Shan State (West) for a power station that will generate 600 megawatts. The power station will distribute 4,022 million kilowatt hours through the national power grid every year."

Yunnan Machinery (I&E) Co Ltd, 21/12/06. http://www.ymec.com.cn/cn/news/news_7.htm

Title in English: 'River successfully closed [blocked off] for Shweli No 1 hydroelectric power project'

Compiler's note: A picture that accompanies this news release in Chinese shows a section of the river before it was blocked off.

MIC, 13/12/06. <http://www.myanmar-information.net/infosheet/2006/061213.htm>

EPM-1 Zaw Min and President Huang Guangming of YUPD Ltd officially open the diversion tunnel of the Shweli hydel power project dam in Namhkam township. 42% of the construction work on the project has been completed. It is expected to generate 3,022 million kilowatt hours a year.

Myanmar Times, 13/11/06. [Issue 342 of the MT is not available on-line.]

Among the projects expected to be finished in 2009 are those at Yeywa and Shweli.

Sinohydro, Yan Zhenwei, 10/10/06.

[http://www.sinohydro.com/english/portlet?](http://www.sinohydro.com/english/portlet?pm_pl_id=7&pm_pp_id=13&ARTICLEID=11631307410001&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1)

[pm_pl_id=7&pm_pp_id=13&ARTICLEID=11631307410001&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1](http://www.sinohydro.com/english/portlet?pm_pl_id=7&pm_pp_id=13&ARTICLEID=11631307410001&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1)

Sinohydro's 14th Bureau finished excavating the diversion tunnel of Myanmar Rilijiang [Shweli] power station. Owner required that the diversion closure be finished by the end of 2006.

NLM, 26/09/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060926.htm>

PM Soe Win briefed on Shweli hydel power project and building of the power plant in co-operation with foreign companies, also on arrangements for distribution of power to Shweli, Mansan and Shwesaryan via

Bellin sub-power station through 230-KV power lines. Construction of the 853-foot diversion tunnel is underway. The project will generate 600 megawatts; it is 38% complete; souvenirs are presented to the chairman of YUPD Co Ltd. A series of power projects is to be implemented along the Shweli river.

NLM, 30/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060730.htm>

From the report of a meeting of Hydroelectric Power Development Project Work Cte: plans are underway to implement the 150-MW Shweli No 1 hydel power plant in Namhkam township in Shan state north and the 500-MW Shweli No 2 hydel power plant in Momeik township, also in Shan state north.

NLM, 16/06/06. <http://www.ibiblio.org/obl/docs2/NLM2006-06-16.pdf>

Four 100-MW generators will be installed at the Shweli hydel power project. The project is expected to generate 3,022 million kWh per year which will be transmitted throughout the country. It is being carried out by HPID of EPM No 1 and the YMEC.

NLM, 03/06/06. <http://www.ibiblio.org/obl/docs2/NLM2006-06-03.pdf>

Shweli Hydel Power Project will be equipped with six 100-megawatt generators.

NLM, 22/03/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n050322.htm>

PM Soe Win inspects work on the entrance to the intake and diversion tunnels. The Shweli project will generate 400 megawatts. It is being built on the Shweli River near Mantet Village [23° 41' N, 97° 29' E], 17 miles southwest of Namkham. A 25/7-mile-long gravel road links it to the Union Highway. The road and project site were built by Asia World Co Ltd and completed in June 2004.

NLM, 27/02/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040227.htm>

SPDC V-C Maung Aye and party are told that the natural condition of Shweli River is good for the generation of hydro-electric power. The Shweli project will be able to generate 400 megawatts and produce 3,022 million kilowatt hours a year. Preliminary tasks are being carried out. Electricity generated from the project will be supplied to Shan state north through 66-kV high-tension cables. A grid including a 230-mile long double high-tension cable line from Shweli to Mandalay will be built to supply power to other regions. YMEC Chairman Feng Ke expresses thanks for assigning his company the task of building the facility. Maung Aye and party view site of main dam, tunnel and preliminary engineering works. The concrete gravity dam will be 531 feet long and 154 feet high. Two tunnels, the first 850 feet long, 33-feet in diameter, and the second 3.12 miles long and 23-feet in diameter, will be built.

Palaung (Ta'ang) Youth Network Group, *Under the Boot*, December 2007. pp 9,10, 11, 14,

<http://www.salweenwatch.org/downloads/UndertheBootEnglish.pdf>

According to the text of the document *Shweli hydro-electric project* published by the HPD of the EPM on 22/02/04, the Shwel-1 Hydropower Project is to consist of a concrete gravity dam, 531 ft (162m) long, 154 ft (47m) high, a 33-ft-diameter, 256.41-metre-long diversion tunnel, a 23-ft-diameter, 5014-metre long conveyance [mill-race] tunnel. Initial construction costs are estimated at US \$185 million. Electricity generated by the project is to be supplied by a system of high voltage lines and substations to a [lead and zinc] mine at Namtu, a copper mine at Monywa, and a nickel mine in Thabeikkyin. **Compiler's note:** The photo mock-up on p. 9 of *Under the Boot* and the map and photo on p 14 appear to be reproduced from the document published by the HPD. The map on p. 11 gives a useful overview of the area on the Shweli river where the project is to take place. With reference to the nickel mine, an agreement was signed in Beijing on 12/07/04 granting the China Non-ferrous Metal Corporation rights to explore for nickel chromide and to develop a plan to mine the ore in the Tagaung-taung area in the northern part of Thabeikkyin township (NLM: 19/07/04). Studies have shown a deposit of up to 40 million tonnes of ore with average grades of over 2pc.

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MYOGYI MULTI-PURPOSE DAM TO HARNESS WATERS OF THE ZAWGYI

NLM, 25/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061225.htm>

Gen Thura Shwe Mann and Lt-Gen Ye Myint of the Defence Dept visited the site of Myogyi multi-purpose dam project on the Zawgyi river near Myogyi Village in Ywangan township. At the briefing hall of the project

A&Imin Htay Oo reported on the construction of the diaphragm wall, the main embankment, the diversion tunnel and the tunnel for the hydel power station by Construction Group No 7 of the ID. The earth embankment of the Myogyi Dam will be 2,461 feet long and 258 feet high. The dam will irrigate Meiktila plain through the canals of Kinda dam. It will also generate 30 MW of power.

Presently, five projects are underway to make more irrigation water available to Meiktila plain. The first is Kengkham multi-purpose dam project located on Nam-et creek, a subsidiary of the Zawgyi river near Kengkham village. It will also generate six megawatts. The second project, already completed, is Zawgyi multi-purpose dam on the Zawgyi river near Indaw village. The third is Myogyi multi-purpose dam below Zawgyi dam on the Zawgyi. It will supply water to Meiktila plain through Myogyi diversion dam and the Kinda feeder canal. The fourth, already completed, involved the construction of Chaunggauk, Lunngin, Letkhokpin and Nyaunggon dams with their canal and the fifth, currently underway, has to do with the building of Shanmange dam in Meiktila township. All of these projects will feed water into Meiktila lake and make possible the systematic utilization of Samon Dam.

Lt-Gen Ye Myint instructed officials to build the Myogyi diversion dam [weir] at the same time as work is going ahead on the Myogyi dam project. He stressed the need for supplying water to Meiktila Plain through the Myogyi diversion dam and the timely completion of Kengkham multi-purpose dam project.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-09: Mandalay Myogyi dam near Myogyi village [21° 28' N, 96° 20' E], grid square reference: 13\0, 25\8
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-9.jpg>

Website reference

<http://www.urec.com.cn/en/project/power.htm>

Union Resources and Engineering Co Ltd (UREC) has been active in engineering contracting since the 1980s. It provides project management including preliminary study, financing, design, construction, manufacture, purchase, installation, commissioning and operation management, etc. It has good contacts with domestic and foreign financial institutes, consultation institutes, construction enterprises and equipment manufacturers. In Myanmar it has been involved with the building of 22 hydropower projects including the Paunglaung and Shweli projects. [Compiler's note: UREC was previously known as the Yunnan Machinery and Equipment Import & Export Corp (YMEC). The old name still appears as one of the PRC partners involved in the Shweli hydropower contracts. The YMEC website is still maintained online.
<http://www.ymec.com.cn/en/>]

Additional references

Data summary [Myogyi](#)

See above: '[Kengkham multi-purpose dam](#) to help 'green' the Meiktila plain' (NLM: 07/08/08)

See below: '[Zawgyi](#) no 2 hydropower station launched' (NLM: 17/03/00)

[Kinda dam](#) fifteen years on: an evaluation of hydropower impacts' (ADB: Mar 2002)

Khin Maung Than (Sethmu), NLM, 17/09/10. Excerpt. Edited.

<http://www.burmalibrary.org/docs09/NLM2010-09-17.pdf>

The Myogyi dam embankment is scheduled to be completed by 2010. Work is continuing on the reinforced concrete spillway which will be put into service in 2011- 2012. The dam has a catchment area of 725 square miles. Annual inflow of water into the dam is expected to average 373,420 acre feet; its maximum water storage capacity will be 359,550 acre feet. [The power plants at the dam will have] a generating capacity of 30 MW and is expected to produce 135.70 million kilowatt hours a year. Myogyi Diversion Weir about five miles downstream from Myogyi Dam near Taungpaw Village will supply water from the Zawgyi river through Myaungmadaw canal and the right canal of Kinda Dam to irrigated areas [in Wundwin, Thazi, Myttha and Kyaukse townships]. [Photos of Myogyi diversion weir and Myaungmadaw canal];

Khin Maung Than (Sethmu), NLM, 19/10/09. <http://www.burmalibrary.org/docs07/NLM2009-10-19.pdf>

Myogyi dam will be able to store water from Kengkham and Zawgyi dams in Shan state. It is expected to provide 700,000 acre feet to the Zawgyi irrigation system area and 445,605 acre feet for the greening of the Meiktila plain. It is a huge undertaking with groundwork scheduled for completion in 2010. The construction of all diversion tunnels was finished at the end of October 2008. The construction of the spillway was launched in December 2007 and is due to be completed by 2010-11. Myogyi diversion [weir] was put into commission on 29/08/09. The main embankment links Kyeekan and Shwemyintha mountains. [Photos showing earthwork being carried out on the main embankment and a distributor canal as well as what appears to be the completed main canal and diversion tunnel accompany the article in the print edition of NLM.]

Kyaw Sein, NLM, 11/10/09. <http://www.burmalibrary.org/docs07/NLM2009-10-11.pdf>

Myogyi multi-purpose dam lies just within Shan State about 14.5 miles east of the village of Hanmyintmo in Kyaukse township. Rainfall in the region is about 40 inches annually, and a total of 373,420 acre-feet of water flows into the reservoir on the Zawgyi river. The construction of the diaphragm wall is completely finished. The water diversion tunnel is of horse's hoof type and measures 18 feet in diameter and 1535 feet in length. The hydropower tunnel is of circular type. It is 19.7 feet in diameter and 1319 feet long. Work on both tunnels has now been completed. Efforts are being made to finish construction of the spillway, the main embankment and the dredging of the main canal during the 2010-2011 financial year. Up to the end of August 2009, construction of the dam was 57.42pc complete. [Photos giving a panoramic view of the Zawgyi river valley and the Kyaykan and Shwemyintha hills accompany the article in the print edition of NLM.]

NLM, 01/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-01.pdf>

A photo of landclearing operations at the reservoir site of Myogyi dam is included in the print edition of NLM.

YMEC [UREC]. http://www.ymec.com.cn/en/news/news_24.htm

Myogyi hydropower station will be located upriver along the Gyogyi [Zawgyi], a branch of the Ayeyarwady River, to the southeast of and 60km from Mandalay. The total [generating] capacity will be 2×15 MW which falls under Class IV, model small-1 hydropower projects. The station is a combined power and water conservancy project with the functions of both power generation and agricultural irrigation. The owner of the project is Myanmar's A&I Ministry. The working scope of UREC [YMEC] covers the design of the civil construction of the power station pivot and the irrigation pivot and the design, supply and installation of the metal structure, hydro mechanism and electric apparatus. UREC will also be responsible for the technical training and site instruction of the owner's personnel. The total construction period of the project will be two years and the power station is planned to be put into use by the end of 2010. Open bidding of the project began in April 2007. UREC was awarded with the contract in August 2008 while the contract was finally signed at the A&I Ministry in Naypyitaw on 25/02/09. This was the first contract between UREC and A&I of Myanmar.

NLM, 06/09/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nml/n080906.htm>

Director Myo Tun of ID reports to the A&I Min on construction of the concrete wall, the tunnel, the spillway and the diversion weir. The minister views work on the main embankment and concrete work on the inner part of the diversion tunnel. The dam will be able to store 359,550 acre-feet of water.

NLM, 29/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nml/n080829.htm>

Maj-Gen Ohn Myint of the MoD visits Myogyi multipurpose dam project and checks on work on the entrance and exit to the tunnel and the diversion canal. He also inspects the Myogyi diversion weir near Taungtaw in Kyaukse township. Myogyi earthen dam will be 2461 feet long and 258 feet high and will benefit some 30,000 acres of farmlands in Meiktila plain and generate 30 MW. [A photo of the area around the dam is included in the print edition of NLM.]

NLM: 07/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-07.pdf>

An earth embankment is under construction on Namet Creek near Kengkham village in Yaksawk township. When the multi-purpose dam is finished it will contribute to the greening of the Meiktila plain and will generate 2x3 MW. From Bahtoo we drove to MP 18, thence across across Zawgyi Creek and along Kengkham road to the construction site of the dam. It is 42 miles from Yaksawk. Kengkham dam will be built

by blocking Namet creek which is fed by other creeks and flows north into the Dokhtawady [Myitnge] river. Water will be supplied from Kengkham dam to Zawgyi dam through Nammelyan creek. This will enable the Zawgyi dam to increase its generating capacity from 6 MW to 12 MW. Through Zawgyi and Myogyi dams on the Zawgyi river, 990,000 acre-feet of water will be supplied to irrigation works on Meiktila plain and other crops included in the Zawgyi irrigated area. Canals will be dredged to connect Kengkham dam with Zawgyi dam. Zawgyi dam is 14 miles from Kengkham dam. The power plant at the Kengkham dam is expected to generate 20 million kilowatt hours yearly. The project started in 2005-2006. It is estimated that the project will be completed in 2009-2010. At present, earthwork is being carried out at the Kengkham project. Land preparations are being made for construction of the spillway and the canals. [Photos of earth work underway at the Kengkham site.]

NLM, 28/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080228.htm>

Construction of the main dam, the diversion tunnel and the spillway, as well as the digging of the main canal and the diversion canal of the Myogyi dam are proceeding. The diversion tunnel of will be 468 metres long and its diameter 18 feet across.

NLM, 13/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071213.htm>

Gen Than Shwe visits Myogyi multi-purpose dam project and is briefed on work on the main dam and diversion tunnel, construction of the hydropower tunnel and spillway. The dam will store water from Zawgyi River which will be supplied to Meiktila Plain by means of a canal that will carry the water through the Myogyi diversion weir. Construction group no 7 of the ID is implementing the project on the Zawgyi river. Besides supplying more water for irrigation purposes the dam will generate 30 MW. Over 36pc of the project has been completed.

NLM, 30/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071130.htm>

Lt-Gen Ye Myint is briefed on earth work, the construction of a diversion tunnel and concrete work at Myogyi dam project, as well as the selection of the route for tunnel that will supply water from Myogyi Kinywa [21° 28' N, 96° 20' E] diversion dam to the Gonywa [21° 11' N, 96° 09' E] pump project through the Kintarlay dam. The water will irrigate 5,000 acres of farmland in the Daingkaunggon area of Wundwin township. Efforts are to be made for the completion of the diversion dam and civil work on time and arrangements are to be made for power supply to the project.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.igsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf

Myogyi dam and power station with a planned capacity of 30 MW is under implementation by the ID. It will generate 135 million kWh annually when it comes on-line in 2009.

NLM, 26/07/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070726.htm>

Work on the Myogyi [21° 27' N, 96° 22' E] multi-purpose dam project in Ywangan township is moving forward. 700 feet of the 1,698-ft-long main tunnel have been dug. Concrete laying on the interior surface of 1,575-ft-long diversion tunnel is underway. Two 15-MW generators will be installed at the dam.

NLM, 27/08/06. <http://burmalibrary.org/docs2/NLM2006-08-27.pdf>

A photo giving a panoramic view of the Myogyi dam site is included in the print edition of NLM. The dam will provide water to a pump project that will irrigate 30,000a of farmland in Meiktila plan in Wundwin and Thazi townships.

NLM, 23/03/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060323.htm>

PM Soe Win and party visit Myogyi multi-purpose dam project being implemented by Construction Group 7 of the ID. The entrance to the underground diversion tunnel is being dug and a separation wall measuring 1,535 feet by 50 feet is being built. The dam will supply 500,000 acre-feet of water to the catchment area of Zawgyi dam in Kyaukse district and 400,000 acre-feet of water to Meiktila plain. The dam will generate 24 MW of electricity.

NLM, 19/08/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n050819.htm>

PM Soe Win and party visit Zawgyi (Myogyi) dam project site near Myogyi village in Ywangan township where they are briefed on work on the Zawgyi (Myogyi) dam as well as preliminary engineering preparatory tasks for the implementation of Kengkham dam project. He tells officials to get down to the business of construction in the upcoming open season. Water will be supplied from the existing Zawgyi dam in Yaksawk township and from the watershed area between Zawgyi and Myogyi dams to farmlands and Meiktila Plain. The Myogyi dam will be 2,650 feet in length and 282 feet in height. It will be able to store 480,580 acre-feet of water. Kengkham dam on Nan-et Creek in Yaksawk township will supply water to the Zawgyi dam for greening the Meiktila Plain.

NLM, 11/11/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n041111.htm>

At the Myogyi dam project on the Zawgyi river near Myogyi village in Ywangan township, Lt-Gen Ye Myint of the Defence Dept receives reports on preparations for the project and the water supply system from officials of the ID and the WRUD. The earthen dam will be 2,270 feet long and 223 feet high on and will be able to store 271,850 acre-feet of water. Annual average water flow into the dam is 200,000 acre feet. It is expected to generate 12 MW. Water from the Myogyi and Zawgyi dams will be supplied to the project for the greening of Meiktila Plain via the Kinda diversion weir.

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THAKETA POWER STATION IMPORTANT DISTRIBUTION HUB

NLM, 13/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061213.htm>

EPM No 2 Khin Maung Myint visited Thakayta power station in Thakayta Township on 10 December. The head of the power station, U Tun Hlaing, reported on maintenance work, operation of the generators based on the supply of gas, requirement of gas for the three generators to run at full capacity, distribution of electricity from Toungoo and Hlawga grids and the station. The chief engineer of YESB, U Tun Aye, reported on direct supply of electricity from Toungoo and Hlawga power stations; and D-G Thein Tun of the EPD on a plan to establish a 230 KV sub-power station in the east of Yangon City. The minister stressed the importance of operating the generators at full capacity, calling for constant supervision of maintenance of the generators.

Director U Thein Hlaing of Electricity Distribution Project (South) reported on the construction of a 230- KV grid line across the Bago river connecting Thakayta andThanlyin. The minister called for co-operation with the officials concerned and completion of the project on schedule. Daw Soe Soe Tint of Myanmar V-Pile Co Ltd gave an account of the plan under way for setting up towers. The minister inspected the control room and dealt with the project for distribution of electricity. He also inspected designated sites for putting up the towers on the Thakayta side.

Additional references

Data summary: [Thaketa](#)

NLM, 06/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-06.pdf>

EPM No 2 Khin Maung Myint reports to the SPIC that major repairs to the generators in the Hlawga, Ywama, Ahlon and Thakayta gas-fired power plants in Yangon and at the Kyunchaung, Mann and Shwedaung gas-fired power stations.

NLM, 23/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071123.htm>

A contract for the purchase of spare parts for the F-5 gas turbine to be installed at Thakayta gas trurbine was signed by MEPE and United National Oil & Gas Pte Ltd held at Shwe Myanmar Hotel in Naypyitaw on 20/11/07. EPM No 2 Khin Maung Myint delivered an opening speech. After that, GM Lee Bang Ho of United National Oil & Gas Pte Ltd spoke words of thanks and he and MEPE MD San Oo signed the contract and exchanged notes.

NLM, 06/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070306.htm>

Inspection of a new fuel nozzle, cross fire tube, combustion liner and filter at the Thakayta power station needed to run the station at full capacity. Briefing on gas control equipment, turbine and generator; at the Thaketa gas station, preparations for sending gas from the gas control and distribution station to the gas station and acquisition of gas. Need for concerted efforts to increase power supply.

NLM, 09/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070109.htm>

EPM No 2 Khin Maung Myint inspects the natural gas supply stations of Myanma Oil and Gas Enterprise in Thakayta Township and Dagon Myothit (East) Township.

Myanmar Times, 02/10/06. [Issue 336 of the MT is not available on-line.]

Repairs completed on a pipeline that supplies natural gas to four power plants in Yangon. Problems with the pipeline, which was shut down September 23 for repairs, were blamed for blackouts in Yangon. The 320-kilometre (199-mile) pipeline carries 3.1 million cubic metres (110 million cubic feet) of gas a day to Yangon's Ywama gas control station from the Yandana gas project in Tanintharyi division.

NLM, 29/11/03. <http://www.ibiblio.org/obl/docs/NLM2003-11-29.pdf>

Compiler's note: A good exterior picture of the Thaketa power plant is available on page 11 of the print edition of the New Light of Myanmar.

Kawasaki Plant Systems, undated. www.khi.co.jp/kplant/english/products/PowerPlant/01.html

In 1995, Kawasaki was awarded a turnkey contract to install an F5-3 Hitachi steam turbine as a combined cycle add-on to MEPE's natural gas turbine plant at Tharkayta [in Yangon]. The contract was completed in 1997 raising the total installed capacity at the plant to 92 MW.

Myanmar official website information, undated. [no longer available on-line]

Marubeni Corp of Japan was awarded the contract for construction of a combined cycle power station on Ayeyarwun Street in Thaketa township. Work started 24/03/95 and was completed in Jan 1997. A single 35-MW turbine was installed at a cost of US \$ 23.5 million (K 141.02 million) + K 348.0 million for other construction costs making a total of K 489.02 million.

WPD, 08/05/92. <http://www.ibiblio.org/obl/docs3/BPS92-05.pdf>

At the annual meeting of MEPE, Minister for Energy Khin Maung Thein reported that the Thaketa Power Station would be able to distribute more power as the Aphyauk oil field can produce and distribute gas.

U.S. Dept of State, Burma Petrogas Report, 1991. www.ibiblio.org/freeburma/docs/usgasrep.txt

In January 1992, Shell Oil found gas -- 11,000 mcf/d at a depth of 2,940 m -- on the Apyauk field (Block G) which it began producing at the rate of 20 mmcf/d for the Ministry of Energy 1992. To accommodate the Shell gas, the Burmese built a 24-km spur to the existing gas pipeline which leads from the Payagon gas field to the gas turbine in Rangoon.

WPD, 11/01/92. <http://www.ibiblio.org/obl/docs3/BPS92-01.pdf>

Aphyauk No. 1 test well in Taikkyi tsp is yielding 14.78 million cubic-feet of natural gas per day, according to the latest survey. It was jointly drilled by MOGE and Shell Oil of the Netherlands and natural gas was found at 9,669 feet. 11 million cubic-feet. Surveys under way for steady yield.

Myanmar official website information. [undated] [no longer available on-line]

Marubeni Corp of Japan began construction of the Tharkayta gas turbine power station on Ayeyarwun street, Thaketa township, Yangon on 09/02/88. Three 20-MW gas turbines were installed for a total capacity of 60 MW. Unit 1 started operations in Jan 1990, Unit 2 in Feb 1990, Unit 3 in Mar 1990. Total amount expended was ¥ 310.96 million (K 174.3 million) + K 124.6 million = K 298.9 million.

Minerals Yearbook, US Bureau of Mines, 1987

<http://digicoll.library.wisc.edu/cgi-bin/EcoNatRes/EcoNatRes-idx?type=article&did=ECONATRES.MINYB1987V3.GKINNEY&isize=M>

Twelve new production wells and seven appraisal wells are expected to increase gas output at the Payagon gasfield, 50 km southwest of Rangoon, by 35 million cubic feet per day. A 40-centimeter pipeline will be laid

to Rangoon and a basic gas distribution network to serve the capital, and pilot LPG and compressed natural gas plants will also be constructed. The field currently supplies 12 million cubic feet per day through a small pipeline to four industrial plants and three powerplants in the Rangoon area. A planned second phase would extend the pipeline to industries in Mon and Karen States east of Rangoon. Gas use will be further expanded by a Government plan to set up a 60-megawatt gas turbine power station at Thaketa, a suburb of Rangoon.

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MINISTERS MEET WITH [PRC SUPPLIERS](http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061106.htm) IN NANNING AND WUHAN

NLM, 06/11/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061106.htm>

EPM No 1 Zaw Min received Chairman Feng Ke of YMEC at Wharton International Hotel in Nanning on 29 October. They discussed matters related to Shweli No 1, Upper Paunglaung, Nancho, Wetwun, Dattawgyaing and Zawgyi No 1 hydel power plants. At the same venue, the Minister received Chairman Yang Jixue and party of China Gezhouba Corp and discussed construction of the roller-compacted concrete dam at the Yeywa hydel power project and sending of the contractor's equipment. Chairman Jean Zhou and party of CITIC Technology called on the minister and held discussions on matters related to the pen stock and tunnel lining of the Yenwe hydel power project and the hydraulic steel structure for the Yeywa hydel power project.

Minister Col Zaw Min met with Chairman Zhao Ruolin and party of China National Electric Equipment Corp. They discussed matters related to the timely arrival of electronic and mechanical equipment for the Yenwe, Yeywa, Khabaung and Kengtawng hydel power projects. V-C Zhu Xu and party of China National Heavy Machinery Corp called on the minister and discussed the timely despatch of electronic and mechanical equipment and the hydraulic steel structure for the Kun and Khabaung hydel power projects, and the timely shipping of 230-KVA transmission lines and sub-station equipment for the Yeywa hydel power project. Minister Zaw Min also received the chairman of Sinohydro Corp, Huang Baodong, and party. They discussed matters related to the timely shipment of hydraulic steel structure No 2, turbines and generators for the Yeywa hydel power project and the Hatgyi hydel power project.

YUPD Chairman Wang Wen and party called on Minister Zaw Min on 30 October. They discussed matters concerning Shweli No 1, Shweli No 2 and Shweli No 3 hydel power projects. The minister also met with the V-Cs of the China Power Investment Corp and of China CAMC Engineering. They discussed the survey and implementation of hydel power projects at the confluence of the Ayeyawady, Maykha and Malikha rivers.

On 29 October, PM Soe Win separately received MD Huang Guang Ming and party of YUPD and Chairman Yang Jixue of the China Gezhouba Corp in Nanning. On 30 October, the PM met with V-C Zhang Xiaolu and party of China Power Investment Corp.

On 3 November, PM Soe Win and party visited the Central China Power Grid Co in Wuhan, Hubei Province. Chairman Xie Ming Liang reported on power supply, generation of power and co-operation with international companies. General Soe Win said generation of power and distribution is undertaken by two ministries in Myanmar. Investment, technological assistance and cooperation are needed to expedite its momentum. He said that Myanmar would welcome the participation of Central China Power Grid Co in hydro-electric power projects and power distribution in Myanmar. The Prime Minister and the Chairman exchanged gifts.

Additional references

See above: 'Electricity [ministers busy](#) in Beijing and Kunming (NLM: 13/06/07)

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[TAPING RIVER](#) HYDROPOWER PROJECTS UNDER DISCUSSION IN CHINA

Hubei Daily (Wuhan), 04/11/06. Translated. <http://www.cnhubei.com/200611/ca1198075.htm>

Myanmar's PM Soe Win visited the Central China Power Grid Co (CCPG) and reached consensus over joint co-operation in developing Myanmar's hydropower resources. In March 2004, CCPG successfully clinched a bid to build the transmission line and sub-stations between Yangon and Yekyi [in Ayeyadwaddy division]. The contract was worth about US\$ 16 million. Two sub-stations and a transmission cable were put into service in June, and the construction of the other sub-station and transmission cable will be finished by next April.

Gen Soe Win also negotiated with CCPG over the construction of a hydropower station on the Taping river in Myanmar (known as the Daying River upstream in Yingjiang County of Yunnan's Dehong Prefecture). The installed capacity of the hydropower station will be 240 MW. The total cost will be 108 million yuan. Both parties signed a draft agreement on a framework for co-operation in September, and are expected to sign the official text in the near future.

Gen Soe Win said Myanmar has rich hydropower resources and urgently needs capital and technology from outside the country. The GM of Central China Grid Company, Mr. Xie Ming-liang, said the company is looking into the feasibility of building a production chain based on the electricity output.

Website references:

China Datang Corporation

<http://www.china-cdt.com/en/ABOUTCDT/BRIEFINTRODUCTION/46465.html>

China Datang Corporation (CDT), one of the five large-scale power generation enterprises in the PRC, was established in Dec 2002 on the basis of the partial power generation assets of former State Power Corporation of China. It is a solely state-owned corporation and operates as an experimental state-authorized investment and state share-holding enterprise. CDT is mainly specialized in the development, investment, construction, operation and management of power energy; organization of power (thermal) production and sales; electric power equipment manufacture, maintenance and commissioning; power technology development and consultation; contracting and consulting of electric power engineering and environmental protection projects and renewable energy development. CDT has established 6 wholly funded subsidiaries and 8 branch companies. It also owns the Datang International Power Generation Co Ltd, the first company in China listed on the London and Hong Kong stock exchanges. Its subsidiaries have several large-scale power plants with a capacity over 1,000 MW each and other wind and hydro power projects under development with a planned capacity of 6,300 MW. It also includes the China National Water Resources & Electric Power Materials & Equipment Co Ltd with a nation wide logistic network. Its power generation assets are widely distributed over 19 provinces or autonomous regions. **[Compiler's Note:** It Datang Yunnan United Hydropower Developing Co Ltd referred to in notes below is a subsidiary of the China Datang Corporation.]

Central China Power Grid Co Ltd website information, undated, (circa 2004). [edited]

<http://intl.ccpq.com.cn/pub/huazhong/english/organization/CentralChina/default.htm>

Located on the banks of East Lake in Wuhan city, Hubei prov, the Central China Power Grid Co Ltd (CCPG) was established in November 2003, through the restructuring of the former Central China Power Administration of the Central China Power Group Corp and the State Power Central Co. CCG is a state-owned company vested by the State Grid Corp of China with 36 billion yuan as its authorized equity capital. Its main duties are: operating and controlling the power grid as well as power sources remaining with the power grid, guaranteeing safety of power supply, developing plans for the regional grid, fostering a regional power market, running the power dispatch and exchange centre, implementing integrated dispatch of the regional grid and integrated optimization of power resource allocation in the region it serves. As one of six large regional grids in China, CCG operates in an area of 1,298,000 sq km, supplying power to a population of 382 million. By the end of 2002, the installed generating capacity in the region reached 73.59 GW, accounting for 25pc of the total installed capacity in China. its annual electricity generation was 314.3 TW h, total assets 269. 73 billion yuan and annual sales revenue 84.7 billion yuan. As the strategic planning centre of central China region, CCG has established close ties with many famous power companies and institutions all over the world. By Nov, 2003, 33 foreign-invested large-scale power projects with a total installed capacity of 14.61 GW and total foreign investment of 6,274 million US dollars in CCG have been approved by the State. At the same time, a number of power enterprises have stepped abroad to develop

the international market, resulting in the design and construction of 24 power projects in southeast Asia, the Middle East and Africa.

Topographic map references:

China 1:250,000: Series L500, U.S. Army Map: NG 47-13: Lung Ling

Tapein-1 hydropower project is near Kalonkha [Hkalunghko: 24°25' N, 97°31' E], grid square : 38\3, 8\3.

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-14.jpg>

Burma 1:250,000: Series U542, U.S. Army Map: NG 47-14: Bhamo

The site of Tapein-2 hydropower project is reported to be a few miles downstream from Tapein-1, probably near the village of Kalehkyet [24°21' N, 97°27' E] grid square 38\2, 8\2.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ng47-13.jpg>

Additional references

Data summary: [Tapein-1](#) [Tapein-2](#)

See above: 'Datang begins [operations at Tapein river](#) hydropower plant' (Interfax: 03/09/10)

'Agreement on [four hydro projects signed with Datang](#) (Yunnan) (PRC Comm: 15/01/10)

'Ministers meet with [PRC suppliers](#) in Nanning and Wuhan' (NLM: 06/11/06)

Dali Sub-bureau of Sinohydro's 14th Engineering Bureau, February 2008.

<http://www.fcbdl.com/bencandy.php?fid=61&id=683>

This URL presents a series of photos taken by a PR team from Sinohydro's 14th Engineering Bureau at the site of the Taping River hydropower project between Nov 2007 and Feb 2008. Obviously, work is proceeding rapidly at both the dam site and in the diversion area. The text is in Chinese characters. This reference and translation was made available through the courtesy of the Burma team of Earthrights International. For more information see ERI's publication: *China in Burma: The increasing investment of Chinese multinational corporations in Burma's hydropower, oil and natural gas, and mining sectors* (September 2008). <http://www.earthrights.org/files/Reports/China%20in%20Burma%20-%20BACKGROUNDER%20-%202008%20Update%20-%20FINAL.pdf>

Dali Sub-bureau of Sinohydro's Engineering Bureau 14, 31/12/07.

<http://www.fcbdl.com/bencandy.php?fid=37&id=737>

This URL presents a series of photos taken by a PR team from Sinohydro's 14th Engineering Bureau at the site of the Taping River hydropower dam on the occasion of the project launch on 19/12/07. The text is in Chinese characters. One or two Burmese officials appear in a couple of the pictures. This reference and translation was made available through the courtesy of the Burma team of Earthrights International. For more information see ERI's publication: *China in Burma: The increasing investment of Chinese multinational corporations in Burma's hydropower, oil and natural gas, and mining sectors* (September 2008).

Sinohydro Corp. 25/12/07. <http://www.sasac.gov.cn/zyqy/gcjz/200712250102.htm>.

Excerpted from a translation by Kevin Li. <http://groups.yahoo.com/group/greenburma/message/1138>

Construction of the the Taping River hydropower station was launched on 19/12/07 by the China Datang Group and Myanmar's EPM-1. The station will be located close to China-Myanmar border in Kachin state, 90 km from Yingjiang county of Dehong prefecture in Yunnan. The power plant will have four generating turbines with a total capacity of 240 MW. It will consist of a hub station, water diversion systems and a generating area hub. The developer plans to dam the river in October 2008. The first generating unit is scheduled to begin operations in Sept 2009, while the complete power plant will be finished by June 2010. Majority owner of the power plant will be the China Datang Group with minority shareholders Central China Power International Trade Co and Jiangxi Water Resources Planning and Design Institute. Project construction is to be undertaken by the PRC's Sinohydro Corp, including all civil construction, installation of metal, and the structure of the electrical and mechanical equipment, and will be carried out by the 14th Bureau of Sinohydro's subsidiary, the China Water Resources and Hydropower Construction Corp. Construction of the diversion tunnel for the project is currently in full swing with work progressing smoothly. [Translator's note: The Taping river is known in China as Da-ying-jiang (Da-ying river).]

NLM, 25/10/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071025.htm>

EPM-1 Zaw Min and DepMin Myo Myint meet with President Wu Jing, V-P Hing Heng Xi and officials of Datang (Yunnan) United Hydropower Developing Co Ltd (DUHD) in Nay Pyi Taw regarding implementation of the Tapein hydropower project.

NLM, 07/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070507.htm>

At Tarpein No 1 hydropower project, 33 miles from Bhamo, near Kalon village, Vice-GM Xiong Heng Xi of CCPG and Deputy EPM No 1 Myo Myint brief cabinet ministers on the project. The power plant of Tarpein-1 hydropower project will generate 240 megawatts and produce 1,081 million kWh yearly.

NLM, 20/04/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070420.htm>

Gen Than Shwe is briefed on the 240-MW Tarpein No 1 and the 168-MW Tarpein-2 projects in Momauk township; he stresses the need to implement the two Tarpen projects as soon as possible. Water resources have been surveyed; surveys [are to be conducted] to search for more resources and the power grid is to be installed on schedule in order to supply electricity to the nation.

NLM, 25/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070325.htm>

Tarpein No 1 hydel power project to be implemented on the Tarpein river in Kachin state is 3.5 miles from Momauk. Tarpein-2 hydel power plant will be 6 miles downstream of Tarpein-1.

NLM, 26/09/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060926.htm>

A feasibility study will examine the viability of a hydel power project along the Tarpain river.

PADAUNG FACTORIES BEGIN PRODUCTION OF GENERATORS AND METERS

NLM, 17/10/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061017.htm>

Myanma Machine Tool and Electrical Industries (MMTEI) under the Ministry of Industry-2 opened two factories that will produce generators and meters in Padaung township in Pyay District on 14 October. The generator factory will produce 5-kW, 10-kW single phase generators and 20-kW, 30-kW, 50-kW and 100-kW triple-phase generators. The factory is expected to produce over 1,800 generators per year. Present for the opening were the Southern Commander, the Minister for Industry-2 and officials of the China National Machinery Corp and Angelique International Co Ltd.

The generator factory was formally opened by the MD of MMTEI, the MD of Myanma Industrial Construction Services (MICS) and the MD of China National Machinery Import and Export Corp.

The triple-phase, watt-hour meter factory was formally opened by the MD of MMTEI, the MD of MICS and V-P of Angelique International Pradeep Arya. The triple-phase, watt-hour meter factory launched its test run on 22 September 2005 and can produce 200 triple-phase, watt-hour meters a month. It is expected to manufacture 10,000 triple-phase, watt-hour meters a year. 80pc of the components for the meters are produced in Myanmar.

Compiler's note: It would appear that the manufacture of single- and triple- phase generators at the new factory in Sinde has replaced production of generators at the MMTEI workshop on Inya Lake road in Mayangon township in Yangon. See the MMTEI section of the Ministry for Industry-2 website: <http://www.industry2.gov.mm/mtei.htm> The information on this website appears to date from 2007 and does not include recent developments at the newly opened MMTEI factory in Pakokku.

Additional references for production, sale and use of meter boxes: (A)

See above: 'Electricity metering program taking root' (IMNA: 11/05/07)

See below: 'Yangon company producing [industrial energy meters](#)' (MT: 04/07/05)

NLM, 29/10/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n081029.htm>

The laboratory of MEPE in Ahlon township is testing kwh-meters using bench breakers, control panels and relays. It also puts a cover seal on new meters.

NLM, 28/10/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n081028.htm>

Minister for Industry-2 Soe Thein inspects the ministry's factory which manufactures electric meter boxes in South Dagon. High technology is used in the production of the boxes. The factory is making 1600 boxes per day which exceeds local demand of 400,000 units per year. The minister calls for finished products of better quality, regular supply of raw materials, increased production capacity and fulfillment of the requirements of the Ministry.

NLM, 11/07/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080711.htm>

Lt-Gen Myint Swe of the MoD visits the electrical and electronic appliances factory of MMTEI in South Dagon township industrial zone where he is briefed by GM Lei Lei Win. Yearly production and distribution amounts to 600,000 home-use meters and power meters. [Photo of the interior of the factory on p.1 of the print edition of NLM.]

NLM, 07/07/07. www.mrtv3.net.mm/newspaper/77newsn.pdf

EPM No 2 Khin Maung Myint is briefed on the production of electric meter boxes at the factory of MMTEI in South Dagon. The moving disc, base, terminal block cover, die and mould for the boxes are produced by the meter box factory in Padaung township.

NLM, 23/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070523.htm>

The Minister for Industry No 2 and the D-G of the Directorate of Myanma Industrial Planning inspect the electrical and electronic appliance factory in Mayangon township. Rice cookers and electric irons are produced in the household workshop of the factory. The minister urges production of appliances with modern marketable designs and distribution to the markets in timely fashion.

NLM, 02/04/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070402.htm>

The Minister of Industry No 2 is conducted around the electric meter workshop of the electrical and electronic manufacturing factory in the South Dagon IZ by GM Lei Lei Win. Meters produced at the factory are under test run.

NLM, 26/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061226.htm>

EPM No 2 Khin Maung Myint visits the power testing centre in Ahlon township and is briefed on the testing, distribution and installation of electric meters.

NLM, 29/05/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060529.htm>

EPM No 2 Khin Maung Myint looks into the test lab [at the Ahlon Gas Turbine]. He tells the staff that arrangements are being made to install 100,000 electric meters in Yangon. So far, 72,507 electric meters have been allotted to consumers. A thorough inspection of the meters is required.

Additional references for production, sale and use of generators and turbines (B)

See below: 'Market expands for [generator and rental shops](#)' (MT: 09/05/05)
["Manufacture of small hydro turbines](#) in Myanmar' (JICA: Sept 2003)

NLM, 04/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-04.pdf>

Minister for Industry-2 Vice-Admiral Soe Thein inspected the production of hydropower turbines at No 1 Machine and Machine Tools Factory (Nyaungchedauk) and machinery for the industrial training schools. Later, he viewed production process of the factory. [A photo of a medium-sized Francis turbine produced at the factory is included in the print edition of NLM.]

NLM, [reference date lost, probably 2006]

Minister for Industry-2 Saw Lwin checks the production of 75-kw turbines for hydel power projects at No 1 Machine and Machine Tools Factory (Nyaungchedauk).

NLM, 19/11/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051119.htm>

An industrial development coordination meeting took place at the Ministry of Industry No 1 on Kaba Aye Pagoda Road in Yangon with an address by Committee chairman Gen Soe Win. After the meeting, Gen Soe Win and party viewed round the materials displayed by ministries and private entrepreneurs in the compound of the Ministry of Industry No 2. Minister Saw Lwin and Deputy Minister Khin Maung Kyaw and officials conducted the Prime Minister and party around the booth of MMTEI. At the booth, a 5-kW hydel power generator to be used with 15 ft-high waterfall, a 40-kW hydel power turbine to be used with a 60 ft-high waterfall, and 60 kW and 200 kW hydel power turbines to be used with 120-ft high water falls were on display. A Francis water turbine model-HL-160-WJ-42 that can be used at 130-ft-high water level was also on view. The Ministry of Industry No 2 had a display of motors of various capacities manufactured by the electric motor factory in Indagaw. In addition, ignition coils, fuel pumps, alternators and starter motors manufactured at the automobile electronics factory in Indagaw and meters produced at the meter workshop in Sinda were put on display.

NLM, 15/12/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n021215.htm>

Minister for Industry-2 Saw Lwin visits No 2 Machine Tool Manufacturing Factory of MMTEI [on Parami road] and inspects the production of generators. He gives instructions on the production of quality products.

NLM, 03/02/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020203.htm>

Minister for Industry-2 Saw Lwin checks on the manufacture of 5 kVA, 10 kVA and 35 kVA generators and the test run of 100 kVA generators at Machine Tool Factory No 2 of MMTEI [on Parami road] in Mayangon [Hlaing?] township. He leaves instructions on timely production, quality and marketing of the products.

USE OF BIO-DIESEL FUEL FOR RURAL ELECTRIFICATION TO GET ATTENTION

NLM, 05/10/06. Excerpt. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061005.htm>

At meeting no 1/2006 of the Central Cte for Development of Border Areas and National Races, General Than Shwe gave an address. . . . He said efforts are to be made to step up the supply of electricity to rural areas generated from hydel power plants and bio gas-using generators. Officials are to encourage the use of bio-diesel extracted from physic nut seeds to run generators to produce electricity.

General Soe Win said that [since 1988] small-scale hydel power plants had been set up in 14 towns in border areas and 265 generators provided to 199 villages. Small-scale hydel power plants had been put in place in border areas where water resources were available. . . . In accordance with the guidance of the Senior General, the Ministry of Industry No 2 is constructing a factory to produce turbines and generators. . . .

EPM No 1 Zaw Min submitted reports on small scale hydel power projects being implemented by the ministry. . . . [He said that the] Ministry of Electric Power No 1 has made arrangements to establish a total of 185 small-scale hydel power plants in Kachin, Kayah, Kayin, Mon, Rakhine and Shan states and Sagaing, Bago, Magway and Mandalay divisions. When completed, these plants could be expected to generate a total of 187 MW.

Website reference:

<http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>

Information presented by the Energy Planning Dept of the Myanmar Ministry of Energy at the second subregional energy forum in Ho Chi Minh city on 22/11/08 indicates that the Dept of Alternative Energy Development and Efficiency (DEDE) of the Ministry of Energy (MOE) of Thailand is sponsoring a community-based bio-diesel demonstration project in Myanmar.

Additional references

See above: ['Generator fired by physic nut oil](#) supplying power in Wanmaison (NLM: 28/09/08)
['Cogeneration potential](#) of Myanmar's production of sugarcane' (Appendix 17)
['Case study of MOST'S village biogas electrification](#) project (Appendix 18)

Hla Kyaw et al., ***Status and Potential for the Development of Biofuels and Rural Renewable Energy: Myanmar*** (ADB: Greater Mekong subregion Economic Cooperation Program, Manila, 2009, pp 24 - 26)
 Edited and condensed.

<http://www.adb.org/Documents/Reports/Biofuels/biofuels-mya.pdf>

Among alternative bioenergy sources, jatropha is rated highly, and its cultivation is being pursued as a priority by the Myanmar government. About 0.5 million ha (1.86 million acres) have been planted, and the 3-Year Plan of 2006–2008 calls for the expansion of jatropha over 3.4 million ha of land in all states and divisions of Myanmar. Biodiesel is being processed under a pilot project run by the research team of Myanmar Industrial Crops Development Enterprise and the Ministry of Agriculture and Irrigation (MOAI) in Yangon. The output capacity of the pilot plant is 100 gal/day of biodiesel. Parallel attempts to fabricate prototype or model pilotbiodiesel plants are being carried out at MAS, MA&I, Ind-2, the SciTechMinistry, and the EnerMin. The oil content of jatropha cultivars was found to vary from 26% to 41%. Genotypes with a high seed yield, high harvest index, high oil content, and resistance to pests and diseases need to be sought. The economic yield is expected to be obtained starting in the fifth year. Based on seed yield of 1,000–1,200 kg/acre, processed seeds could yield 50–60 gal/acre. The government's drive to expand the area planted to jatropha focused on both community and large-scale production business. However, the development for commercial processing, marketing, and utilization has been slow. Three or four prominent companies have established jatropha plantations. To accelerate the process, a partnership program shown has been proposed to carry out joint venture contract farming projects.

Jessica Cheam, Straits Times, 10/12/08. Edited, corrected and condensed.

<http://blogs.straitstimes.com/2008/12/10/life-on-myanmar-s-biofuels-plantations>

Singapore-listed Yoma Strategic Holdings has a majority interest in a 100,000 acre estate that is being planted with jatropha at Maw Tin in the Irrawaddy delta. The estate which employs 650 mostly-local farmers is managed by Plantation Resources, which sells the produce in partnership with a local Myanmar firm called Myanmar Agri-Tech. Yoma is planning to build a biodiesel refinery in partnership with a major Korean biofuels supplier, Enertech. It will be three miles from Maw Tin, along the Patheingyi River, and will facilitate both domestic use and export of the biofuel -- something that might save Myanmar from spending millions of its foreign reserves on fuel imports (a top reason why Myanmar's government has embraced jatropha in such a big way). Yoma's Serge Pun, who has been doing business in Myanmar for 18 years, is bullish about jatropha's prospects, despite its critics - which is why Yoma has pumped in US\$6 million into their jatropha operations in the country so far.

PNA/Xinhua, 27/10/08.

<http://balita.ph/2008/10/27/myanmar-plans-joint-venture-with-foreign-enterprise-for-bio-diesel/>

The Myanmar agricultural authorities will cooperate with some Japanese institutions to produce high-grade bio-diesel by forming a joint venture, the local weekly Flower News reported Monday. Under Myanmar's Jatropha bio-energy program, a joint venture company, named Myanmar Bio Energy Company, will be formed between the Myanmar Ministry of Agriculture and Irrigation, and Japan Development Institute (JDI) and Japan Bio Energy Development Cooperation (JBEDC) for the move, the report said quoting agricultural experts involved in the project. In the course of the formation of the joint venture, cultivation of Jatropha physic nut plants, establishment of trading center for such crops and raw edible oil factory and training of experts in the aspects will be carried out, the report said. The bio-diesel produced from the joint venture will be supplied for domestic use as well as for export, the report added. . . . The Myanmar private sector is also participating in playing part in production of bio-diesel fuel, planning to build a first and largest private-run bio-diesel plant in the country this year, private industries sources said. With a projected production of 80 tons of bio-diesel per day, the six-hectare bio-diesel plant in Yangon's Thardhukan Industrial Zone will be constructed by the Khaing Khaing Group Co. Ltd with an investment of 8 million U.S. dollars and foreign technical know-how will be introduced, local media also said. Using domestic raw materials, the plant will generate 20,000 tons to 30,000 tons of bio-diesel per year on completion, it said.

Reuters, 29/08/07 (as reported by the Myanmar Times: 03/09/07). www.mmtimes.com/no382/b005.htm

Myanmar plans to export jatropha-based biodiesel as it attempts to tap the growing market for biofuels, a senior Myanmar energy official told a seminar in Singapore on August 27. "By this time next year we hope to have seven million acres (2.8 million hectares) of jatropha plantations in full swing and a large amount of

biodiesel for export in the future,” said U Soe Myint, D-G of the Energy Planning Dept. “Myanmar’s requirements for biodiesel are minimal, but the jatropha project should earn some foreign exchange income,” he said. “Malaysian and Indonesian companies are already in talks with people in the various states to set up processing plants, while the central government will be responsible for quality control.”

Win Nyunt Lwin, Myanmar Times, 30/04/07. <http://www.mmtimes.com/no364/n011.htm> [not available on-line]

The government has unveiled a plan for a massive increase in the production of biofuel from the jatropha or physic nut plant as an alternative to diesel. The plan has set a target for growing the plants, which produce oil-bearing nuts, on up to eight million acres by 2008. Realising the target would support the production of about 20 million tonnes a year of the nuts, which contain up to 37pc of an oil which does not need refining and can be mixed with fuel for use in simple diesel engines. U Kyaw Swe Linn of Myanma Industrial Crops Development Enterprise said the physic nut plants were currently being grown on about 1.6 million acres, mainly in the dry zone areas of Mandalay, Sagaing and Magwe divisions. Almost 900,000 acres of the hardy, drought-tolerant plants, which bear fruit twice a year, had been planted as community forests or live fencing. A one-acre plantation can produce about 100 gallons a year. U Kyaw Swe Linn said the use of the oil would help to increase the mechanisation of the agricultural sector as well as reducing the country’s reliance on imported diesel. Myanmar produces about 90 million gallons of diesel a year but needs to import more than 200 million gallons annually. Myanmar has about 15.85 million acres of low-grade land suitable for growing jatropha plants, so realising the target would not involve the use of areas earmarked for other crops. The enterprise has developed refining equipment costing about K 7 million that can produce about 100 gallons of biofuel a day from the nuts.

NLM, 21/03/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060321.htm>

In Lashio Maj-Gen Myint Hlaing reported on efforts to implement guidance by the Head of State on . . . the production of bio-fuel for heavy machinery. Arrangements will be made to grow 500,000 acres of physic nut in Shan State within three years to produce the bio-fuel. The prime minister gave instructions saying that strenuous efforts would be made for growing of physic nut plants. Conditions are favourable to produce bio fuel on a commercial scale and physic nut oil can be used in generators, water pumps and tillers, he said.

NLM, 24/02/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060224.htm>

Diplomats, officials of UN agencies, journalists and the Deputy Foreign Minister participated in a physic nut planting ceremony on a 100-acre model farm of the Northeast Command in Lashio. Together with local national races and members of social organizations they sowed seeds and planted physic nut grafts. Afterwards, they observed the test run of generators and grinding machines that use physic nut oil.

Cf Ethnic Community Development Forum, *Biofuel by Decree: Unmasking Burma’s bio-energy fiasco* (2008), pp 22-23. <<http://burmalibrary.org/docs4/BiofuelbyDecree.pdf>> If jatropha oil is not properly refined, carbon-deposit build-up can damage engines. A resident from Loikaw explained that although jatropha oil is on sale in town car owners do not want to purchase it because the thick oil blocks fuel lines and filters, making it necessary to clean them often. Others report that vehicles using the oil cannot drive up inclines because the engine sputters and stops. Villagers are quick to see through the facade of ceremonials promoting the use of jatropha. “We had a good laugh during our festival. They tried to demonstrate how a small tractor could run through jet sus [physic nut] fuel. The man filled the tank and started the engine. After a while the engine stopped running. He tried to restart it again and again but it failed. The audience all laughed,” a villager reported.

NLM, 15/01/06. <http://www.ibiblio.org/obi/docs2/NLM2006-01-15.pdf>

Testing of physic nut oil in running buses, light trucks and generators produced by Mandalay Industrial Zone showed considerable success, drawing the attention of rural folks. The tests showed that using a gallon of the oil, a jeep or a light truck installed with 2C engine could run 23 miles. It is learnt that with 100pc use of diesel, such a vehicle can run 25 miles. A 42-passenger bus can run 10 miles with 100pc use of a gallon of physic nut oil and 12 miles with the use of a gallon of diesel. Farmers can use physic nut oil they produce with the use of manual millers to operate power-tillers, reapers, combine harvesters, water pumps, generators, outboard motors less than 20 hps, small agricultural trucks.

On other types of small-scale generation of electricity for rural communities see the following:

- 'Interest growing in rice husk generation' (MT: 10/07/06)
- 'Wind power [system ideal](#) for villages' (MT: 05/12/05)
- 'Village [electrification technology](#) on display' (MT: 14/11/05)
- 'Mini hydropower plants planned for rural areas' (MT: 08/08/05)
- 'Hydropower station commissioned in [Kaungkha](#)' (NLM: 26/07/05)
- 'Biogas power plants supply electricity to rural areas' (MT: 16/08/04)
- 'Private sector promoting interest in renewable energy' (MT: 12/07/04)
- 'Rural Areas Encouraged to make [greater use of renewable](#) energy' (MT: 05/01/04)
- 'Solar power seen as solution for remote villages' (MT: 06/10/03)
- 'Alternative energy project uses [three power sources](#)' (MT: 06/01/03)
- 'Introduction of renewable energies in rural areas of Myanmar' (In preparation)
- 'Electricity generation in Myanmar by [state and division](#)' (In preparation)

[LETPANPIN VILLAGE PLUGGED INTO NATIONAL GRID](#)

Embassy of Japan in Myanmar, 03/10/06.

[http://www.mm.emb-japan.go.jp/profile/english/press/2006-10-03\(1\).htm](http://www.mm.emb-japan.go.jp/profile/english/press/2006-10-03(1).htm)

The Government of Japan, under its Grassroots Grant Assistance Scheme, will provide a grant aid of US\$35,794 to the Letpanpin Village Electric Power and Water Supply Installation Committee to provide for the installation of power and water supply facilities in the village.

Letpanpin Village is situated about 240km south-west of Mandalay, just 4km from Kyaukpadaung town and has a total population of 1,855. Most of the villagers make a living from agriculture or related small-scale industries such as jaggery-making.

The villagers currently rely on candles and battery lights for their activities after dark. To improve the situation, motivated villagers under the leadership of the chief abbot of the local monastery succeeded in 2002 in installing a 50-kVA transformer that is connected to the national electric grid along the Yangon-Mandalay highway. However, they can no longer afford to install the power supply lines to each house due to a shortage of funds. In recognition of their salient efforts, an electric power supply system in the village will be funded under the Grassroots Grant Assistance Programme. In addition, an efficient water supply system will also be constructed for the village. It is expected that the project will upgrade the standard of living of the villagers and contribute to the all round development of Letpanpin Village .

The grant contract to this effect was signed on 3 October 2006 at the Embassy of Japan in Yangon between Mr. Tetsuro Amano, Minister/Deputy Chief of Mission, Embassy of Japan to the Union of Myanmar, and U San Maung, Chairman of the Letpanpin Village Electric Power and Water Supply Installation Committee.

[ELECTRIC POWER SUPPLY IMPROVES AFTER YEARS OF ABNORMAL STATUS](#)

Xinhua, 02/09/06. http://english.people.com.cn/200609/02/eng20060902_299091.html

Electricity supply in Yangon city has gradually improved to nearly normal since late July with round-the-clock distribution of electricity after experiencing years of abnormal and restricted power supply. The alternate distribution at three different times a day had caused much inconvenience. The resumption of almost normal electricity supply in all townships as well as in the industrial zones of Yangon is mainly due to the functioning at full capacity of two hydropower plants -- Paunglaung and Mone -- official media reported. The Paunglaung hydropower plant in Pyinmana township has a capacity of 280 MW, while the Mone plant in Magway division has a capacity of 75 MW.

Electric power authorities have been working to ensure electricity in Yangon 24-hour a day in the wake of years of power shortage. MEPE, the main electricity supplier, said it is supplying 360 MW of electricity to

Yangon daily and 860 MW to other parts of the country. MEPE has also attributed the possible increase of power supply in Yangon to the removal of government ministries to the new capital of Nay Pyi Taw since last November. This has resulted in reduced power consumption by ministry offices in Yangon and has made it possible to increase distribution to residential areas as well as industrial zones.

MEPE raised the prices charged for electricity prices last May, advising people to use electric power more efficiently and to avoid overuse. The new rates are K 25 (US\$ 0.02) per unit for home-lighting purposes, up from previous rates that varied from K 2.5 to K 25 for 1 to 200 units. Unit charges for business customers doubled. The previous rates had been in force since May 1999.

Official stats show that before 1988, there were 24 power plants in Myanmar with a total capacity of 568.45 MW with 14 hydropower accounting for 228.45 MW. Since 1988, Myanmar has built 39 new power plants with a total capacity of 1,071 MW. Thirty are hydropowered, having a capacity of 517.22 MW. Myanmar is currently building 16 hydropower projects with a total capacity of over 1,778 MW. These projects in Mandalay, Bago, Shan, Kayin and Rakhine divisions and states include Yeywa (790 MW), Kunchaung (60 MW), Pyuchaung (40 MW), Khabaung (30 MW), Yenwe (25 MW), Shwegyin (75 MW), Shweli (600 MW), Kengtawng (54 MW) and Thahtay (102 MW). Plans are underway to build 15 more plants that would increase add another 4,346 MW. These include facilities at Bawgata (160 MW), Bilin (280 MW), Hatkyi (600 MW), Shwesayay (660 MW), Manipura (380 MW), Tanintharyi (600 MW), Shweli No 1 (150 MW), Shweli No 2 (500 MW) and Maykha (800 MW).

According to government stats, Myanmar had an installed generating capacity of over 1,775 MW as of October 2005, up from 706.82 MW in 1988. Hydropower account for 35pc, while gas-fired generation stands at 50pc. Other recent stats show that electric power produced totalled 6.064 billion kilowatt-hours in 2005-06, up from 2.2 billion units in 1988-89. Despite the improvement in Yangon's electricity supply, issues such as frequent power failure due to old-aged cable lines and voltage drops remain to be resolved.

Additional references

See above: 'Full power supply promised for July' (MT: 04/06/07)
 'Myanmar learns to live with the lights out' (Reuters: 09/04/07)
 See below: 'Yangon electricity supplies get boost from YESB plan' (MT, 24/07/06)

PLANS FOR HTAMANTHI DAM PROJECT ON CHINDWIN NEAR FINALIZATION

Nwe Nwe Aye and Moe Moe Oo, Myanmar Times, 28/08/06.

(Compiler's note: Issue 331 of the Myanmar Times is not available on-line.)

The design for Htamanthi dam, slated to be the biggest ever built in Myanmar, is expected to be finalised in early 2007, an official from the Ministry of Agriculture and Irrigation said early this month. U Aung Naing Win, an official with the ID, told MT in an interview in the village of Tazone, about 52 kilometres (32 miles) from Homalin in Sagaing Division, that the ministry had already drafted the design and hoped to finalise it under supervision of Colenco, an international consulting and engineering company.

The project on the Chindwin River, which was started in 2005, is being implemented by the A&I Ministry. The EPM No 1 will build the power house, navigation lock and spillway, said U Aung Naing Win. "We are now at the stage of preparing the land, installing machines and finding rock that will be used for the dam bed," he said. The completed dam will be 2,350 metres (7759 ft) long and 72m (236 ft) high, and will create a reservoir with a surface area of 540 sq mi. It is expected to produce 1200 megawatts of power.

The project will also include the installation of two 373-km (230-mi) cables that will carry 500 kilovolts of power from the dam to Monywa. The surplus electricity will be sold to India. The entire project is expected to be complete within seven years.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-12: Tamanthi

Htamanthi dam near Tason village [25° 07' N, 95° 03' E], grid square reference: 35\5, 9\0.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ng46-12.jpg>

Additional References

Data summary: [Htamanthi](#)

See below: [‘Shwezayay](#) hydropower project under detailed feasibility study’ (NLM: 07/02/04)

Central Electrical Authority [India], 31/12/10. Condensed and adapted.

<http://www.cea.nic.in/hydro/myan.pdf>

NHPC established a site office at Tamanthi in Feb-2010 and investigations relating to geology, seismicity, construction material survey, etc, were taken up. Field investigations for Shwezayay project were to be taken up in Sep-2010 after the end of the monsoon period. Pending preparation of a detailed project report (DPR) an interim report highlighting the updated project parameters and expected cost of the projects was to be prepared so that an MoA for the Tamanthi and Shwezayay projects could be signed by Dec-2010. A high level delegation visited Myanmar in May-2010 and held discussions with Myanmar authorities in this regard. Subsequently, members of the task force visited the project sites of the Tamanthi and Shwezayay projects in Myanmar in Jun-2010. The target dates for submission of an updated DPR were set for Jan-2011 for the Tamanthi project and Jul-2011 for the Shwezayay project.

Utpal Bhaskar & Elizabeth Roche, LiveMint, 08/09/10 Edited and condensed.

<http://www.livemint.com/2010/09/07213124/NHPC-to-submit-report-on-Myanm.html?atype=tp>

State-run NHPC Ltd plans to submit proposals to revive the Tamanthi and Shezayay hydropower projects in Myanmar to India's Ministry of External Affairs (MEA). The investment required for setting up the projects and building a transmission link is estimated at Rs.25,000 crore [US\$5.4 billion]. "We are updating the detailed project reports and will submit the report to MEA by October. Our team is working there," said S.K. Garg, chairman and managing director of NHPC. The feasibility reports on the Tamanthi and Shwezayay projects were prepared by Switzerland's Colenco Power Engineering Ltd and Japan's Kansai Electric Power Co Inc. "This is a report that NHPC is preparing for the Myanmar government. We haven't seen it yet," said a government official who did not want to be identified. The projects are integral to India for its engagement with Myanmar and the MEA will underwrite as much as Rs.40 crore [US\$ 8.6 million] in expenses to be incurred by NHPC on hydrological studies needed to develop the two power plants.

Agreement signed during visit of General Than Shwe to India, 29/07/10.

<http://www.burmanet.org/news/2010/07/29/mea-government-of-india-joint-statement-during-the-visit-of-chairman-state-peace-and-development-council-of-myanmar/>

Both India and Myanmar identified the power sector as an area of growing cooperation and agreed "to cooperate in the implementation of the Tamanthi and Shwezayay projects on the Chindwin River Basin in Myanmar. They welcomed the involvement of M/s NHPC in carrying out the much required additional investigations after the signing of the MoU on Cooperation in Hydro-power Development projects in the Chindwin River Basin in September 2008. Subject to the findings of these additional investigations, the two countries will endeavour to conclude the Memorandum of Agreement within a year".

Jyoti Malhotra, Business Standard, 19/07/10.

<http://www.business-standard.com/india/news/myanmar-dictator-to-get-warm-welcome-in-india/401819/>

Burma withdrew an Indian offer to build the Tamanthi hydro-electric project on the Chindwin river because of inordinate delays by NHPC, offering it to the Swiss and the South Koreans. But when they refused the bait, the Myanmar government offered it back to NHPC in 2009, on the condition that a detailed project report be submitted in 12 months.

Utpal Bhaskar, LiveMint, 10/05/10 Edited and condensed.

<http://www.livemint.com/2010/05/10210808/Indian-team-to-visit-Myanmar-f.html>

An Indian team will be leaving for Myanmar on Tuesday to discuss building power plants and transmitting some of the electricity to India. The visit is designed to revive the stalled 1,200MW Tamanthi hydroelectric power plant and 642MW Shwezayay project on the Chindwin river. A memorandum of association for these projects is expected to be signed by December. The delegation will comprise officials from state-owned

firms NHPC Ltd and Power Grid Corp. of India Ltd (PGCIL), said a government official who did not want to be identified. S.K. Garg, chairman and managing director, NHPC, confirmed the impending visit and said: "Survey and investigation work are yet to be completed. No modalities have been worked out so far. A transmission link for the evacuation of power is expected to be set up. We had submitted a report on the transmission of power around one-and-a-half years back," a PGCIL executive said on condition of anonymity.

Mumbai, Eric Yep, Wall Street Journal, 21/04/10. Edited and condensed.

<http://online.wsj.com/article/SB10001424052748704448304575197233284679618.html>

India's state-run NHPC Ltd. is considering building two hydroelectric power projects in Myanmar at an investment of 250 billion rupees (\$5.6 billion) as it seeks to expand, its chairman said Wednesday. "We are inching towards Myanmar. We have already sent our team to Myanmar for further survey and investigation for two projects," S.K. Garg told reporters on the sidelines of an industry conference. Mr. Garg said the NHPC is looking to build a 510 MW plant and another project with a capacity of 520 MW in Myanmar. NHPC is yet to decide on whether it will tie up with any other company for the projects, he said.

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

In a report to the SPIC, Hydropower Minister Zaw Min included the Htamanthi project as one of 31 that are to be implemented with the investment of foreign companies. Name-plate capacity of 1200 MW.

Utpal Bhaskar, MINT, 02/09/09. Edited and condensed.

<http://www.moneycontrol.com/india/news/business/mea-may-back-nhpcs-myanmar-project/413824>

India's ministry of external affairs is mulling underwriting as much as Rs 70 crore [US\$ 14.5 million] of NHPC's expenses in developing the Tamanti and [Shwesayay] projects on Myanmar's Chindwin river. Although detailed reports on the two projects have been readied and studied by India's largest hydro-electric power utility, some additional studies are required. Because NHPC is a commercial organization, it is not ready to bear the cost of these studies. The capital cost of the two projects with a total generating capacity of around 1,800MW has been estimated at around Rs 5-7 crore [US\$ 1-1.5 million] per MW, depending upon the location and geology, as well. The hydro power projects are seen as part of India's economic diplomacy initiative to engage Myanmar where Chinese influence has been growing. The electricity that generated would be brought back to India.

Jyoti Malhotra, Business Standard, 29/06/09. <http://www.business-standard.com/india/news/myanmar-pipelines-confirm-china/s-place-in-baybengal/362405/>

Indian officials pointed out that Yangon, having withdrawn the offer to develop a hydro-electric project on the Tamarthi river [sic] because of inordinate delays in New Delhi, had a few weeks ago offered it back to the National Hydroelectric Power Corporation, on the condition that the detailed project report be submitted to Yangon in 12 months.

William Boot, IRROL 12/05/09. http://www.irrawaddy.org/article.php?art_id=15615

India's state hydroelectric firm NHPC says it is ready to invest about US\$5 billion in two hydroelectric projects in western Burma. That's how much it will cost to develop hydro dams at Tamarthi and Shwezayay in the Chindwin River basin, said a report in India's Hindu News newspaper, quoting senior company executives. The two projects would deliver an electricity generating capacity of 1,800 megawatts. Most if not all of the power would be transmitted into energy starved northeast India. "There is great potential in Myanmar and the government there is very keen that we [NHPC] start work," the Hindu News quotes NHPC Managing Director S.K. Garg. The human rights NGO Burma Rivers Network has estimated that at least 30,000 people would be forced to move to make way for the two dams.

Iftikhar Gilani, Daily Times (Pakistan), 24/04/09.

http://www.dailytimes.com.pk/default.asp?page=2009\04\24\story_24-4-2009_pg7_40

Addressing a press conference on Thursday, NHPC Chairman and Managing Director SK Garg said that India's state-run power producer . . . had signed an MoU with Myanmar to study the master plan for hydro power development of the Chindwin River basin that includes a review of detailed project reports (DPRs) for the 1,200MW-Tamarthi hydroelectric project (HEP) and the 642MW-Shwezayay HEP. "

Press Trust of India, 13/03/09.

<http://www.business-standard.com/india/news/nhpc-to-commission-two-power-projects-by-dec-09/56586/on>

NHPC Chairman and Managing Director S K Garg told reporters in New Delhi that the company [still] plans to set up two projects in Myanmar to harness the hydro potential of the Tamanti and Shwezaye projects. "We hope to work on big projects (1,200 MW and 640 MW) in Myanmar and are discussing the probability with them (Myanmar)," Garg added.

Utpal Bhaskar, LiveMint, 13/02/09.

<http://www.livemint.com/2009/02/12214748/Bhel-NHPC-in-joint-bid-to-bri.html>

State-owned Bharat Heavy Electricals Ltd (Bhel) and National Hydroelectric Power Corp. Ltd (NHPC) may together build the 2,400MW [sic]-Tamanti hydropower project in Myanmar, setting the delayed Rs14,000 crore [approx US\$3 billion] project back on track. "The talks with Myanmar for the Tamanti project have restarted," a Bhel executive said, adding that top officials of both firms visited Myanmar last week. They were part of a team of businessmen, lawmakers and bureaucrats accompanying India's vice-president Hamid Ansari on a four-day tour of Myanmar. "We are looking at reviving and developing the project through a joint venture with NHPC," the Bhel executive said, requesting anonymity. Bhel makes equipment for power plants and NHPC builds and operates hydroelectric projects. The project was delayed after NHPC could not start work on it three years after submitting a feasibility report, saying that it had too much to do back home. Shubhramshu Patnaik, an executive director at consultancy firm PricewaterhouseCoopers, said international projects such as this will materialize only through state negotiations. "There are also larger issues about project financing as in countries such as Myanmar...as these may not get commercial bank funding and...have to depend on government funding," he said.

P. S. Suryanarayana, The Hindu, 18/10/08

<http://www.thehindu.com/2008/10/18/stories/2008101888881800.htm>

[During his visit to Burma], Union Minister of State for Commerce, Industry and Power, Jairam Ramesh held discussions with Burma's Electric Power Minister Zhaw Min. These centred on the timelines of two India-aided projects and the overall competitiveness of Indian expertise. Myanmar was assured that there would be no slippage in respect of the ongoing 1,200-MW Thamanthi project in the Chindwin basin and the 111-MW Rakhine unit. Col. Zhaw Min pointed out that the cost-per-MW in China-aided projects was almost one-half of that in regard to the Indian venture.

Khin Maung Soe Win, DVB, 10/10/08. <http://english.dvb.no/news.php?id=1851>

The Burmese forestry department granted permission for Chinese companies to cut down all the trees in areas that would be submerged by the Htamanthi dam project. An estimated 100 square miles of forest between Htamanthi and Khamtee has been felled since the end of last year and wildlife is fleeing to India, according to ethnic Naga El Maung Sar, quoting a Naga hunter. "All the forests are gone and the animals have nowhere to go so they have moved on," he said. "Indigenous animals such as elephants, wild boars and tigers have crossed the border in the west and settled in Nagaland and Manipur." The destruction of the forests is not only forcing the animals to flee but could lead to the extinction of rare herbs and medicinal plants. Naga and Kuki people who make a living hunting animals and collecting medicinal plants are also facing difficulties, and three ancient Naga, Kuki and Red Shan settlements have also been forcibly relocated to make way for the project.

Aung Kyi and Aung Shin, Myanmar Times, 29/09/08. <http://mmtimes.com/no438/n009.htm>

Myanmar's Hydroelectric Power Department signed an agreement with the National Hydroelectric Power Corporation (NHPC) of India to build two hydroelectric projects in the Chindwin River basin on September 17. The department is implementing [a number of] joint-venture hydropower projects with neighbouring countries to increase the country's power generation and to receive foreign exchange revenue over the concession period. Under all the joint-venture agreements, Myanmar is entitled to get 10pc to 15pc of annual electricity generation from the power stations free of charge.

NLM, 29/09/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nIm/n080929.htm>

A Baucer [Bauer] trench cutter (BC-32) needed for construction tasks at the Thahtay hydropower project is being sent from the Htamanthi hydropower project near Tazone village, 30-miles north of Homalin. [See notes for the [Thahtay hydropower dam](#) (NLM, 13/01/09) for more details on the use of trench cutters in dam construction.

The Hindu, India, 19/09/08. <http://www.hindu.com/2008/09/19/stories/2008091957301800.htm>

"This is a major strategic victory for us. The Chindwin River holds huge hydro power potential and we intend to further strengthen this relationship by going in for other such projects in Myanmar," said Jairam Ramesh, India's Minister of State for Power and Commerce, following the signing of an MoU between the Burmese and Indian governments for taking up detailed project reports (DPRs) on two major hydropower projects. Under the agreement, Burma's Department of Hydropower Implementation (HPID) with the help of India's NHPC Ltd will develop the 1,200-MW Tamathi [Htamanthi] and the 600-MW Shwzaye [Shwesayay] hydro power projects on the Chindwin river in Burma. The Minister said both the parties would form a joint venture company to execute the projects.

NLM, 19/09/08. <http://www.burmalibrary.org/docs6/NLM2008-09-19.pdf>

An MoU on the Htamanthi and Shwesayay hydropower projects was signed in Nay Pyi Taw by Chairman S K Gorg of the National Hydroelectric Power Corp Ltd (NHPC) of India and the director-general of Myanmar's Hydroelectric Power Dept. Under the MoU, the Hydroelectric Power Department and NHPC will implement the two projects. The Htamanthi project that will have a generating capacity of 1200 MW and the Shwesayay project will have generators capable of generating 600 MW. The signing ceremony was preceded by discussions on the two projects by officials of the Myanmar Ministry of Electric Power No 1 and directors of NHPC and the Ministry of Power of the Republic of India.

Indian Telegraph, 12/09/08. http://www.telegraphindia.com/1080913/jsp/business/story_9827654.jsp

An NHPC, (formerly National Hydro Power Corporation Ltd) team will visit Myanmar later this week to sign a MoU with the Myanmarese authorities to develop two hydel projects on the bank of Chin Win river and also to study the potential for hydro power generation on the river embankments, besides carrying out geological studies in the area. "We are in advanced stages of dialogue with the government of Myanmar for developing [these] hydroelectric projects," said S.K. Garg, chairman and managing director of NHPC Ltd.

Financial Express (India), 30/07/08.

<http://www.indoburmanews.net/archives-1/2008/july-2008/india-eyes-2-hydel-power-projects-with-myanmar>

New Delhi is once again attempting to woo Rangoon, with plans to develop two hydel power projects -- the 1,200-MW Tamaranthi and the 600-MW Shwezaye power projects -- in the Chindwin river basin. The projects, expected to cost around Rs 15,000 crore [US\$ 3.5 billion], will be developed under the joint venture route by India's NHPC Ltd and the Burmese government-owned Department of Hydropower Implementation (HPID). Power from the projects would be exported to India via a proposed transmission link through Manipur. Officials said that a MoU on hydropower development on the Chindwin river basin has already been readied and is expected to be inked shortly between NHPC and HPID. NHPC Chairman and MD S.K. Garg confirmed that the talks in this regard were progressing with the Myanmar government. However, on the issue of project execution, Garg said, "The details are yet to be worked out. Modalities in this regard will be decided mutually between the two sides".

The Hindu, 28/06/08. <http://www.thehindu.com/2008/06/28/stories/2008062854731600.htm>

Minister of State for Power, Jairam Ramesh, who returned after a four-day visit to Burma, said that the Burmese leadership had shown keen interest to join hands with the Indian companies to take up construction of the 1,200-MW Tamaranthi power project and the 660-MW Shwe Saysay power projects on the Chindwin river in order to tap the huge hydro power potential in Burma.

NLM, 25/06/08. <http://www.myanmargeneva.org/08nln/n080625.htm>

An Indian delegation led by Minister of State for Commerce and Power Shri Jairam Remesh called on Minister for National Planning and Economic Development Soe Tha at the ministry in Nay Pyi Taw where they frankly discussed matters on bilateral cooperation in economic and trade sectors. Mr Shri Jairam Remesh also called on EPM No 1 Zaw Min at the latter's office and discussed matters related to hydel projects in Myanmar.

Utpal Bhaskar, LiveMint, 23.06/08

<http://www.livemint.com/2008/06/23234932/India-uses-power-diplomacy-to.html>

The roadblocks that have delayed a key hydropower project in Myanmar by more than three years may finally be cleared during the visit of Minister of State for Power Jairam Ramesh to Myanmar. The Export-Import Bank of India, or Exim Bank, is to extend two lines of credit amounting to \$84 million (Rs361.2 crore) to Myanmar during the four-day trip by Ramesh. "This visit is part of our regional diplomacy initiatives to use electricity in order to engage our neighbours," Ramesh said before his departure for Myanmar. "The lines of credit are for developing the power transmission and distribution networks in Myanmar. I will also use this visit as an opportunity to help NHPC get the Tamanti project, the detailed project report for which has been prepared by NHPC. I am aware that there are some difficulties with the project, which will be sorted out," said Ramesh. Myanmar had redesigned the Tamanti project, doubling its capacity to 2,400MW. NHPC Ltd, previously known as National Hydroelectric Power Corp. Ltd, an Indian government enterprise, had prepared a feasibility report for the original 1,200-MW project. Ramesh is to meet Myanmar's power minister Col Zaw Min in Nay Pyi Taw, the country's capital. His visit is part of the Indian government's exercise to improve its diplomatic and economic ties with a neighbour that has rich deposits of natural gas, a fuel India needs. "Inter-country deals are very complex. It is more government-to-government intervention that helps. Nothing else works," Shubhranshu Patnaik, an executive director at audit firm PricewaterhouseCoopers, had earlier said about the project. India has been trying to utilize its infrastructure development efforts in Myanmar to sign long-term contracts for supply of natural gas. The successful completion of the project could help India develop more hydropower projects in Myanmar and tap its energy resources.

Utpal Bhaskar, LiveMint, 27/03/08.

<http://www.livemint.com/2008/03/27014021/NHPC8217s-Myanmar-failure-m.html>

Plans by India's National Hydroelectric Power Corp (NHPC) to develop the 1,200-MW Tamanti hydropower project in Myanmar have come to nought. "The plan has fizzled out. Though there were a lot of discussions after submitting the PFR (project feasibility report), nothing progressed. We were not able to present our case and expedite the matter. The primary reason for this is our national commitments which we are trying to complete," said a NHPC executive who did not wish to be identified. The project would have helped control floods and provide water for irrigation. In return, India would have received the bulk of the power generated. Once completed, the project would have helped control floods and provide water for irrigation. In return, India would have received the bulk of the power generated. The Tamanti project was scheduled to be operational by 2014. Seven of 12 projects NHPC is working on have been delayed due to unavailability of manpower and price disputes with private contractors working on the projects.

NLM: 08/04/08. <http://www.myanmargeneva.org/08nlm/n080408.htm>

In New Delhi, EPM No 1 Zaw Min holds talks with MD D.K Mittal and members of Infrastructure Leasing and Financial Services Ltd and members about co-operation in hydropower projects in the Chindwin basin.

Mizzima News, 05/03/07. <http://www.mizzima.com/MizzimaNews/News/2007/Mar/07-Mar-2007.html>

About 380 households from Leivomjang and Tazong villages, located between Tamanthi and Homalin towns on the Chindwin river, have been forced to leave their homes and relocate to new places, said an ethnic Kuki woman, whose family members were compelled to relocate from Leivomjang village. She said the Burmese Army had started destroying houses in the two villages, forcing the villagers to relocate to a new village named 'Laung Min' on the eastern bank of Chindwin. However, as the new village site is barren and is situated in a remote area away from the communication network, villagers have refused to stay in the new place, she said. "Most refused to go to the new site and some went into the jungle to hide. Some are temporarily staying in farm huts. No one dares to remain in their village," she added. The Burmese junta with the help of India's National Hydroelectric Power Corporation (NHPC), is building a hydro project on the Chindwin that will generate 1,200 MW of electricity. According to anti-Tamanthi Dam campaigners 80% of the power is to be transmitted to India. They said the authorities in Burma had forcibly seized about 17,000 acres of agricultural land from villagers for the proposed dam site. Lu Lun, coordinator of the ATDCC in New Delhi, said that over 61 Kuki villages lying in the area targeted for the dam will be forced to relocate. Moreover, the construction which has begun without an iota of environmental assessment, will adversely affect the existing biodiversity, ecological balance and climatic conditions in the region.

NLM, 28/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070128.htm>

General Soe Win and party visit the site of the Htamanthi dam and hydroelectric power multi-purpose project. EPM No 1 Zaw Min reports on [plans for] the power intake, steel pipelines, power station, canal,

spillway and switching yard. A&I Minister Htay Oo reports on preliminary engineering work and the arrival of heavy machinery and Deputy EPM No 1 Myo Myint explains matters related to geological conditions and the change of design for the main embankment. Deputy A&I Minister Ohn Myint clarifies construction of separation wall, collection of quality stones and tasks being carried out in co-operation with Colenco Co. The PM and party view construction of the concrete separation wall, preparations for construction of the main embankment and other engineering works. They also inspect the site of Test Cell No 2, a completed fuel tank and concrete mixer. Afterwards, the PM presents fruit baskets to the Project Director of Colenco Power Engineering Ltd and engineers.

NLM, 19/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061219.htm>

General Than Shwe and party visit the Htamanthi multipurpose hydel power site at Tazone village about 30 miles north of Homalin. EPM No 1 Zaw Min reports that the project will be undertaken by HPID. The 1,200-MW power station will generate 6,685 million kWh of electricity annually. Besides the Htamanthi project, the 520-MW Mawlaik hydel power project and the 600-MW Shwesarye hydel power project [also on the Chindwin] will be implemented. A&I Minister Htay Oo explains the dam-building work to be carried out by the ID. The two ministries concerned will work co-operatively in building the diaphragm, the spillway and the irrigation network. Personnel have already been trained to drive the trench-cutter that will be used in building the diaphragm. Forestry Minister Thein Aung reports on forests in the project areas and Energy Minister Lun Thi on arrangements to provide fuel. The earth dam on the Chindwin will be 5,250 feet long and 263 feet high. Water stored by the dam will be used to irrigate over one million acres of farmland. Six 200-MW turbines are to be installed.

NLM, 01/02/06. <http://burmalibrary.org/docs2/NLM2006-02-01.pdf>

Two sets of trench cutters and related machinery for the Htamanthi multi-purpose dam project of the A&IMin have arrived from Germany at No 7 Sule Wharf in Yangon.

Tribune News Service, 20/07/05. www.tribuneindia.com/2005/20050721/cth1.htm

Over six years after a joint Indo-Myanmar hydro-power generation project was initiated, it has finally made headway, with the governments of both countries accepting the pre-feasibility report for Tamananthi hydro-electric project. It will have a generating capacity of 1,200 MW and will be developed as a mutual interest venture between India and Myanmar. "We had started work on the report in April, 2004, after signing a formal agreement with the Ministry of External Affairs," said Mr M.M. Madan, Executive Director of the National Hydro Power Corporation (NHPC). "Acceptance of the report implies that both countries are keen to go ahead with the project." This is the third major foreign project to be undertaken by the NHPC after setting up power stations in Nepal and Bhutan. The NHPC was tasked by the External Affairs Ministry to prepare the report on the Tamananthi project, and it has conducted field surveys and investigations at the project site in collaboration with the Myanmar authorities. It would be the major Indian agency to execute the project. The project would involve construction of a dam on the Chindwin, the main tributary of Myanmar's major river, the Irrawaddy. The 840-km-long Chindwin, known as Ningthi in Manipur, has its source in the Pulkai Kumon ranges along the Indo-Myanmar border.

In February 1999, a fact-finding mission led by the Member (Hydro), Central Electricity Authority (CEA), visited Myanmar, followed by a joint site inspection by technical experts from both countries. The Indian team comprised experts from the CEA, the NHPC, the Central Water Commission and the Geological Survey of India. It identified two potential sites at Tazon and Hwena, and gauge and discharge stations were established to study the general geology of the sites. During his visit to India in Oct 2004, General Than Shwe signed an MoU on the project with the Indian gov't. In Feb 2005, a five-member team of experts from the CEA, the NHPC and the Power Grid Corp of India held discussions with Myanmar authorities about exporting 80% of the power generated by the project to India. Laying of transmission lines from the project site to a hub in north-eastern India, funding, contracts and investments were other issues reportedly discussed during the visit. It was also among energy and infrastructure-related issues on the agenda when External Affairs Minister Natwar Singh, visited Myanmar in March 2005.

Myanmar Times, 12/06/00. [Issue 15 of the Myanmar Times is not available on-line.]

U Soe Myint, D-G of the Myanmar Energy Planning Dept, at a BIMSTEC energy conference: "Myanmar is to export its hydro power to north-eastern parts of India once we can substantiate our proposed [Tamanthi] project, which is expected to cost US\$1 billion. In five years' time we could be ready." Rajendra K Pachauri, Indian expert from the New Delhi based Teri group: "This is very exciting prospect. There is enormous potential for Myanmar and India on energy generation and this project is impressive."

Anti-Htamanthi Dam Campaign Committee, [undated]. [No longer available on-line.]

Genesis of the [Htamanthi] project goes back to 1962 when preliminary investigation work was carried out with the assistance of the UNDP agency. (Compiler's Note: Pictures of the project area and villages, maps and a petition are available on this site. Consult also these Kuki websites for updates on the campaign against the Tamanthi dam.

<http://www.petitiononline.com/67kukis/petition.html>

<http://www.ksdf.org/read.asp?title=TAMANTHI%20DAM%20IN%20BURMA&CatId=Article&id=2>)

See also the following editions of the New Light of Myanmar: 28/04/04, 09/06/05, 30/01/06, 01/02/06, 24/09/06, 23/01/07

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TROUBLED HISTORY OF POWER SUPPLY AT TACHILEK

Shan Herald: 25/08/06 <http://www.burmanet.org/news/2006/08/25/shan-herald-agency-for-news-%e2%80%98patriotic-power-shut-down-in-tachilek/>

For the fourth consecutive day Tachilek, the twin city of Maesai, has been in darkness again, three years after electricity supply from Thailand was stopped by the order of the Burma Army, according to sources from the border. This time the plant in Ponglo quarter is undergoing repairs.

The military zone north of the city, however, has not been affected by the power outage. "Actually, it was the military that got hit by the blackout," one respected citizen explained. "But they ordered that the supply lines going into the city be redirected to the military zone." "In a way, this is another sample of our future democracy," he quipped, "which will be of the army, by the army, for the army."

The plant in Ponglo quarter, set up in 2003, is undergoing emergency repairs under the supervision of five engineers summoned from Mandalay, said another source.

Before 2003, electricity to Tachilek was supplied by Thailand, at 4.75 baht (US\$ 0.10) per unit. However following a series of confrontations with Thailand, Maj-Gen Khin Zaw, then commander of eastern Shan State, downgraded the purchase of power from Thailand as an 'unpatriotic act' and contracted the local Wai Family Electrical Production and Supplies Co.Ltd, owned by U Tar Wai, instead to supply electricity to the city, at 8 baht (\$0.2) per unit, which has now gone up to 12.50 baht (\$ 0.30) per unit.

U Tar Wai, said to be a close associate of Wa druglord Wei Hsuehkang, was arrested last year in connection with the Myanmar Universal Bank that was closed down in August by a military order. "He was freed later after paying Kyat 800 million (\$666,000)," a Wa source told S.H.A.N. U Tar Wai reportedly was close to Maj Gen Khin Zaw, now commander of Mandalay-based Central Region Command, when he was still chief of Tachilek district between 1998-2000.

Additional references:

See below: ['Private operators](#) meet consumer need for alternative power service' (MT: 03/02/02)
Chronology of the canceled [lignite power plant](#) at Tachilek (NLM: 10/05/00)

NLM, 17/09/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030917.htm>

At the power station in Tachilek, Lt-Gen Aung Htwe of the Ministry of Defence was briefed on the power production capacity of the station and progress in the installation of the unit system. He gave instruction to provide power to the villages around the clock and extended installation of meter boxes. The station is situated on a 24.42-acre site on Polo [Ponglo] Street in Haungleik village-tract in Tachilek. A project for ensuring all-day power supply to the town was launched on 17 April 2003. Up to 9 September, 528 meter boxes have been installed. Arrangements are being made for generating electricity with the use of the current of Mehok Creek 20 km from Tachilek.

Shan Herald, 27/06/03.

<http://www.asiantribune.com/news/2003/06/28/tachilek-blasts-electricity-considered-one-causes>

Whatever the political and military reasons were that led to the bomb explosions in Tachilek on 21 May that killed 4 and wrecked the statue of a Burmese hero, the jostle for the right to electricity supply among local businessmen was one issue that could not be brushed off easily, a recent informal meeting of traders in Mae Sai concluded. "The destruction of the statue of King Bayinnaung (1551-1581) was carried out simply to confuse the issues," said one. "The main object of the exercise was the Tar Wai power station, where the blast successfully damaged two of the generators." Tachilek, except for government quarters and people with private generators, is once more in the dark since the electricity plant of Wai Family Electrical Production and Supplies Co. Ltd. went out of commission during the blowup that also killed one of its workers. The Wai family station had only been in operation for less than a month, after the application of another local businessman, Sai Hseng who wanted to use meter boxes from Thailand at a cheaper rate was turned down. Instead the concession was granted to Tar Wai, who enjoys close ties with the United Wa State Army and its business firm, Hong Pang. The grant angered even the local authorities who thought they had been cheated out of their rightful shares in the spoils by Triangle Commander Brig-Gen Khin Zaw, according to a source. "As a result, there is a concerted effort by some officers at present to have him removed from eastern Shan State." Currently, U Tar Wai, U Maung Win, 58, another ethnic Chinese applicant, and an unidentified representative of the Thai power agent in Mae Sai are in Rangoon to have the issue resolved.

Asian Tribune, 21/05/03. www.burmalibrary.org/TinKyi/archives/2003-05/msg00022.html

Soon after four bombs exploded in and near Tachilek late last night and this morning, commanders of the rebel Shan State Army turned out to disclaim suggestions as to their involvement. According to the Shan Herald, the first bomb reportedly blew up at 22:00 last night, killing two policemen in the Pakook police box, 6 miles east of the town. A second went up at 03:15 am near the Myanmar Petroleum Production Enterprise (MPPE) gas station in Paliang ward, east of the Maekhao, a tributary of the Maesai, killing a civilian. The third explosion was at the King Bayinnaung statue at the center of the city at 06:45am. The blast was of such force that all windowpanes from a third-story building were smashed to pieces," informed another resident. The fourth bomb that discharged at 08:20am blew away a worker at the newly set up electricity plant near the Regina Hotel. The plant was owned by U Tar Wai, an ethnic Chinese with connections to the Wa, said the source.

Shan Herald, 30/04/03. http://www.shanland.org/general/2003/few_buy_new_electricity_meters.htm

Since an official announcement was made in Tachilek on 1 April that meter boxes from Thailand would be replaced by those from a company contracted to supply electricity to the border city, not more than 30 have been purchased by the townspeople, according to several local sources. The announcement by the township council stated that U Tar Wai, an ethnic Chinese partner of the Hongpang Co, had been engaged to provide electricity to the city and that he had obtained 3,000 meter-boxes that would have to be purchased at 35,000 baht each in order to connect to the service. U Tar Wai would be using three diesel-run generators during the day time and another three at night. The charge for the service would be eight baht per unit. Sources say most residents are reluctant to procure the new meter boxes because the service charge is much higher than the five-baht rate previously charged by Thailand and because the boxes will have to be replaced after only two years. Many of them have also bought their own generators since Burma cut off service from Thailand during a border confrontation between the two countries in 2002.

Moe Kyaw, IRROL, 28/06/02. http://www.irrawaddy.org/article.php?art_id=2407

The Burmese border town of Tachilek has been plagued by an electricity deficiency since relations between Thailand and Burma soured last month. The town's electricity is normally drawn from Mae Sai, Thailand,

opposite Tachilek, but on June 9 Burma's military government issued an order prohibiting residents from accessing electricity from Thailand, according to a report from the Thai-based Khaosod newspaper. Since then, residents have had to rely on diesel-powered generators for their electricity. Due to the high price of fuel and the rising cost of generators, only well-to-do residents of Tachilek have been able to afford the service. The price of generators has quadrupled since the bridge was sealed, according to a Thai merchant from Mae Sai. Government offices in Tachilek are reportedly able to draw power from 6:00pm to 8:30pm with the help of government-provided generators. The United Wa State Army's (UWSA) Hong Pan Company along with Kyi Myanmar Import and Export Co Ltd are trying to setup a huge generator in order to distribute electricity in Tachilek. U Kyi Myint of the Kyi Myanmar Co has travelled to Rangoon to try to obtain the necessary business permit. Hong Pan already has a giant generator capable of providing for the town's energy needs but has been unable to move it from its location near the Tachilek airport since the border is closed. Moving the giant generator requires the use of a large crane that is currently in Thailand.

ASEAN energy centre [undated, circa 2001]

http://www.aseanenergy.org/energy_sector/electricity/myanmar/future_electricity_projects.htm

A hydropower plant with a generating capacity of 6,000 kilowatts will be constructed on the Nam Maesai, two miles west of Tachilek in Shan State East. It will supply electricity to Tachilek. Any surplus power will be exported to Thailand.

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KIO PROMISES BETTER POWER SUPPLY FOR **KACHIN STATE**

Khun Sam, Irrawaddy On-line, 25/08/06. http://www.irrawaddy.org/print_article.php?art_id=6097

The Kachin Independence Organization (KIO) says it will be soon able to supply electricity throughout Kachin State from its hydropower projects. The ethnic ceasefire group confirmed on Thursday that the newly-completed Mali Hka hydropower plant had concluded a one-month test and would soon be able to more than double power supplies to the Kachin capital, Myitkyina.

Kumhtat Gam, the KIO's liaison officer in Myitkina, told The Irrawaddy on Friday that power would be supplied by the state-run MEPE and the KIO-run Buga Co Ltd under the terms of a contract signed by the KIO and the Burmese government. Kumhtat Gam said the unit price of the electricity had been provisionally fixed at K 130 (less than US \$ 0.10) for government departments, K 110 for households and street lighting and religious buildings, and K 250 (\$ 0.20) for businesses.

Mali Hka hydropower plant, which took three years to build, can generate a total of 10.5 MW and will provide 5 MW to Myitkyina. The rest will be used in the construction of the KIO's other project, Dabang Hka hydropower plant.

The announcement of the planned boost in power supplies to Myitkyina was welcome news for residents of the city, who have been hit by black-outs since flooding damaged the main power station, Chying Hkrang Hka. Kachin State also relies for electricity on two other hydropower plants—Nam Hkam Hka and Galai Jaung—run by the government.

Map references

Burma 1:250,000: Series U542, NG 47-09: Myitkyina

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ng47-9.jpg>

China 1:250,000: Series L 500, NG 47-10: T'eng Ch'ung

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-10.jpg>

The Malikha and Tabatkha [Dabak] are easily visible in the lower right hand corner of the Myitkyina map but the hydropower projects would be located on both rivers on the T'eng Ch'ung map in the hilly area east of the Bhamo – Myitkyina road. According to local sources, the Mali creek hydropower plant is located near the village of Gangdau Yang.

Additional references

Data summary: [Malikha](#)

See above: 'China Guodian to build power station on [Nam Tabat](#) in Kachin state' (NLM: 22/01/11)
'Agreement signed for [Upper Kachin hydropower](#) projects' (NLM: 02/01/07)

KNG, 20/04/09.

<http://www.bnionline.net/news/kng/6136-chinese-tycoon-imports-timber-from-northern-burma.html>

Chinese business man Lau Ying, who is heavily involved in extracting teak and other hardwoods from government reserved forests along the east and west banks of the Irrawaddy in Kachin state, also distributes electricity in Laiza, the border business centre and headquarters of KIO since 2005. He has a contract to supply power poles and electric cables to the KIO's Buga Company, which supplies electricity to Myitkyina and nearby Waingmaw, according to Buga Co sources. Lau Ying is based in Yingjiang, in the Dehong prefecture of Yunnan province near the border with Burma.

KNG, 10/04/09. http://www.kachinnews.com/index.php?option=com_content&view=article&id=784:electric-company-worker-dies-of-electric-shock-&catid=1:latest-news&Itemid=50

Laha Dau Hkawng, 19, a lineman at the Buga company's customer complaint office in Myitkyina, has died of electric shock while he was fixing a problem in the electric line at a house in Tatkone quarter in the town, said eyewitnesses. Sources close to Laha Dau Hkawng said he had been working with the company for just over two months and had little education and no training as an electrician. The customer office in Myitkyina has over 100 workers, who respond to service calls from customers but have no formal training for the work they perform. While residents of Myitkyina are pleased with the 24-hour service that Buga supplies, there have been complaints about increased costs. The company charges K160 per unit, more than three times the K50 per unit charged previously. Moreover new customers have to pay between K 300,000 (US \$291) and K1,000,000 Kyat (US \$971) per house to get connected. They have to pay for everything--- poles, meter boxes, wires and electric cables, transformers, bulbs and installation fees.

KNG, 23/03/09. http://www.kachinnews.com/index.php?option=com_content&view=article&id=760:junta-amasses-money-while-civilians-suffer-&catid=1:latest-news&Itemid=50

At the moment, the KIO-owned Buga Company has received over K 700 million (US \$ 710,660) to install electricity in people's homes in Myitkyina. More and more houses are being lighted by Buga, said a businessman..

KNG, 30/09/08. <http://chronon.com/bnion-en5/news/kng/5065-junta-orders-civilians-to-pay-electricity-charges-for-roadside-lighting.html>

Residents of Myitkyina have been ordered to pay the monthly electricity bills for roadside lighting in the municipal area. A merchant in Tatkone quarter of Myitkyina said the order covers the electricity charges for the bulbs on poles along the road leading from the Balamintin bridge over the Irrawaddy to the headquarters of the Northern Command, a distance of about nine miles. The roadside lighting used to be paid by the Myitkyina municipal office. However, civilians in each quarter or village where the grid line crosses have now been ordered to pay the bill for the bulbs and [the costs of the electric power used] on a monthly basis. Since April this year, Myitkyina is being supplied with 24-hour electricity by the Mali Hka hydropower plant which is under the management of the KIO's Buga Company. Buga collects electricity charges in Myitkyina but it has to pay an electric meter box tax to the local office of the government's electric power company, said Buga company sources.

KNG, 17/07/08.

<http://chronon.com/bnion-en5/news/kng/4513-the-kio-supplies-24-hour-electricity-in-kachin-state.html>

The Mali creek hydropower project has been producing electricity on a 24-hour-a-day basis since March 2008. The achievement follows the KIO's Buga Company taking up the responsibility of producing electricity in Kachin State, a KIO source said. A Buga official said the company had signed an MoU to supply electricity to Myitkyina on 23 March 2007 and had started to produce electricity on 18 October 2007. The company is now supplying electricity in 27 quarters in Myitkyina on a round the clock basis. It has also set up 13 transformers in the city. The Buga Company sells electricity at K 160 per kWh to which the government adds a service fee of K 50 per unit.

KNG, 11/07/08. http://bnionline.net/index.php?option=com_content&task=view&id=4463&Itemid=1

Rural residents of the Myitkyina quarter Tatkone [Dapkawng] are desperate to receive an uninterrupted supply of electricity from the Mali creek hydro-power project of the KIO in Gang Dau Yang. Distribution of electricity in Myitkyina is inequitable. While some quarters in town receive electricity 24 hours a day from the Mali station, rural areas close to the city do not get regular power supply. Tatkone's (Dapkawng) residents say they have set up a committee which includes Christian religious leaders to procure electricity and have started collecting the necessary finance for uninterrupted electricity supply. Their efforts should bear fruit within a year. The KIO and local authorities claim that they have been trying to distribute electricity to the rural areas but do not have the necessary infrastructure to do so, a resident added. Committee members said that if they could raise five million kyat [US\$ 4,444] for the project, their first project would be to light up the main road in Tatkone. After that, they would try to get the electricity through to the households in the quarter.

KNG, 21/02/08. http://www.bnionline.net/index.php?option=com_content&task=view&id=3593&Itemid=6

Residents in Lekone quarter of Myitkyina are being charged K 120,000 (US \$ 99) per household to set up a pylon on the main road to connect their quarter with the city's power supply. Most cannot afford to pay that kind of money. But those who apply for an electric meter box for their house can get it within six months. To apply for a meter box, they need recommendation letters from the authorities in the quarter. This is to prove that the house still does not have a meter box. The box has to be paid for by residents. Even if residents do get a meter box, the authorities need to set up the pylon and string the wires needed. The expensive part of getting electricity is paying for the infrastructure, according to a local resident. In Myitkyina, the KIO's Buga company provides most of the electricity to the town but most of it goes to the Burmese military army camp and its buildings.

KNG, 13/08/07. <http://www.burmanet.org/news/2007/08/13/kachin-news-group-pregnant-women-give-birth-in-candle-lit-myitkyina-hospital/>

Pregnant women have been giving birth to babies in the Myitkyina Government Hospital by candle light. The hospital has been without electricity for over a month, said a hospital source. The hospital's Delivery Room is lit with candles and sometimes torchlight is used during delivery and surgery, the sources added. Currently power is available to the hospital for only two hours from 7pm to 9 pm. Pregnant women are expected to carry candles and a torches, a hospital worker told KNG. Although the hospital has a private electric generator it can run for only one hour daily from 11am to 12 noon to provide power for the X-Ray machine. If patients need surgery, they have to pay K 7,500 (US\$ 6) per hour for the cost of electricity specially generated for the hospital's operating room by the hospital-owned generator. Shortage of electricity began when the government's Chyinghkrang river hydroelectric power plant was destroyed during flooding in May 2006. Power supply was resumed when a hydroelectric facility on Mali creek built by the KIO commenced operations in July 2006 but there are often technical problems in the plant, according to KIO officials.

NLM: 14/06/06 <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060614.htm>

Malichaung hydel power project in Waingmaw township will be equipped with three 3.5-MW generators.

Global Witness, *A Choice for China: Ending the Destruction of Burma's Northern Frontier Forests*, p. 58, Oct 2005. www.globalwitness.org/media_library_detail.php/492/en/

In 1997, the KIO initiated the construction of two large hydro-electric power stations -- the Mali creek hydropower scheme and the Dabak river dam -- to improve the electricity supply situation in Kachin State. Eight years later, in Jan 2005, the KIO was in negotiations with MEPE regarding the purchase of electricity to be generated by these plants. The Jinxin Co with bases in both Tengchong and Pianma is the largest logging company operating in Kachin State. It is this company that has been the main contractor for the construction of both dams. Work is being carried out in return for logging rights to timber in the area, worth millions of dollars. The dams are being built with the permission of the SPDC, which also gave permission for logging the upper Dabak region to pay for the schemes. Neither dam has yet been completed, despite the fact that the value of the timber already exported to China exceeds the cost of the Mali project and half that of the Dabak project. Ara La, who manages the projects, formerly a leading member of KIO, left the organization in disgrace in the wake of a corruption scandal surrounding the dam construction. Following pressure from the Yunnan provincial gov't, Jinxin agreed in principle to complete Dabak. Whether or not

Jinxin is asked to finish the Mali dam depends on their performance at Dabak. It is feared that more timber will have to be felled in order to pay for further work.

NLM, 17/01/04. <http://www.myanmargeneva.org/04nlm/n040117.htm>

Mali hydel power project in Waingmaw township, with a capacity of over 10 MW, and Dabut creek hydel project, with a capacity of 24 MW, are being implemented in Kachin state. The projects will contribute to the industrial development of Kachin State.

NLM, 16/01/04. <http://www.myanmargeneva.org/04nlm/n040116.htm>

At Bala Minhtin Bridge across the Ayeyawady river officials report to SPDC Sec'y-1 Soe Win on the implementation of the Mali hydropower project. Efforts are being made to complete the project by the end of 2004. Electricity from the 10.5-megawatt power plant will be distributed to Myitkyina and Waingmaw.

Pan Kachin Development Society, Karen Environmental and Social Action Network, *Listening to the People's Voices*, 2004, p 12. <http://www.xs4all.nl/~bijstbnd/birma/birma-12.html>

In 2001, the KIO hired the Hung Ki Company to build the Mali hydropower station. In return the Jahta area was given as a logging concession to the Hung Ki Company. Now the concession has been extended to two Chinese companies -- the Hung Ki and Hung Hta companies. KIO leaders have ordered local people not to do any logging in this area.

Global Witness, *A Conflict of Interests: The uncertain future of Burma's forests*, October 2003, p. 93.

http://www.globalwitness.org/media_library_detail.php/113/en/

Electricity generation in Kachin state is totally inadequate. The Jinghkrang dam built by the SLORC in 1993 does not produce sufficient electricity to supply Myitkyina, let alone the rest of Kachin state, and that which is generated is prioritised to the Tatmadaw bases. Since 1997, the KIO has been involved in two hydroelectric power schemes, the Mali creek hydropower scheme and the Dabak river dam, to increase electricity generation in the state. This would increase the rate of development and provide for the needs of nascent industries in the area. In terms of the timber trade this could mean an increase in processing capacity and the manufacture of value added timber products. However, it is far from clear whether there would be a ready market for such value added products;

NLM, 11/04/01. <http://www.myanmargeneva.org/01nlm/n010411.htm>

SPDC Secretary No 1 Khin Nyunt and party were welcomed by KIO leaders, officials of the Bugar Co, members of the national races and local people. Officials reported on the targets and benefits of the Mali and Dabat hydro-electric power projects. Afterwards, Secretary No 1 and party met with KIO Chairman La Mon Tu Jai and national leaders, officials of Bugar Co and local people. They were introduced to officials of Mali hydro-electric power project. Secretary-1 said the Dabat and Mali power projects were the result of the KIO's endeavours for the local people's interests. Electric-powered home industries and commercial-scale industries would emerge not only in Myitkyina and Waingmaw but also in the villages in the area.

NLM, 27/05/97. www.ibiblio.org/obl/reg.burma/archives/199705/msg00006.htm

Minister for Energy U Khing Maung Thein and the Northern Commander Maj-Gen Kyaw Win visited Dunban [Tumbang] Creek [=Malikha] in Waingmaw township where a hydel power project is to be implemented. Assistant Chief Engineer Aung Koe Shwe reported on the project. The Dunban creek hydel power project will generate 45 million kWh a year.

ASEAN energy centre [undated, circa 2001]

http://www.aseanenergy.org/energy_sector/electricity/myanmar/future_electricity_projects.htm

A hydropower plant with a generating capacity of 6,000 kilowatts will be constructed on the Tumbangkha [= Mali creek] 40 miles southeast of Waingmaw in Kachin state. It will supply electricity to Myitkyina and Waingmaw.

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INVENTOR CO-OP SOCIETY EXPORTS FIRST RICE-HUSK GENERATORS

Kyaw Thu, Myanmar Times, 21/08/06

(Compiler's note: Issue 330 of the Myanmar Times is not available on-line.)

The Myanmar Inventor Cooperative Society has agreed to sell Laos rice-husk-fuelled electricity generators in a deal worth US\$1.5 million that marks the group's first sale abroad. An MoU was signed July 28 with the Laos Ministry of Energy and Mines to provide the mid-sized renewable energy plants. The deal follows the ASEAN-organised Fifth Renewable Energy Project Competition held in Brunei in June where the society won third place for its rice-husk power plant design.

U Soe Tint Aung, president of the inventors' society, said the generators sold to Laos would have a power range of 20 kilowatts to 50kw and were to be exported this year, with installation work to begin in 2007. He said that Laos had not yet decided how many or exactly what size generators it wanted. "The final contract will be signed in October," U Soe Tint Aung said. "We don't know whether they will buy 20kw or 50kw plants."

The society would build a small factory in Laos and train local people how to operate the generators, he added. "We will set up the power plants up in areas where there is no connection to the national power grid." U Soe Tint Aung said the generators were not reliant solely on rice husks and could be run on branches and other kinds of plant waste.

The society was also set to ink a joint venture deal with a Thai electricity company last Thursday for five rice-husk power plants that produced between 650kw and 1000kw. "Although this is joint venture, we will try to manufacture the entire generator in Myanmar," U Soe Tint Aung said. He added that the society had also received orders from Vietnam, Cambodia and the Philippines. "The award (from the Fifth Renewable Energy Project Competition) helped us penetrate new markets," the 18-year industry veteran said.

The society has sold more than 470 of the generators in Myanmar, although U Soe Tint Aung said the deal with Laos was the first time they had exported their generators.

Additional references

Compiler's Note: The extracts immediately below relate mainly to the *manufacture* or *assembly* of gasifier-generator sets at various locations in Burma/Myanmar. Links to other entries in the compendium dealing with paddy (rice) husk generators are found at the end of this entry.

NLM, 19/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070619.htm>

At a state-owned vest factory in Kyaukse, the Minister of Industry No 1 and party view a demonstration of producing electricity using a paddy husk-fired plant.

NLM, 30/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070530.htm>

Industrialists at the Kalay IZ explain the assembly of husk-fired generators, power distribution and the manufacture of small-scale generators to Lt-Gen Ye Myint of the Defence Dept. He visits a husk-fired power station in the zone which is supplying power to 450 houses in four villages close to the IZ. The 300-kVa generator of the station consumes eight to twelve baskets of paddy husk per hour. The generator is a product of the zone. Other editions of NLM that refer to the manufacture of small-scale hydro turbines by workshops in the Kalay IZ: 16/08/06, 05/05/06, 25/03/05, 14/06/04, 19/01/04. U Aung Min is the proprietor of a workshop which assembles jeeps and other vehicles.

NLM, 05-03-07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070305.htm>

The Yangon Commander and the EP Minister No 2 inspect a 'fuel-substitute factory' in Hlinethaya IZ where they check over paddy husk-fired engines. A total of 519 15KV-100 KV generators have been produced since 1995. The generators are used widely in water pumping projects, ice factories, saw mills and watercraft. The 'inspection' was followed later in the month by a visit to the factory by delegates to a renewable energy conference sponsored by ASEAN. The Myanmar Inventors' Co-op won an ASEAN Alternative Energy Award in 2006 (NLM: 26/03/07). A good picture of some of the products and the workers at the Inventors' Co-op factory in Hlaingthaya is available on the front page of the print edition of NLM of 06/07/07. <http://www.ibiblio.org/obl/docs2/NLM2007-07-06.pdf>. See also NLM: 20/06/06 in which U

Soe Tint Aung explains the 20pc saving in fuel costs through the use a mixture of diesel and paddy husk gas and on the test run of 180-HP engine using the mixture.

NLM, 17/11/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nIm/n061117.htm>

Lt-Gen Khin Maung Than visits the fuel-substitute paddy husk-fired power generator industry of Mann Cho and Sons Co in Hsamalauk Village in Nyaungdon township. For more on village electrification at Hsamalauk see the extract on the program there under '[Interest growing](#) in rice husk generation'.

Kyaw Thu, MT, 11/09/05. [Issue 333 of the Myanmar Times is not available on-line.]

The Myanmar Inventors' Cooperative Society will set up five rice-husk electricity generators in townships in Rakhine state, according to the society's manager U Than Aung. The generators will produce 0.15 - 0.30 MW. Their installation in Sitwe and Minbya townships marks the second phase in boosting the region's electricity supplies after five rice-husk generators were installed in the state earlier this year. The total cost for the 10 generators will be between K200 million and K300 million. They are for communities where there no electricity connection is currently available.

May Oo Moe, MT, 05/05/06. [Issue 319 of the Myanmar Times is not available on-line.]

Hein Engineering Co Ltd signed an MoU with Act Venture Sdn Bhd (AVSB) of Malaysia to produce gasifiers using high technologies. Under the agreement, research and development of the gasifiers will be shared with other ASEAN countries, according to U Zarni Aung, MD of Hein Engineering. The company, which engages in the production of feed mills and the installation of steel structures, began production of biomass gasifiers using technology from China in 2006. A news item in the New Light of Myanmar (14/03/07) reports that the company will export gasifiers to Cambodia and Malaysia. They are of two different types: one that operates 100pc on biogas and another that use a dual fuel system.

Good News Weekly Journal, 17/03/05 (as summarized in the MT Media Review column: 28/03/05).

[Issue 260 of the Myanmar Times is not available on-line.]

A Myanmar technician has invented a device that enables diesel and petrol engines to operate on gas produced by rice husks. The president of the Yangon-based Myanmar Inventors' Co-op, U Soe Tint Aung, had also succeeded in devising a method to remove tar from the gas, which ensured that the engines operated more efficiently. According to U Soe Tint Aung, the gas was about 80pc cheaper than diesel or petrol. The co-operative has sold 208 engines of various capacities that have been fitted with the device. Most of the engines sold were used to power rice milling machines.

NLM, 18/02/05. <http://www.ibiblio.org/obl/docs2/NLM2005-02-18.pdf>

Chairman Soe Tint Aung of the Myanma Inventors' Co-op Ltd explains the conversion of a 1,200/1,400 BHP diesel engine to a paddy husk-fired power generator. [A photo showing a paddy-husk generator being assembled can be found in the print edition of NLM.]

JICA, MEPE, NK, IEE Japan, ***The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Final Report: Volume 1: Summary***, Sept 2003, p 17.

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1)

Although there are commercially successful examples of biomass gas engines in China and Thailand, the removal of tar from the gas produced from rice husks by pyrolysis has proved difficult. However, the Myanmar Inventors' Co-operative succeeded in overcoming the problem and started commercial production of a gasification-engine-generator system in 1995. A total of 109 husk engine units were installed up to 2000. These are mostly used to power rice-mills. Application to rural electrification began in 2001. The husk combustion chamber and filtering devices of the gas are all locally made. Second-hand diesel engines from trucks are converted to spark plug ignition. [If produced on a large scale in Myanmar], the supply of spare parts for the used engines could become a problem. The cost of the rice husk gasification -engine generator set is low. No special expense is necessary for water treatment, unlike the steam turbine generator. The lines used for distribution would normally cost more than the gasifier-generator set itself. According to tests carried out in Japan by the Agriculture Mechanization Research Institute, 3 - 5 kilos of rice husks are needed to generate 1 kWh, whereas data from China quotes a figure of 2.0 - 2.2 kg/kWh. It is

essential to test and confirm the actual relationship between fuel consumption and power generation of the units produced by the Myanmar Inventors' Co-op. (Compiler's note: Two photos of the units produced by the Inventors' Co-op accompany the description.)

Thaung Win Bo, NLM, 09/01/03. <http://www.myanmar.gov.mm/Article/Article2003/jan/jan9a.html>

Paddy husk-fired engines of Myanma Inventors' Co-operative Society are popular and prominent among the exhibits at the Co-op Products Exhibition and Market Festival 2003 in the Co-op Commercial Centre in Bahan township. They are used for pumping water, livestock breeding, rural power supply, rice and oil mill grinding, saw mills, ice factories, brewing and other operations. Located at No 55/56 on Kyaikwaing Pagoda road in Mayangon township, the co-op is producing engines of high quality after years of research and experiment. In seven years it has sold 155 of 158 engines produced of which 64 were sold in Ayeyawady division. Production costs of the multipurpose engine range from K 5 million to K 20.4 million according to type and size.

NLM, 16/02/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nml/n020216.htm>

During an inspection of the Myitkyina industrial zone Maj-Gen Ye Myint of the Defence Dept urges industrialists to extend production of bio-mass power generators in the Myitkyina zone.

NLM, 23/01/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nml/n020123.htm>

Maj-Gen Khin Maung Than of the Defence Dept visits the Ayeya Swan-ar paddy husk-powered engine production plant in Pathein IZ in Pathein. Manager Maj Aung Naing reports on the production of 54 engines. Instructions are given. A news item in NLM (05/05/01) refers to the inauguration of one of the paddy husk-fired plants manufactured by Ayeya Swan-ar in Yonthalin village in Henzada township. The 130-KVA power plant can light up over a thousand homes in the village. Ayeya-shwewa, the parent company of Ayeya Swan-ar, is in the agribusiness in a big way. It is reported to have received grants of over 45,000 acres in various townships of Ayeyawaddy Division to develop for commercial farming purposes (NLM: 22/06/99, 02/09/00).

Myanmar Times, 15/01/01. [Issue 46 of MT is not available on-line.]

By using a paddy husk-fired engine to pump in 600,000 gallons of water on a 1,200-acre farm at Payami in Thabaung township, the Ayeya shwe-wah Co saved as much as K 30,000 daily in fuel costs. Diesel would have cost the company K 30,800, but the 176 bushels of rice husks needed to produce the gas for the operation only cost K 880. The inventor of the paddy gas-husk engine is U Soe Tint Aung, president of the Myanmar Inventors' Co-op. Though designed as a paddy husk-fuelled engine, his machine can also run on gas produced by saw dust or organic waste. Besides pumping water, it can generate enough power to run a rice mill, a saw mill or an ice factory. One of the engines is supplying the electricity needs of Nyaung-gan village in Htilin township.

NLM, 25/07/98. <http://mission.itu.ch/MISSIONS/Myanmar/98nml/n980725.htm>

Four cabinet ministers including the Minister for Electric Power visit the Myanma Tihthwinthumyar Co-op Syndicate on Kyaikwaing Pagoda Road in Mayangon township. The co-op chairman U Soe Tint Aung briefs them on paddy husk gas-powered engines, the syndicate's financial accounts and marketing of the engines. He has been experimenting with 'producer gas' obtained from paddy husks since 1992 and has been successful in operating engines such as 30-HP [300?] Toyota which are used in rice mills, saw mills, edible oil mills, ice factories, generators and pumps. The co-op has has twenty 200-HP engines for sale. It could sell up to 49 machines valued at over K26 million to state/division co-op syndicates and private co-ops.

See above: 'Village rice husk power plant will serve as [research centre](#)' (MT: 24/09/07)

'Plans for [7-million-dollar](#) power plant edge forward' (MT: 27/08/07)

'[Rice-husk generators](#) slated for villages in Yangon division' (MT: 11/06/07)

See below: '[Interest growing](#) in rice-husk generation' (MT: 10/07/06)

'Paddy husk power plant tested to cut rice [milling costs](#)' (MT: 19/12/05)

'[Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)

'Biomass gasifier used for [tobacco curing](#) in Myingyan' (TERI: 08/04)

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SOUTH KOREA' S [KEPCO](#) TO STUDY IMPROVING POWER TRANSMISSION SYSTEM

Kyaw Thu, Myanmar Times, 31/07/06.

(Compiler's note: Issue 327 of the Myanmar Times is not available on-line.)

A meeting was held in Nay Pyi Taw last week between the Ministry of Electric Power (2) and Korea International Cooperation Agency (KOICA) to discuss plans for the development of an improved electrical power network in Myanmar. The meeting, which was held July 28, was also attended by representatives from Korea Electric Power Corporation (KEPCO), which will likely conduct surveys and training programs for the development project.

The meeting followed the signing in April of an agreement between the ministry and KOICA to provide systematic management and operation of a power network to improve the energy sector in Myanmar. "The project, whose combined budget amounts to US\$1.4 million, will include the transfer of (South) Korean knowledge and experience in power system operation and protection, general facilities testing, fault analysis, the provision of relay equipment, and a vehicle for field surveys," said a statement released July 21 by KOICA. The project, which is expected to take three years to complete, will also include a study of the condition of power lines and power substations in Yangon and Mandalay.

Additional references

See above: '[Chinese engineers planning](#) grid connection with Burma (IRROL: 23/01/10)

See below: '[Power trading](#) in the Greater Mekong Sub-region (GMS)' (Appendix 14)

'Annex 1: National high-voltage [grid system and maps](#)' Note especially Maps 6 & 7.

NLM, 28/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080828.htm>

The final report of the project on Power System Operation and Protection, jointly conducted by MEPE and KEPCO, was delivered by Resident Representative of KOICA Kwang Geol Cho to D-G Thein Tun of the Energy Planning Dept in Nay Pyi Taw on 21/08/08. The observation programme was conducted at power stations in Thazi, Taungdwingyi, Nay Pyi Taw-Pyinmana, Toungoo, Hlawga and Kamanat from April 2006 to March 2008 by KEPCO using a US\$ 1.4 million contribution of the Republic of Korea. The final workshop of the project took place in Nay Pyi Taw on 18 June 2008.

Xinhua, 28/07/08. http://english.peopledaily.com.cn/200607/31/eng20060731_288424.html

KOICA will fund [another] electric power network development project worth US\$ 1.4 in Myanmar, the local weekly Myanmar Times reported 28/07/08. The project will involve KEPCO and will include the transfer of Korean knowledge and experience in power system operation and protection, general facilities testing, fault analysis and the provision of relay equipment, KOICA was quoted as saying. The project, which is likely to last for three years, also includes a study of the condition of power lines and power substations in Yangon and Mandalay, sources said.

Khin Myat, Myanmar Times, 03/09/07 <http://mmtimes.com/no382/n016.htm>

The Korea International Cooperation Agency (KOICA) and the EPM No 2 met to discuss the KOICA-sponsored project to develop a nationwide electric power network. The third phase of the project is 50pc complete; the first phase in 01-02 involved analysis of Myanmar's power system network; the second phase in 03-05 involved draft of a basic design for a 500-kilovolt transmission system. During the third phase, titled 'Power System Operation and Protection Scheme' from 2006 to 2008, KEPCO has been commissioned to carry out research and consulting activities including data surveys for operation and protection areas, establishment of a reactive power compensation plan and a statistics management system, and to prepare recommendations to prevention of power system blackouts prevention methods.

William Boot, IRROL Business, 06/07/07. http://www.irrawaddy.org/article.php?art_id=7792

Claims by Burmese media that a South Korean-led technical development program will expand Burma's power supply by setting up a 'national grid' fall short of reality, according to Bangkok energy researcher Sar Watana. The program, financed by KOICA, will be at the halfway point when Seoul officials present a progress report in the Burmese capital in August. Burma had a total generating capacity of 1,775 MW at the

end of 2006 -- barely enough to power Rangoon. According to Sar Watana, the Koreans are "installing 500-kilovolt transmission lines, which are not the fastest or most modern" but which will be an improvement in the areas the program is directed to. Compared with Thailand's generating capacity and population Burma is about 20,000 megawatts still too short.

Xinhua: 04/04/07. <http://english.eastday.com/eastday/englishedition/business/userobject1ai2950269.html>

According to the local Flower News, South Korea's latest network development project in Myanmar aims to share Korean knowledge and experience in power system operation and protection, general facilities testing, fault analysis and the provision of relay equipment. The project is funded by KOICA and undertaken by the Korea Electric Power Corporation (KEPCO). It is starting with the power lines and power substations in Yangon and Mandalay. Technical training will be conducted with officials in Bago division's Thayagon sub-power station. KOICA funded two other projects in 2001-02 and 2004-05 that studied the electric power system network and the transmission system.

Kyaw Soe Linn, Myanmar Times, 02/07/07. <http://mmtimes.com/no373/n008.htm>

A seminar in August 2007 will review progress on KEPCO's two-year, US\$ 1.4 million project: 'Power System Operation and Protection Scheme'. Kim Jong Hwa, general manager of the project team of KEPCO said it is third co-operative project between KOICA and MEPE aimed at establishing systematic management and operation schemes for Myanmar's national grid. The first project in 2001-2002 involved an analytical study of Myanmar's overall power system network, while a 2003-2005 project focused on designing and installing a 500-kilovolt transmission system for the grid. The current project involves research and consulting activities such as conducting data surveys for the operation of the national grid and prevention of system failures, establishing a statistics management system and developing recommendations for ways to prevent power system blackouts. Other aspects include the provision of testing equipment, training sessions for Myanmar electric power technicians in South Korea and visits to Myanmar by KEPCO consulting teams.

Korea International Co-operation Agency website information, 2007:

https://www.koica.go.kr/english/board/news/1206244_597.html

KOICA will conduct an 'Advanced Transmission Technology' training program for 15 staff members in charge of transmission engineering from electric companies in Cambodia, Laos and Myanmar as part of the Korean government's grant aid and technical cooperation program for 2007. The course will take place at the training institution of the Korea Electric Power Corporation (KEPCO) in Seoul from March 15 to April 15, 2007. Lectures and practice sessions will include the following topics: insulation co-ordination, conductor design, tower design, transmission line design, transmission line grounding, sag design, insulator design, transmission line electrical environment, hardware design, conductor connection spot inspection, project manage[ment], material transport and tower foundation, tower erection, supervisory tracking system in transmission maintenance, lightening indicator, transmission facility foundation rei-nforcement, 765 kV transmission technology, line maintenance and operation, methods for detecting faulty insulators disaster response systems and procedures. It will also include country report presentations by the participants on developments in the power industry over the last years and information on power utilities. Study trips and field vsits will be made to a tower manufacturer at Hyosung, to the LS cable manufacturing factory, the Gochang testing center, POSCO, Hyundai Heavy Industries.

KEPCO 2005 Annual Report. <http://cyber.kepcoco.co.kr/kepcoco/updata/eng/2005.pdf>

KEPCO [has been conducting] a feasibility study and designing a basic plan to upgrade existing grid voltages in Myanmar to 500kV. Project duration: Jan 2004 to Jan 2006.

Yonhap, 31/10/02. www.burmanet.org/bnn_archives/2002/20021031.txt

Korea Electric Power Co (KEPCO) has completed a one-year project to diagnose and research the electric power network in Myanmar, KEPCO said Thursday (31/10/02). The project marked the company's first overseas venture in the power transmission and transforming sector. Under the project, the power company engaged in an overall analysis of Myanmar's electric power system and made proposals of short- and long-term measures to improve it. This will pave the way for South Korean firms to make advances into Myanmar's power generation and transmission market, a KEPCO official said.

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INVENTORY OF GENERATING PLANTS, TRANSMISSION GRIDS, PROJECTS

NLM, 30/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060730.htm>

The meeting (1/2006) of the State Electric Power Development Project Work Committee took place at the PM's office with an address by General Soe Win, chairman of the committee. It was attended by ministers, deputy ministers, directors-general and officials of the SPDC office and the PM's office, departmental heads and officials of the Ministries of Electric Power Nos 1 and 2.

The Prime Minister said the development of electric power goes together with that of the socio-economy of the State. That is why the leading committee and the work committee for the State Electric Power Development Project were formed. The work committee is responsible for presenting the conditions of the projects being implemented and to be implemented to the leading committee. Presently, the State is taking steps to change the nation's agro-based economy to a system in which different kinds of industry can be set up. To bring this about, emphasis has been placed on boosting the power supply in order to develop both the agricultural sector and the industrial sector. This is why the Ministry of Electric Power itself was reconstituted into the two ministries, one to focus on generating electric power and the other to getting it distributed.

The duties of the work committee include the co-ordination necessary to speed the implementation of on-going projects. It will also take charge of matters related to the systematic generation and distribution of electric power. Another priority is the constant implementation of small-scale regional hydel power station projects.

The Head of State has assigned to the Ministry of Industry No 2 responsibility for the production of machines for small-scale hydropower plants in the respective regions. Surveys will have to be conducted with the help of local people in the different regions to find out which water resources are best suited for hydropower plants. Simultaneously, measures are to be taken for changing dams constructed by the Ag & Irrig Ministry into multi-purpose facilities to supply electric power to the regions. The process calls for a master plan through which the major projects that are part of the national grid and the projects designed to supply electric power to the regions concerned can be implemented in harmony.

The drive for extended generation of electric power is to cover construction of new power plants, the building of more sub-power stations and power lines, and the upgrading of present electric power facilities. Furthermore, steps are to be taken to improve the distribution of electric power, and eliminate the dishonest ways in which power is sometimes consumed. Nor have the problems of unnecessary wastage of power through machinery breakdowns been remedied completely. Preventive measures are to be taken remedy power losses through both causes. Besides, necessary arrangements are to be made for correctly levying taxes on power consumption.

In his report, EPM-1 Zaw Min compared the differences in electric power capacity and production in 1988 with the current situation. In 1988, there were 24 power plants that could generate 568.453 MW, 14 hydel power plants (228.453 MW), seven gas turbines (280 MW) and three steam power plants (60 MW). Since 1988, the ministry had built 39 new power plants: 30 hydropower plants (517.227 MW), four steam power plants (281 MW), one [coal-fired] steam (120 MW) and four recycle power plants (152.9 MW).

A total of 16 hydel power projects are currently underway: Yeywa in Kyaukse township (790 MW); Kunchaung in Pyu township (60 MW); Pyuchaung in Pyu township (40 MW); Khabaung In Ottwin township (30 MW); Yenwe in Kyaukdaga township (25 MW); Shwegyin in Shwegyin township (75 MW); Shweli in Namhkam township (600 MW); Kengtawng in Mongnai township (54 MW); Pathi in Thandaung township (2.2 MW); and Thahtay in Thandwe township (102 MW).

Furthermore, plans are under way to implement 15 hydel power projects such as Kawgata in Kyaukkyi township (160 MW); Biluchaung No 3 in Loikaw township (48 MW); Bilin in Bilin township (140 MW in its first phase and 140 MW in its second phase); Hatkyi in Hlaingbwe township (600 MW); Shwesayay in Budalin township (660 MW); Thandwe in Thandwe township (39 MW); Kyeintali in Gwa township (30 MW);

Kengtawng in Mongnai township (54 MW); Manipura in Falam township (380 MW); 600-megawatt Taninthayi in Taninthayi township (600 MW); Shweli No 1 in Namhkam township (150 MW) Shweli No 2 in Momeik township (500 MW); Maykha in Myitkyina township (800 MW), Dayaingchaung in Hlaingbwe township (25 MW); and Thakyet in Taninthayi township (20 MW). The capacity of the machines in the power plants [in the planning stage] will amount to 4,346 megawatts in total.

Ten hydel power plants are already connected to the national grid: Biluchaung Nos 1 & 2 in Loikaw township, Kinda in Myittha township, Paunglaung in Pyinmana township, Hsedawgyi in Madaya township, Zawgyi Nos 1 & 2 in Yaksawk township, Zaungtu in Bago township Thaphanseik in Kunhla township and Monechaung in Sedoktara township. There is also the Tikyit coal-fired power plant in Pinlaung township. The capacity of the machines in the [grid-linked] power plants already in operation amounts to 832 megawatts.

The hydel power projects with top priority are Yenwe, Kabaung, Kengtawng, Shweli, Kunchaung, Pyuchaung, Shwegyin and Yeywa hydel power projects. Yenwe, Khabaung and Pyuchaung hydel power projects are being implemented through the joint efforts of the Ministry of Electric Power No 1 and the Ministry of Agriculture and Irrigation.

EPM-2 Khin Maung Myint reported that the hydel power stations already supplying electricity to the national grid are Baluchaung No 1, Baluchaung No 2, Zawgi No 1, Zawgi No 2, Kinda, Hsedawgyi, Zaungtu, Thaphanseik, Paunglaung and Monchaung. These stations are currently generating 712 MW in total. The gas-fired power stations are Ywama, Kyunchaung, Mann, Thaton, Shwedaung, Myanaung, Thakayta, Ahlon and Hlawga, and these are currently generating 549.9 MW. Steam-powered stations are Ahlon, Hlawga, Ywama, Thakayta, Tikyit and Mawlamyine, and these power stations are currently generating 285 MW. The 25 grid-linked power stations have a capacity of 1546.9 megawatts in total. But the actual producing capacity in 2005 ranged from 601 to 818 MW.

The EPM-2 has twelve 230-KV power stations, sixteen 132-KV power stations and forty-seven 66-KV power stations for a total of 75. The national grid lines under the ministry include thirteen 230-KV sections with a total length of 834.16 miles; nineteen 132-KV sections with a total length of 1056.73 miles, and fifty-two 66-KV sections with a total length of 1224.92 miles. Sections to be built to improve the power supply are the 177-mile-long, 230-KV grid linking Taungoo-Kyauktaga-Bago-Thanlyin, the 105-mile-long, 230-KV line linking Meiktila and Taungdwingyi, the 60-mile-long, 230-KV line linking Bago and Myaungtaga [in Hmawbi township], and the 12-mile-long 230-KV line linking Shwesayan [in Singaing township] and Aungpinle [in Patheingyi township]. Sections to be built connecting new hydel power stations to the grid include the 180-mile-long, 230-KV line linking Manipura and Monywa, the 100-mile-long, 230-KV line linking Kyiohn-Kyiwa and Minbu, the 69-mile-long, 230-KV line linking Thahtay and Ushitbin and the 24-mile-long, 230-KV grid linking Ushitbin and Shwedaung.

Minister Khin Maung Myint made a comparison between 1988-89 and 2005-06 with regard to power generation, consumption of power and loss of power. In 1988-89, there were 2,226.45 million units of power generated, 1475.55 million units of power consumed and 750.90 million units of power lost, accounting for 34pc power loss [in the transmission-distribution process]. In 2005-2006, there were 6064.16 million units of power generated, 4431.06 million units of power used and 1633.10 million units of power lost, accounting for 27pc power loss [in the transmission-distribution process].

A&I Minister Htay Oo reported on the hydro-electric power projects [of his ministry], co-operation with the Ministry of Electric Power and future programmes for full supply of electric power. Deputy EPM No 1 Myo Myint and Deputy A&I Minister Ohn Myint reported on the generation of electric power from dams and reservoirs. Minister for Industry No 2 Saw Lwin reported on the production of meter boxes and ACSR wire by factories under his ministry and future programmes. Minister for Energy Lun Thi reported on the drilling of natural gas wells that allow for greater distribution of power, the installation of pipelines, distribution of gas and future programmes. Minister for National Planning and Economic Development U Soe Tha reported on the role of electric power sector in economic development.

Additonal references

See below: 'National update on electric power plants' (NLM: 18-22/01/06)
 'State's electric power projects' (NLM: 25-27/04/05)
 'Than Shwe on key role of electricity in national development' (NLM: 28/04/04)
 'Formation of work committee for electric power development' (NLM: 01/04/04)
 'Annex 1: National high-voltage grid system and maps'

See also the following reports available on-line. These maps accompanying these reports are especially useful for locating power stations and transmission line routes.

Country Presentation Myanmar: Franco-ASEAN Seminar, 6-7 September, 2007. (ELGR019)
<http://burmalibrary.org/docs4/Tin%20-%20Myanmar%20-%20Presentation.pdf>

Country Report Myanmar on Power Development Plans and Transmission Projects, Greater Mekong Region ADB Consultation, 21 November, 2008. (ELOV018)
<http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

See also the list of all the articles in the index: Power Grid and Distribution Networks (PG)

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

At a meeting of the Special Projects Implementation Committee held in Nay Pyi Taw on 05/03/10, EPM-2 Khin Maung Myint submitted reports on the renovation of nine national grids, 10 main power station projects and the planned major repair of power plants. Among the lines connected to the national grid the Ministry of Electric Power No 2 is undertaking are the installation of the 18-mile-long Panlon-Namhsam 66-KV power grid, the 3-mile-long power line from the Kyaukpahto-Shwegu-Bhamo 66-KV power grid to the Naba sub-power station, the 9.5-mile-long 66-KV power line from the Kyunchaung-Pakokku 66-KV power line (near Myitchay) to Kanma, the 34-mile-long Lashio-Hsenwi 66-KV power grid, the 15-mile-long Hlinethaya-Ahlon 230-KV twin-bundle, single-circuit power grid, the 0.9-mile-long Hline river crossing (Ahlon) 230-KV twin-bundle, single-circuit power grid, the 60-mile long Thaton-Mawlamyine twin-bundle, single-circuit power grid, the 40-mile-long Naba-Mohnyin 66-KV power line and the 55-mile-long Mohnyin-Mogaung 66-KV power line. Of them, the Panlon-Namhsam power line project has been completed, three [others] are under implementation and plans are under way to implement the other five. Among the projects to build or upgrade main power stations are: the Namhsam 66/11-KV, 5-MVA power station; the Naba 66/33/11-KV, 10-MVA power station; the Kanma 66/11-KV, 5-MVA power station; the Hsenwi 66/33-KV, 10-MVA power station; the extension of the substation bay at the Hlinethaya power station, the Ahlon 230/33-KV, 2x100-MVA main power station; the extension of the 230-KV switch bay at the Thaton power plant, the Mawlamyine 230/66/11-KV, 2x50-MVA power station; the Mohnyin 66/11-KV, 5-MVA power station and the Mogaung 66/11-KV, 5-MVA power station. The Namhsam power station project has been completed, and the power stations in Naba, Kanma and Hsenwi are currently under construction.

NLM, 19/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-19.pdf>

Among the 22 ongoing grid projects are the following transmission lines stretching 1151 miles: 1) Shweli-Mansan-Shwesaryan, 2) Yeywa-Belin, 3) Yeywa-Meiktila, 4) Belin-Ohndaw, 5) Monywa-Meiktila-Taungdwingyi, 6) Thazi-Meiktila-Myingyan, 7) Toungoo-Thayagon-Bago-Thanyin, 8) Thakayta-Thanyin, 9) Bago-Myaungdagar, 10) Shwegyin-Thayagon, 11) Kunchaung [generating plant] to the Toungoo-Bago line, 12) Shwedaung-Okshitpin, 13) Upper Paunglaung-Nancho-Paunglaung, 14) Kengtawng-Namsan-Petpin-Kalaw, 15) Kyeeohn Kyeeawa-Mann, 16) Athok-Thabaung, 17) Mansan-Lashio, and 18) Mansan-Hsipaw.

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

The Special Projects Implementation Committee held its co-ordination meeting (1/2008) at the office of the Commander-in-Chief (Army) in Nay Pyi Taw on 14/11/08. . . . EPM No 2 Khin Maung Myint reported on progress in constructing national grids and main power stations. . . The completed grid projects up to now include the following: 1) the link between the 132-kV Dagundaing-PyinOoLwin grid and the Yadanabon Myothit main power station; 2) the link between the 132-kV Dagundaing-PyinOoLwin grid and the Shwesaryan main power station; 3) the link between the 132-kV Mone-Chauk grid and the Tanyaung main power station; 4) the link between the 230-kV Pyinmana-Toungoo grid and the Thebyu main power station; 5) the project to shift the Kazindaw tower on the 230-kV Hlinethaya-Athok grid across the Ayeyawady River; and 6) the link between the 230-kV Pyinmana-Taungdwingyi grid and the main power station in Nay Pyi Taw. Also completed are the following: 1) the 132/33/11-kV, 18-MVA main power station in Yadanabon Myothit [near Pyin-U-Lwin]; 2) the 132/66/11-kV, 60-MVA main power station at Tanyaung [opposite Chauk on the Irrawaddy]; and 3) the 230/33/11-kV, 100-MVA main power station at Nay Pyi Taw.

Currently plans are underway to complete on schedule the following grid projects: 1) the link between the 132-kV Thazi-Dagundaing grid and the main power station at Belin, 2) the link between the 132-kV Kindah-Inngon-Aungpinle grid [in Mandalay division] and the Bellin main power station, and 3) the link between the 230-kV Pyinmana-Thazi grid and the Shwemyo main power station. Installations underway include 1) two transformers at the main power station in Thazi, 2) a capacitor bank in the main power station at Myaungdagar, 3) a transformer at the Hlawgar main power station, 4) a capacitor bank each at the Hlawgar Thakayta and Hlinethaya main power stations. Nine more grids and 19 main power stations will be established to supply to improve the power supply system.

Tripartite Core Group, *Post-Nargis Joint Assessment*, Tripartite Core Group, July, 2008, p 115 [doc 139].

<http://www.asean.org/21765.pdf>

As of April 2007, the total installed capacity in Myanmar was 1,750 MW, of which 1,645 MW was connected to the National Grid System (the Grid), and 106 MW was off-grid generation. Nationally, the transmission facilities exceed 1,352 km (845 miles) at 230 kV voltage level, 1,692 km (1,056 miles) at 132 kV, and 2,173 km (1,358 miles) at 66 kV.

Country Presentation Myanmar: Franco-ASEAN Seminar, 6-7 September, 2007.

<http://burmalibrary.org/docs2/MMpresentation.pdf>

See p 11 for a list of operating power stations, p 12 for existing substations, pp 21-22 for hydropower projects under construction and p 36 for hydropower projects under planning. See p 24 for information about existing transmission facilities, pp 25 – 27 for transmission lines under construction or planning, p 28 for substations under construction, pp 30 – 32 for a list of transmission projects to be implemented in the near future, p 33 for a list of substations to be constructed in the near future, p 29 for a map of the existing national transmission grid, p 34 for a map of the future national grid system and p 35 for a long-term planning projection of the national grid system. See also Appendix 15 below: 'Country report of [Myanmar at the Franco - ASEAN Seminar](#)'.

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YANGON ELECTRICITY SUPPLIES GET BOOST FROM [YESB PLAN](#)

Kyaw Thu and Ye Lwin, MT, 24/07/06.

(Compiler's note: Issue 326 of the Myanmar Times is not available on-line.)

To help Yangon City achieve regular electricity supplies, the Yangon City Electricity Supply Board (YESB) is building new transformers and extending powerlines, an official from the board said July 14. "We are now building 10 MVA transformers at Dagon Seikkan and Hlaingthayar townships, and have a plan to build a 100-MVA power station in Bayinnaung in Mayangone township," said YESB chief engineer U Tun Aye. He said that now that all 30 townships in Yangon City had access to the national power grid, 24-hour electricity could become a reality.

Yangon City currently has about 450 megawatts (MW) at its disposal. About 250 MW comes from four gas-powered electricity generating plants in Yangon and the remainder comes from the national grid. Yangon's industrial zones use about 100 MW and the rest is available for individual consumers, U Tun Aye said. He added that the maximum demand for electricity in the city last year was 430 MW and demand this year was expected to exceed that. "So far (this year) the highest demand we've had for electricity in Yangon is 380 MW," he said. According to U Tun Aye, the total power consumption for the country is 900 MW.

The YESB started a program this month to deliver 24-hour electricity to Yangon's 51 townships, 21 of which are on the city's outskirts. The YESB official said that a good inflow of water at hydropower projects like Paunglaung and Mone Creek were contributing to the success of 24-hour electricity supplies. U Tun Aye said electricity supplies would likely be cut back again after the rainy season as hydro-electric dams reduced production. He noted, however, that some blackouts were currently occurring due to broken tree branches falling onto power lines. "That is the main problem for us. We deliver electricity to the households and industries but broken branches cut supplies," he said. Another cause of blackouts was aging transformers breaking down under heavier electricity supplies, although U Tun Aye said this was secondary to damage caused by falling trees.

Meanwhile, the YESB is installing electric meters in houses which currently have no electricity connection as part of a project launched in August last year to install 100,000 meters across Yangon Division. "So far, we have installed more than 90,000 new electric meters and plan to install more if they are needed," U Tun Aye said.

"We've finished 95 percent of the downtown area and now need to install them at the outskirt townships of Yangon." With more meters in homes, the YESB is also looking for more staff to read them and distribute electricity bills. YESB director U Ko Ko said the 400 people currently employed by the board for such jobs was insufficient. Board member U Toe Aung said the YESB was now recruiting an additional 200 workers and positions were open to anyone with a minimum of high school matriculation.

Additional references for the Yangon Electricity Supply Board (YESB)

- See above: 'Facilities and services of the Yangon Electricity Supply Board' (NLM: 31/08/08)
 'YESB: Five billion kyat spent on power [line repair in Yangon](#)' (MT: 16/06/08)
 'Industrial zones recovering from cyclone' (MT: 26/05/08)
 'Myanmar's [biggest city still paralyzed](#) five days after cyclone' (New York Times: 08/05/08)
 See below: 'Ministry of Electric Power [re-organized](#)' (NLM: 16/05/06)
 'Yangon City Electric Power [Supply Board Law enacted](#)' (NLM: 23/11/05)

NLM, 28/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-28.pdf>

EPM-2 Khin Maung Myint meets with the officers of YESB at its headquarters in Ahlon township and gives instructions on administration, finance, office work, discipline and electricity supply tasks. Next, YESB Chairman Khin Maung Soe, Technician Dr San Oo of EPM-2, M-D Myint Aung of EPSE and Chief-Engineer Kyaw Kyaw of YESB report to the minister on work progress and future plans.

Myanmar Times, 29/10/07. <http://mmtimes.com/no390/n006.htm>

Two new power transmission lines from local substations to suburban areas of Yangon will be installed by the end of the year to reduce reliance on the national power grid, according to U Mg Mg Latt, secretary of the YESB. One power line will extend from Thanlwin power substation to South Dagon, the other will go from Ahlone substation to Myaungdagar IZ In Hmawbi township. The new power lines will help reduce the loss of electricity during transmission. "About 10pc of the power is lost when it is transmitted from the national power grid. By installing new lines from substations serving Yangon we can reduce the loss of power during transmission to households," he said.

NLM, 11/08/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070811.htm>

EPM-2 Khin Maung Myint visits YESB's switchgear factory on Strand Road in Ahlon township and is briefed on preparations for construction work at the factory, as well as the production of switchgears and parts by

Asst Chief Engineer U Sein Aung and U Zeya Thura Mon of Gunkul Engineering Supply Co Ltd. The minister inspects control panels, switchgears and circuit breakers manufactured at the factory.

NLM, 02/08/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070802.htm>

EPM-2 Khin Maung Myint inspects the storage of electrical equipment at the supply division of YESB on Hninsigon Street in Ahlon township. He checks on the system for keeping electric meters and transformers.

NLM, 01/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070701.htm>

EPM-2 Khin Maung Myint and the YESB chairman check on work crews restoring damaged power lines caused by the strong wind in Dagon South. At the township's sub-power station, the district officer Lt-Col San Htay reports on the damage to the power lines of YESB and their repair.

NLM, 26/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070526.htm>

EPM-2 Khin Maung Myint meets with district and township engineers at YESB office. He calls for minimizing the waste of electricity and the exposure of those who are using it illegally. Those present include the chairman of YESB, Col Khin Maung Soe, Sec'y U Maung Maung Latt, Joint-Secretary U Toe Aung, chief-engineers U Tun Aye and U Aung Khine, directors and engineers.

NLM, 09/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070309.htm>

EPM-2 Khin Maung Myint attends a meeting to co-ordinate the supply and consumption of electricity in Yangon city area at the hall of YESB in Ahlon township. Attendees include the chairman of YESB, Col Khin Maung Soe, Chief Engineer Aung Khaing, power station managers, and district and township head electrical engineers. After hearing reports on the installation of electric meters and the exposure of illegal usage of electricity, the minister gives necessary instructions.

NLM, 31-01-07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070131.htm>

EPM-2 Khin Maung Myint inspects the Thanlyin township office of EPSB and checks the cash counter, staff quarters and distribution of power from Myoma sub-power station. U Kyaw Min Tun of the township EPSB reports on distribution of electricity, condition of the power lines and the strength of service personnel at the district electrical engineer's office. The minister urges the staff to try to win the love of the people and to minimize the loss of electricity.

NLM, 25/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061225.htm>

EPM-2 Khin Maung Myint inspects Myaungdagar Power Station in Hmawby township. Chief Engineer U Tun Aye of YESB and Project Manager U Saw Win Maung of Power Supply Project (South) report on the supply of electricity from the power station. At Ahlon Power Station in Ahlon township, the minister hears reports on the availability of natural gas for the gas turbines and the generation of electricity by Deputy Chief Engineer U Nyunt Aung of YESB.

NLM, 13/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061213.htm>

EPM-2 Khin Maung Myint visits the office of the electric power supply board in Hlinethaya township where he is briefed on the supply of electricity to the township. The Superintending Engineer of YESB reports on the extension of power lines and what needs to be done to improve the power system in the township. The minister also goes on to the concrete lamp-post factory of YESB the township where he is briefed on daily production and sales of lamp-posts. At the No 1 power station in the township he checks on the supply of electricity to the township.

NLM, 18/11/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061118.htm>

At the 33/6.6 KV Tiger Ali sub-power station near Hanthawady jct in uptown Yangon the EPM-2 is briefed on the supply of power and installation of transformers at the sub station and substitution of underground cable. At the Yangon Crown Wire Cable Factory Ltd in Shwepyitha IZ No 3 the factory manager reports on parts being produced and sold by the factory.

NLM, 14/10/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061014.htm>

EPM-2 Khin Maung Myint, Col Khin Maung Soe of YESB, and MD San Oo of MEPE are briefed on the running of Thakayta Gas Turbine by Turbine Manager Than Naing Oo. They check the control room and the

repair of the 230/33-11 KVA transformer in the switching yard. At the Asia World Jetty on Strand Road in Kyimyindine township, they check on the arrival of machinery to be substituted in the No 1 Boiler of Ahlon power station.

NLM, 02/09/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060902.htm>

EPM-2 Khin Maung Myint meets with 1,030 employees of Yangon West and North district offices and 1,363 employees of Yangon East and South district offices of YESB. He stresses the need to minimize loss and wastage in the supply of power and the collection of payments for power consumption. Col Khin Maung Soe of the board instructs the employees to be accurate in collecting bills for power consumption from consumers. MEPE's Director (Finance) Myo Naing and Chief Engineer U Tun Aye of YESB join in the discussions.

NLM, 26/08/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060826.htm>

EPM-2 Khin Maung Myint and Chief Engineer U Tun Aye of YESB inspect the 33/11-10 MVA transformer of the sub-power station in Dagon Seikkan township. The transformer, previously operated on a self-reliant basis by the Dagon Seikkan IZ Management Cte is being transferred to the YESB.

NLM, 03/08/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060803.htm>

EPM-2 Khin Maung Myint and Chairman Khin Maung Soe of YESB visit the Pabedan township office in downtown Yangon where they are briefed on staff strength, installation of transformers, overhead and underground cables by the township officer and Asst Chief Engineer Nyo Win of YESB. After inspecting the Latha, Pabedan, Kyauktada, Pazundaung and Mingala Taungnyunt township offices, they meet with service personnel to impart instructions.

NLM, 24/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060624.htm>

EPM-2 Khin Maung Myint and officials of YESB visit Hmawby township General Admin Dept (GAD) where they are briefed on the supply of electric power. They also visit the 33/11 KV Kyatphyukan sub-power plant in Hmawby township and the GAD office in Htaukkyant and the Yangon North district GAD office as well as the site where a 230 KV-power line from Hlinethaya to Bayintnaung is under construction.

NLM, 20/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060620.htm>

EPM-2 Khin Maung Myint and Chairman Khin Maung Soe of YESB visit a factory in Hlinethaya township that produces paddy husk-fired engines. Executive director Soe Tint Aung briefs them on the use of a mixture of diesel and paddy husk gas to save fuel. Engines of over 180-HP are being test run at the factory using this mixture. At a transformer factory in Shwepyitha township, the executive director, U Tun Lin Thauang, briefs them on the system for controlling the volume of paddy husk gas and the production transformers.

NLM, 14/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060614.htm>

EPM-2 Khin Maung Myint and Chairman Khin Maung Soe of the YESB visit the transformer factory of Soe Electronics Co in South Dagon township. It was established in 1983/84 and has a staff of 250. It assembles transformers and other machinery which it distributes to various ministries.

NLM, 05/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060605.htm>

EPM-2 Khin Myaung Myint and Chairman Khin Maung Soe of YESB inspect Sein Pan Myaing and Mayangon township sub-power Station in Mayangon township. In Hlinethaya IZ No 1, they meet with the supervisory cte and entrepreneurs and informed them that the newly formed EP Ministry No 2 is responsible for the supply of power. The ministry will see to the distribution of electricity to the industrial zones on schedule so as to boost national productivity. Col Khin Maung Soe of YESB and officials report on the installation of new power lines, the supply of electricity to industrial zones and the functions of the sub-power stations.

NLM, 02/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060602.htm>

Newly appointed EPM No 2 Khin Maung Myint meets with responsible personnel of YESB where Col Khin Maung Soe, chairman of the YESB briefs them on the formation of the Board, its set up and departmental functions. The YESB was launched on 01/04/06 and the Yangon division Electrical Engineering Office functions under it. Among its priorities are the supply of electric power to Yangon City on a 24-hr basis and

the speedy installation of electric meters. YESB personnel are to take prompt action against those who use electric power illegally.

Additional references for the metering program outside of Yangon area:

See above: 'Electricity [metering program](#) taking root' (IMNA: 11/05/07)

Additional references for Yangon power supply and demand

See above 'Gas in [short supply](#) to meet demand for electricity (MT: 17/09/07)

'[More gas needed](#) for 24/7 power in Yangon (MT: 02/07/07)

'[Full power](#) supply promised for July (MT: 04/06/07)

See below '[Pipeline to solve](#) electricity shortages' (MT: 16/09/02)

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[INDUSTRIAL SECTOR TO BENEFIT FROM ATTENTION TO POWER SUPPLY](#)

NLM, 23/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060723.htm>

The Industrial Development Cte held its coordination meeting 1/2006 in Nay Pyi Taw with an address by its Chairman, PM Soe Win. General Soe Win said that as the industrial sector of the State commences to transform from mainly agro-based industries to full industrialization, the Government is making arrangements for the development of the electric power sector in conformity with that of the industrial sector. To highlight the need for power in the industrial sector, separate electric power ministries had been created: No 1 and No 2, each with its assigned duties for the production and supply of electricity.

In the past, the Government took responsibility for large- and medium-scale production of electric power, and entrepreneurs of the private sector were permitted to produce electricity on a medium scale and micro scale. At present, localized and nationalized plans are being implemented to carry out production and supply of power. The Government's large- and medium-scale hydel power projects will have to generate about 5,000 megawatts. Presently, these hydel power plants are producing 1,500 megawatts, a significant increase if compared to the past. Furthermore, the plan is being carried out to extend the national power grid in order to connect it to the hydel power projects under construction.

When progress is made in generating localized power and implementing large-scale hydropower projects and national grid extension projects, industries in the entire nation including the Myaungdaga fertilizer factory and foundries, and the Thanlyin and Thilawa special industrial zones will gain momentum. This will ensure parallel development of industrial sector with the electric power sector.

With regard to industrial development, in the final year of the [present government's] third five-year plan in 2005-2006, "the industrial sector contributed 17.5pc to the GDP of the nation. Sustained efforts are to be made to develop the industrial sector's contribution towards GDP by 18.9pc in 2006-2007, the first year of the fourth five-year plan, by 20.9pc in the second year, and to 23.3pc, 25.9pc and 28.9pc in the next years". the last year of the third five-year short-term plan, the industrial sector contributed 17.5 per cent to the GDP of the nation. Sustained efforts are thus to be made to develop the industrial sector's contribution towards the GDP by 18.9 per cent in 2006-2007, the first year of the fourth five-year plan, by 20.9 per cent in the second year, by 23.3 per cent, 25.9 per cent and 28.9 per cent in the next years.

The electric power plants constructed in the third five-year plan are now in operation and they will produce electricity with increasing momentum year by year. So, the private sector, organizations concerned and the government should strive in harness to raise the industrial sector, enhance industrial development and ensure take-off. . . .

The PM said there are good prospects in the agricultural sector. Various kinds of industries with good prospects such as rice and its products, beans and pulses, wheat, fish and meat, forest, rubber and cotton are to be set up. The oil palm industry which started with cultivation projects has moved to refining. It has

emerged due to high morale, perseverance, diligence, risk-taking and confidence in the government. Priority should be given to the establishment of cultivation-to-production industries.

In implementing rural development tasks, efforts are to be made to supply power to rural areas and the invention of physic nut oil-driven machinery. Under the guidance of the Head of State, cultivation of physic nut is being undertaken nationwide. Within two years, the use of physic nut oil will be wider, the PM said. Ethanol would be produced from sugarcane soon. In the future, bio-gas production will develop. Therefore, industries that can apply the use of ethanol and physic nut [oil] should be founded.

The hydro-electric power industry, the gem and mining industry and energy, electrical, transport and communication sectors will also improve gradually.

He said more electricity and natural gas will be used in the very near future. Extensive measures are also being taken to improve technological and educational standards and to develop technological courses and research in factories and plants. The State will take steps also to develop the industrial sector more significantly by conducting more research. Greater co-operation is needed if the correct policies and guidance of the Head of State are to meet success. The development of industrial sector requires characteristics such as speed, skill and flexibility. Strenuous efforts are needed if the industrial sector is overcome the difficulties which hinder its development.

Additional references

See above: [Yangon industrialists](#) urged to increase production (NLM: 12/03/07)

See below: 'Industrialists urged to [diversify production](#)' (MT: 09/0106)

See also other articles under 'Industrial Use of Electricity' [IU](#)

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BUSINESS LEADERS TO PAY FOR NEW POWER SUB-STATIONS

Ye Lwin, Myanmar Times, 17/07/06.

(Compiler's note: Issue 325 of the Myanmar Times is not available on-line.)

The Yangon Electricity Supply Board (YESB) on July 5 called on business leaders to set up new power supply stations in each of Yangon's IZs by next month at their own expense, said U Myat Thin Aung, president of the Myanmar Industrial Association (MIA).

Colonel Khin Maung Soe, chairman of the YESB, said each station should have a capacity of 10 megavolt-amperes (MVA) to supply electricity to the industrial zones 24 hours a day. The project will be implemented in three major industrial zones – Hlaingthaya, Shwepyitha and Dagon Seikkan – in which a total of about 2000 factories are operating.

There are currently four power stations in Hlaingthaya IZ supplying a total of 55 MVA of electricity, which is "not sufficient for the more than 700 factories in the zone", U Myat Thin Aung said.

The estimated cost to establish each station is about K 150 million, for which the government is not expected to supply any financial assistance. However, the YESB said it would provide technical assistance for the project.

Additional references

See above: 'Reliable electricity supply advantage to [Thai shrimp](#) farmers' (MT: 13/08/07)

[Fisheries factories](#) offered 24-hour power' (MT: 09/07/07)

NLM: 16/07/07 <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070716.htm>

Lt-Gen Khin Maung Than of the Ministry of Defence attended the opening of the new Pyay IZ in Nawade ward in Pyay. Chairman Aung Khin of the supervisory cte reported on the purpose of setting up the industrial zone, allotment of 303 plots for entrepreneurs, manufacturing of machine parts, auto parts and vehicles, and

arrangements for the supply of water and power. The IZ is producing one-ton light trucks and the Pyay Jeep. At the 5-MVA power station of the zone, Khin Maung Than heard reports on supply of power to the industrial zone and control of power.

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GOVERNMENT WILL [PRIORITIZE HYDROPOWER PROJECTS OVER GAS](#)

Kyaw Thu, MT, 10/07/06. (Compiler's note: Issue 324 of the Myanmar Times is not available on-line.)

The government intends to wean Myanmar off its reliance on gas for electricity generation and make hydropower the country's sole source of electricity by 2030, an official from the Ministry of Electric Power No 1 told The Myanmar Times. Currently gas accounts for the bulk of Myanmar's electricity production, providing about 48.5pc of supplies, the official said. "But now the government prefers hydropower."

Hydropower currently accounts for about 38.5pc of electricity, steam turbines 12.5pc and diesel the remaining 0.5pc. But by 2030, the government hopes that 100pc of the country's electricity will come from hydropower plants, which are the most cost-effective option, he said. The government plans to establish 24 hydro-electricity plants which will vary in output from 48 MW to 7,100 MW.

A percentage of the electricity from these projects is to be exported to neighbouring countries. The Hutgyi hydropower dam, which is being built with the Electricity Generating Authority of Thailand (EGAT) at the cost of US\$1 billion, will export some 60pc of its electricity to Thailand. In April, Thai energy firm MDX Group and the government agreed on a \$6 billion hydropower project on the Thanlwin River, from which Thailand will receive 85pc of the electricity. MDX said its dam, the biggest in Myanmar, would be ready in 2012, with electricity capacity to be upgraded to 7,000 MW later.

Progress on the Hutgyi dam slowed earlier this year, although an official from the EPM-1 denied this was the result of the death in May of an EGAT employee working on the feasibility study. In early May an EGAT official had said full-scale surveying was not expected to resume until 2007. "We feel we have enough information to complete the feasibility study, even though it is not really as complete as we would have wanted," the EGAT official said. The Myanmar government official said the feasibility study had been finished. "In May, we finished the feasibility study for the whole project," he said. "And that's why we stopped the progress for a certain period." The official predicted construction on the Hutgyi dam would start in Dec 2006 or Jan 2007, ahead of the Nov 2007 date in the initial agreement.

With all planned dams in operation by 2030, the EPM-1 estimates 23,300 MW of electricity will be available. It balances this with a projected annual domestic demand for 18,900 MW by 2030. In comparison, Thailand, with a population of about 64 million, in September 2004 had an installed power generation capacity of 25,970 megawatts, according to the Electric Power Trade Mission, an international organisation set up by the US Department of Commerce, the International Trade Administration and the Office of Global Trade Programs.

A ministry official told The Myanmar Times that as hydropower accounts for more electricity generation, the government will direct a greater proportion of Myanmar's gas reserves to fertiliser production and other projects. A 1995 World Bank study showed the theoretical potential for hydropower in Myanmar to be 108,000 MW.

Additional references

See above: 'National [hydropower project schedule updated](#)' (MT: 21/07/08)
 'Completion of hydropower plants assigned [highest priority](#)' (MT: 12/02/07)
 See below: 'Hydropower project [nearing completion](#)' (MT: 28/06/04)
 'Generation facilities scheduled for [commissioning in 2002-2004](#)' (MT 07/01/02)
 'More inputs needed to power a [hydro future](#)' (MT: 04/06/01)
 See also the section on hydropower in '[Electricity potential](#) of energy sources available in Myanmar'.

NLM, 17/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-17.pdf>

Since 1988, a total of 13 hydropower plants supplying electricity to the power grids of the whole nation have been built, in addition to [smaller] regional hydro plants. Currently, there are 35 ongoing hydropower projects. These projects lie along the Ayeyawady, Chindwin, Sittoung and Thanlwin river basins which are blessed with lots of water resources. Experts have estimated that the State could generate more than 43,400 megawatts of electricity from all the water resources in Myanmar. With the opening of the 600-MW Shweli-1 hydropower station more than 1,400 megawatts of electricity can be generated from hydropower sources, and when the 35 ongoing projects are completed, they will generate over 32,900 megawatts. Present generating capacity is just over three percent of the potential capacity of the whole nation. This will reach about 79 percent when projects now underway are completed.

Myanmar Times Energy Supplement, August 2007. <http://mmtimes.com/feature/energy/06.htm>

Current hydropower electricity production stands at 745.68 MW, some 43pc of total electricity production. However, gov't figures show an additional 2,034.2 MW are expected to come on-line at the end of 2009 when several hydropower plants should be finished. A total of 13 plants are included in this list and range from 2.2 to 790 MW in capacity. By the end of 2007 about 686 MW from four projects should become available for the national grid, while 247 MW will theoretically come on-line in 2008 but 2009 is expected to show a considerable increase – with more than 1,100 MW expected. In addition to the projects intended to be operational by the end of 2009, another 11 plants are slated for the future. These projects are expected to generate up to 15,725 MW and should be finished by 2015.

Myanmar Times, 13/11/06. [Issue 342 of the Myanmar Times is not available on-line.]

Completion of several hydropower projects in 2009 is expected to more than double production of electricity in Myanmar from 1,667 to 4,000 megawatts, an official from the EPM-1 said last week. Among the hydropower projects expected to be finished in 2009 are those at Yeywa in Mandalay Division and Shweli in Shan State. The official also said the Dept of Hydroelectric Power (DHP) is conducting a feasibility study to build a hydropower station about 16 km (10 miles) upstream from the village of Ann in Rakhine State. "The department is building camps and roads to facilitate the project," the official said, adding that the station will include three turbines capable of producing a total of 15 MW of power. Hydropower currently supplies 38.5pc of Myanmar's electricity, with gas turbines producing another 48.44pc, coal-fired steam turbines 12.5pc and diesel engines 0.5pc.

INTEREST GROWING IN RICE-HUSK GENERATION

Kyaw Thu and Khin Hnin Phyu, Myanmar Times, 10/07/06.

<http://www.aseanenergy.info/News/34000938.htm>

As an environmentally-friendly, renewable energy source, local experts say rice husks could be used to generate electricity in Myanmar and reduce dependence on expensive oil imports. Rice-husk power plants process husks by heating them to create a gas that is then burned and converted into electricity. Experts say the technology could be particularly useful for developing rural areas. It is also an idea that neighbouring countries are putting into practice, with the support of the Asian Development Bank (ADB) and other investors.

On May 31, a United Arab Emirates-based fund, Al Tayyer Energy, announced it would provide US\$120 million for Thailand to build rice husk power plants in the country's more remote north. The move was designed to provide Thailand with alternative energy sources in the face of soaring global oil prices and was expected to save the country some 800 million baht (\$21 million) a year from the six million tonnes of rice husks it produces annually, Al Tayyer Energy said.

On June 22, the ADB announced it would release about \$1 billion dollars each year for renewable energy and energy efficiency projects. U Soe Myint, the vice president of the Renewable Energy Association Myanmar, a local non-governmental organisation, said rice husk projects here could lead to more widespread availability of electricity in villages and also benefit cottage industries and private industrial firms.

Local rice mill owners said there were plenty of rice husks to get the idea off the ground. “We should use these plants in the countryside where rice husks are abundant,” said one mill owner, noting that Mon, Rakhine, Ayeyarwaddy, Yangon and Bago states and divisions were the most suitable areas to develop rice husk plants as they were the country’s biggest rice producers. As an agriculturally-based country of which rice was the primary crop, he said the husks were cheap and readily available in Myanmar.

According to the Ag & Irrig Ministry, the 1,250 million baskets of rice Myanmar produces each year results in some 230 million baskets (about 4.8 million tonnes) of rice husks. Founder of the Myanmar Inventors’ Cooperative Society U Soe Tint Aung, who has been designing rice-husk energy systems since 1985, said public interest in the technology had increased significantly in recent years due to the comparatively low cost of energy production. It was about 10 times cheaper than using diesel, he said. Such plants were being set up on the town-level with firms in industrial zones such as ice as saw mills being the main customers, he said.

Currently there are only a handful of firms designing and producing rice-husk energy plants, although U Soe Tint Aung said rising demand was leading to more companies getting involved in plant production. U Than Nyunt, the managing director of Ar Mahn Tech, a company that sells dual-fuel generators, said that although it was possible to build rice-husk energy plants in Myanmar, more advanced technology was needed to optimise production. The start-up costs and technology needed restricted what local companies could do, he said. One of the main technical hurdles for such alternative energy designers currently is the amount of tar rice-husk plants generate as a by-product, U Than Nyunt said. “This is the barrier for us. If we could eliminate the tar, it would be okay.”

Graham James Dwyer, External Relation Specialist for the ADB, also noted that the bank had not provided Myanmar with a loan for 20 years. Locally-designed rice-husk plants currently produce up to 300 kilowatts. However, a rice miller told The Myanmar Times there was a plan to produce a plant generating as much as 1,500 megawatts in Dedaye, Ayeyarwaddy Division. “We are conducting a feasibility study for building the power plant,” he said. Last month, a rice-husk power plant designed by the Myanmar Inventor’s Cooperative Society was awarded third place in the ASEAN-organised Fifth Renewable Energy Project Competition in Brunei.

Website information:

<http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>

Information presented by the Energy Planning Dept of the Myanmar Ministry of Energy at the Second subregional energy forum in Ho Chi Minh city on 22/11/08 indicates that the installed electrification capacity of renewable energy sources at the end of 2008 was as follows: Solar power: 0.1157 MW, Wind power: 0.5194 MW, Mini hydro power: 8.3530 MW, Bio-mass power: 18.1942 MW; Biogas power 1.5993 MW.

Additional references

- | | |
|------------|---|
| See above: | <p>‘Local electricity plant powers village metal workshops in Thabyu’ (NLM: 27/03/11)</p> <p>‘Rice husks used to power urban wards’ (Myanmar Times: 23/08/10)</p> <p>‘Electricity flowing from monk-driven projects in Mon state’ (IMNA, 05/02/09)</p> <p>‘Natchaung model village well supplied with electric power’ (NLM: 15/09/08)</p> <p>‘Plans for 7-million-dollar rice-husk power plant edge forward’ (MT: 27/08/07)</p> <p>‘Rice-husk generators slated for villages in Yangon division’ (MT: 11/06/07)</p> <p>‘Inventor co-op society exports first rice-husk generators’ (MT: 21/08/06)</p> |
| See below | <p>‘Paddy husk power plant tested to cut rice milling costs’ (MT: 19/12/05)</p> <p>‘Biogas power plants supply electricity to rural areas’ (MT: 16/08/04)</p> <p>‘Biomass gasifier used for tobacco curing in Myingyan’ (TERI: 08/04)</p> <p>‘Village electrification committees’ (Renewable Energies in Rural Areas: 09/03)</p> |

Compiler’s Note: There are numerous references in Myanmar publications to paddy husk generators installed in farms and villages throughout the country. The entries below have been selected on the basis of the details they provide about the political and financial arrangements for installation of the gasifier-generator systems and technical data about the systems.

NLM, 28/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-28.pdf>

At the integrated, eight-acre farm of U Than Ko and Daw Than Than Aye in Lekaing village in Pwintbyu township paddy husk is being used to generate electricity. Integrated farming is based on the concept of using animal droppings and waste left over after harvesting crops to improve life on the farm and to regenerate the soil. [The article describes the farm, the animals that are being raised there, the crops that are produced and the increased income the family is receiving from their farm. It includes photos. Several articles and news items about integrated farming have appeared in NLM over the last year. This is the first that mentions paddy husk generation. No further details are provided.]

NLM, 23/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-23.pdf>

Sports Minister Aye Myint attends the opening of paddy husk-fired generator in the village of Alinthat in ChaungU township, Sagaing division. The 50 KVA-generator can supply power to 230 houses and over 20 video houses and lamp-posts. It also supports the village water supply. It cost K 8.5 million in total.

NLM, 23/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-23.pdf>

Lt-Gen Tha Aye of the MoD looks into the supply of electricity by means of 120-kilowatt husk-powered generator at the township Electrical Engineer's Office at Kyunsu on Kadan Island in Taninthayi division. [A photo of the generator is included in the print edition of NLM.]

NLM, 02/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-02.pdf>

The Yangon division commander inspects the supply of power on Coco Island. It is provided by a 150-KVA generator and a 75 KVA generator as well as "a palm-leaves-fired power generator".

NLM, 27/11/06. <http://burmalibrary.org/docs2/NLM2006-11-27.pdf>

Lt-Gen Kyaw Win of the MoD attends the opening of a paddy husk-fired power station in Yannlon village in Wattaung village-tract, Kengtung township on 24/11/06. Construction of [installation of equipment at?] the station started on 11/11/06. A total of 51 households in four villages including Yannlon have been supplied with electricity. It cost K 16.2 million. [A photo of the interior of the station showing the generating equipment is included in the print edition of NLM. Yannlon village (Yanglaw: 21° 21' N, 99° 36' E) appears to be the location of demonstration project of the Myanmar Agriculture Service.]

<http://mission.itu.ch/MISSIONS/Myanmar/05nml/n050919.htm>

NLM, 25/02/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nml/n060225.htm>

A paddy husk-fired power station is launched in Magyibok village in Myaung township. The 100-hp-capacity power station can generate 400 kW.

South Asian Energy Awards, 2006.

http://www.dgs.de/fileadmin/files/REEPRO/International_projects/Biomass_Rural_Electrification_with_rice_husk_gasifier_in_Myanmar.pdf

This two-page report, titled 'Biomass - Rural Electrification with rice husk gasifier in Myanmar', describes a rice-husk generating station that was set up by the Myanmar Inventor Coop Society in Lin Tha village in Thandwe township, Rakhine state. There is a brief explanation of how the system works, accompanied by a diagram and a photo of the operating system. A 60HP internal combustion engine fueled by gas produced by rice husks is used to drive the generator which has an output of 30KW. Fuel consumption is estimated at 1.6 tons per kWh with total consumption per year[?] of 87 tons. US\$ 15,333 was spent in setting up the plant and distribution system including \$2500 for construction costs, \$3750 for the gasifier unit, \$1250 for the gas engine, \$1250 for the generator, \$4583 for the electricity main and distribution system and \$2000 for installation and overhead costs. The plant operates a rice mill for 12 hours a day and lighting to the village for an additional 5 hours. The system is privately owned (perhaps by the rice mill operator). The report does not state how many homes in the village are served. The project won an ASEAN energy award in 2006.

Myanmar Times, 13/09/04. [not available on-line]

The first power plant in Bago division to generate electricity from rice husks was officially opened in Bine-dar village, Nyaunglaypin township, on August 9. The plant is capable of producing 50 kilowatts of energy for

426 households. It was established by the village electrification committee with the support of the township's USDA. Before the plant was set up, some villagers relied on small and expensive diesel generators for electricity. Because of the cost, many households had no electricity. The plant cost K10.5 million to build, about K 6 million of which was paid with a loan from the Co-operative Bank. The village electrification committee raised the balance of the funds.

NLM, 20/02/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030220.htm>

Minister for Cooperatives Tin Ngwe attends the opening of the paddy husk-fired power plant of Hleseik Village General Enterprises Cooperative Society held at the basic education high school in Hleseik in Kyaunggon township on 16 February. Deputy Director Thein Shwe of Ayeyawady Division Cooperative Dept and Chairman Hla Thwin of Pathein DPDC formally open the plant.

NLM, 16/11/02. <http://www.myanmargeneva.org/02nlm/n021116.htm>

A paddy husk-burning power plant was opened in Taungni Village in Taunggyi township on 11/11/02. The plant was built on a self-reliant basis at a cost of K 5.876 million and can generate 50 KVA.

NLM, 27/10/02. <http://www.burmalibrary.org/NLM/archives/2002-10/msg00032.html>

Lt-Gen Maung Bo and party visit Kyweku Village in Myeik township where they are briefed on the construction of a paddy husk-powered electric power station. The station and a 'Ngwelwe' paddy thresher innovated by youths of Ingamaw village are being test run. The furnace installed at the power station is of an RH 20/22 type, and the engine is a Hino EF 750 V8 with 200 HP. It burns 30 baskets of paddy husks an hour and can supply power to 2,400 four-foot fluorescent lamps. It will supply power to Kyweku Village and a 50-ton rice mill near the station. A report in NLM: 18/11/02 describes the opening of the 120-kilowatt power station on November 9. It is said to have cost K 92.27 [K 9.27?] million. [www.myanmar.gov.mm/NLM-2002/enlm/Nov16_region6.html]

NLM, 04/05/01. www.myanmargeneva.org/01nlm/n010504.htm

A power plant run on paddy husk gas was opened in Yonthalin village-tract, Hinthada township, on 1 May. The 130-KVA power plant was built by Ayeyar Swanar Engine Production Enterprise. It will electrify 1,010 houses in Yonthalin Village.

For more on the Yonthalin community project see the volume 'Interviews/Field Surveys in Villages for Rural Electrification: Feb 2001-Nov 2002', in the series: 'Study on Introduction of Renewable Energies in Rural Areas in Myanmar:

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3)

A memo on pp 94-95 describes a visit to the village on 12 June 2001 by a JICA field team. It reports that the engine at the Yonthalin is a 140-HP, 135 kVA Hino 12-cylinder [converted] diesel type and that the furnace is an RH-14 type and the starter a small DG of 4.4 kW. 420 of the 1,100 households in the village are hooked up, as well as 40 street lights. Households are allowed to use 3.2 foot lights, TV, radio and karaoke, but not rice cookers. The system provides electricity for 5 hours a day during the evening from 18:00 to 23:00. 12 baskets of husks (each weighing 2.3 kg) are needed to operate the system for one hour. The village has approximately 1,200 acres [500 h] of paddy fields of which 250 acres are cultivated by the villagers. The rest is owned by 'non-villagers' [Aye-ya shwe-wah?]. There are 6 privately owned rice mills in the village. The memo does not say whether these are being operated by the gasifier system separately from the community electrification scheme. Total costs for construction of the plants amounted to K 1.5 million for the engine, and K 2.5 million for the distribution lines. Erection of the lines was provided free of charge by MEPE. Installment charges of 20,000 - 40,000 per household are being collected from the villagers.

The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Final Report: Volume 1: Summary, pp 37-38. <http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1)

and also

Interviews/Field Surveys in Villages for Rural Electrification: Feb 2001-Nov 2002, pp 97-101.

[http://lvzopac.jica.go.jp/external/library?](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3)

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3)

Samalauk village has been selected as a model village for electrification using a rice-husk-gas-fueled engine and generator. It is located in Nyaungdon township approximately 50 km west of Yangon along the Yangon-Pathein Highway. The main aim of the model village program will be to monitor the implementation of a rural electrification scheme that uses a rice-husk generator. The generator is to be operated and maintained under the management of a local electrification committee (VEC) on a self-help basis. The monitoring arrangement will show how a rice-husk-gas generating system could best be adapted for use in electrifying paddy-cultivating villages in Myanmar. Samalauk already has four battery charging stations, each capable of charging about 20 batteries at a time. The rice-husk generator program would include 200 of the village's 800 households. Assuming three 20 W lights per household and one 60 W TV per four households (or one 15 W radio per household), average household demand would be 75 W and the total lighting demand would be about 13 kW. The households selected for the program would be in the central part of the village within a thousand metres of the engine-generator. Electricity generated by the plant would be supplied to the houses by 230 V distribution lines for five hours a day from 18:00 to 23:00. The capital cost of the husk gas engine generator system and distribution lines is estimated at about US\$ 130 per household. The operation and maintenance cost is estimated to be \$ 6 per household per annum. Power consumption per household would be: 75 W x 0.75 (factor of concurrent use) x 5 hour/day x 30 days/month = 8.4 kWh/month. The monthly tariff would be in the order of K 600 per household per month. The unit price would be about K 71 kWh (\$ 0.11/kWh) (i.e. much higher than the current tariff of MEPE at K 2.5 kWh). A BCS charges K 100 for a 12 V battery and K 50 for an 8 V battery. A village household that uses a battery spends K 1,500-2,000 for lighting per month. A family with two 8 W fluorescent lights spends K 1,000 per month on lighting. Houses in the outlying areas of Samalauk could be electrified by a line-fed BCS system and smaller satellite villages scattered further afield by a solar powered battery charging system. [Compiler's Note: The notes from the Field Survey provide additional useful background information about Samalauk and the proposal for the electrification system there.]

"3. Rice Husk Gas Engine Generator", pp 16 – 25. Part of an unnumbered volume entitled, *Visual Guide for Planning Village RE Schemes*, of the series, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar* (Sept 2003).

[http://lvzopac.jica.go.jp/external/library?](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159767&volno=000000000&filename=11734050_02.pdf&seqno=2)

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159767&volno=000000000&filename=11734050_02.pdf&seqno=2](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159767&volno=000000000&filename=11734050_02.pdf&seqno=2)

This is background material designed for a non-technical manual for field workers to use in presenting basic information about rice-husk generation at the village level. A very useful diagram on p20, accompanied by pictures, shows the various stages of the gasification and generation system including gasifier, drains, purification towers, filters, engine, and generator. According to the information provided, a typical village gasifier would require 50 baskets of husks per day to provide a five-hour supply of electric power to 250 homes, assuming a demand of 75 watts per household. 50 baskets of husks could also produce sufficient gas to fuel an engine that would power a mill producing 2.5 tons of milled rice per day. The energy content of 50 baskets of rice husks would be equivalent to approximately 10 gals of diesel oil.

Myanmar Times, 15/01/01. <http://www.myanmar.gov.mm/myanmartimes/no46/b2.htm> [not available on-line]

Myanmar has been a rice-producing country for centuries, and yet the productive potential of the paddy husk – other than for use as a coolant for ice blocks and as cheap fuel for open-fire cooking – has not been utilised. Last summer Ayeyar Shwe Wah, an agri-business company, cultivated 1,200 acres of land at Payarni village in Thabaung township, Ayeyarwady Division for growing paddy. What was noteworthy about the venture was that the company used paddy-husk-fuelled engines to pump in 600,000 gallons of water onto the site daily. Had it used diesel oil, the company would have faced a daily cost of K 30,800. But with the price of a bushel of paddy husks at just K 5, Ayeyar Shwe Wah's daily cost was just K 880. If diesel pumps had been used throughout the summer cultivating period the total cost would have been K 2,772,000. But using paddy husk fuelled engine pumps cost only K 79,200. The inventor of the paddy husk fuelled system is U Soe Tint Aung, the president of Myanmar Inventors Cooperative Ltd. Though designed as a paddy-husk gas-fuelled engine, his machine can also run on gas produced by saw dust or organic waste.

Besides pumping water, it can generate enough power to run a rice mill, saw mill or ice factory. One of the engines is supplying the electricity needs of the Nyaung-gan village in Htilin township, Magwe District.

See also the following report of the same field test from the January 2001 edition of The Irrawaddy.

http://www.irrawaddy.org/article.php?art_id=724

The Myanmar Inventors Cooperative Ltd has produced a workable version of a paddy-husk fueled engine that could help beat the high costs of imported diesel fuel. Ayeyar Shwe Wah, an agribusiness company, used the prototype engine last summer to pump 600,000 gallons of water daily to cultivate 1,200 acres of land at a cost \$2.25 per day, or less than 3% of the \$78 required using imported diesel. The high cost of diesel has long hampered cash-strapped Burma's efforts to expand its agricultural output.

TRANSFER OF CAPITAL CREDITED WITH IMPROVING YANGON POWER SUPPLY

Xinhua, 08/07/06. http://english.peopledaily.com.cn/200607/07/eng20060707_280963.html

The Myanmar Electric Power Enterprise (MEPE), the main electricity supplier, is currently supplying 360 megawatts of electricity to Yangon daily and 860 MW to other parts of the country. MEPE attributed the possible increase of power supply in Yangon to the move of government ministries to the new capital of Nay Pyi Taw last November, resulting in reduced power consumption by ministry offices in Yangon and making possible increased supply to residential areas and industrial zones. Previously, electricity was supplied to the city alternately at three different times, causing much inconvenience to consumers.

According to the MEPE, 15 major hydropower projects that will increase electricity generation by 10,000 MW are underway. They include Tasang (7,110 MW), Shweli (400 MW), Yeywa (780 MW) and Htamanthi (1,200 MW) among others. Twelve of these projects yielding over 2,000 MW are expected to be finished in the next three years. This will potentially triple the amount of electricity available on the national power grid, experts said. Official figures show that Myanmar had an installed generating capacity of over 1,335 MW at the end of June 2005. Hydropower stations account for 35pc and gas-fired plants for 50pc of total capacity. Myanmar's electric power generation grew to 5.4 billion kWh in 2004-05, up from 2.2 billion units in 1988.

Additional references

See above: 'Electric power supply improves after [years of abnormal status](#) (Xinhua: 02/09/06).

Myanmar Times Energy Supplement, August 2007. <http://mmtimes.com/feature/energy/06.htm>

Current hydropower electricity production stands at 745.68 MW, some 43pc of total electricity production. However, gov't figures show an additional 2,034.2 MW are expected to come on-line at the end of 2009 when several hydropower plants should be finished. A total of 13 plants are included in this list and range from 2.2 to 790 MW in capacity. By the end of 2007 about 686 MW from four projects should become available for the national grid, while 247 MW will theoretically come on-line in 2008 but 2009 is expected to show a considerable increase – with more than 1,100 MW expected. In addition to the projects intended to be operational by the end of 2009, another 11 plants are slated for the future. These projects are expected to generate up to 15,725 MW and should be finished by 2015.

DIPLOMATS, JOURNALISTS TOUR BAGO HYDROPOWER PROJECTS

NLM, 16/05/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nln/n060516.htm>

Factual information from this article has been filed under entries dealing with the individual projects visited. Some of the information presented is obviously garbled, such as the following statement: "Out of 15 hydro power projects, 12 will be completed in 2006-07 fiscal year, then total production of power will reach over 10,000 MW."

MINISTRY OF ELECTRIC POWER RE-ORGANIZED

NLM, 16/05/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nln/n060516.htm>

Union of Myanmar: State Peace and Development Council Order No 5/2006: 4th Waning of Kason, 1368 ME (15th May 2006)

In order to effectively carry out the economic, nation-building and development tasks, the State Peace and Development Council has reorganized the Ministry of Electric Power as follows: (1) Ministry of Electric Power No (1) (2) Ministry of Electric Power No (2).

By Order, Sd/ Thein Sein, Secretary-1, State Peace and Development Council

Compiler's Note: The decision to split the Ministry of Electric Power into two parts, communicated through the announcement of the appointment of two new ministers on 15 May 2006, was not accompanied by any explanation in the official media. A brief clarification of the reasoning behind the move was offered a few months later by General Soe Win in remarks to the SPDC's Electric Power Development Project Cte. "Presently, the State is taking steps to change the nation's agro-based economy to a system in which different kinds of industry can be set up. To bring this about, emphasis has been placed on boosting the power supply in order to develop both the agricultural sector and the industrial sector. This is why the Ministry of Electric Power itself was reconstituted into the two ministries, one to focus on generating electric power and the other to getting it distributed." What was actually involved was more complex than the oversimplified version offered by Soe Win.

The Ministry of Electric Power No 1 (EPM No 1) was formed by separating out the Hydropower Dept (HPD) which had been responsible for the planning and construction of new hydro-electric projects under the old ministry and adding to it a new state economic enterprise known as the Hydropower Generation Enterprise (HPGE), which took over from MEPE the operation of the existing network of medium and large hydro-electric plants, as well as the 120-MW coal-fired plant at Tigyit. In creating the new ministry the Hydropower Dept was renamed as the Hydropower Implementation Department (HPID). The HPID appears to be responsible for dam construction work, while HPGE takes charge of the installation of power generating equipment and maintenance of the entire facility once the plant is operating. A separate unit known as the Department Hydropower Planning (DHP) was created to take care of planning and internal affairs of the Ministry.

Interestingly, the MoAs, MoUs and agreements to form joint-ventures with foreign companies to develop new hydropower projects in Myanmar are still signed by the head of the renamed HPID of EPM No 1. In reality, decisions about these projects and about which domestic hydropower projects are to be given priority in the allotment of funds appear to be made by the Electric Power Development Project Lead Committee under the direction of General Than Shwe. The work committee under the lead committee would appear to have the responsibility of apportioning dam building assignments between HPID and bodies under other ministries such as the Irrigation Dept which has a much longer history of involvement in dam construction and a much larger inventory of construction equipment to work with.

The Ministry of Electric Power No 2 (EPM No 2) has inherited what remains of MEPE, in particular the operation of the existing gas-fired and steam generating plants in Yangon, Mon state, and the Irrawaddy valley. As pointed out by Soe Win, the most important function of EPM No 2 is to provide impetus to the renewal of the national power grid and to prepare it for the coming on-line of the 790-MW Yeywa plant, perhaps as early as 2010. Three separate but related power supply project teams (north, central and south) under MEPE are engaged in this task. MEPE's mandate for the local distribution networks throughout the country has been handed off to two other newly formed agencies, the Yangon Electric Power Supply Board (YESB) and the Electric Power Supply Enterprise (EPSE) under EPM No 2. These two entities relate to the district and township electrical engineering offices which provide power service to the individual customers. The same agencies are also responsible for the re-invigorated meter box distribution program and the collection of electricity tariffs.

Since the re-organization of the electric power ministry, responsibility for power supply in rural townships not served by the national grid appears to have been spun off by MEPE and put into the hands of municipal power supply committees that make arrangements to purchase and maintain the generators and distribution systems in township centres and other large towns ([ELOV008B](#)). These committees are also charged with the responsibility of the financing and collection of revenues for these networks. Township electrical engineering offices maintained by MEPE would still appear to be responsible for the technical operation of these local systems.

EPM No 2 Khin Maung Myint whose name crops up in the official media two or three times a week is portrayed as a particularly energetic individual, rushing about here and there, meeting with suppliers and contractors, investigating difficulties, demanding answers, finding solutions to a myriad of problems. He and his Ministry certainly have a daunting task. As he pointed out to a meeting of the SPDC's Electric Power Development Project Committee soon after taking office, the grid-linked power stations in the country had a capacity at the time of almost 1550 MW, but actual production capacity was less than half of that figure for most of the year. Moreover, of six million kWh produced by the system in the previous year, more than a quarter had been lost in the transmission-distribution process. Recently, a YESB official put another face on the problem. He told a Myanmar Times reporter that Yangon power engineers have developed 79 different patterns of power distribution in the city to try to deal with the great imbalance between supply and demand at any given time.

Additional references

See above: 'Yangon electricity supplies get boost from [YESB plan](#)' (MT: 24/07/06)

See below: 'Yangon City Electric Power [Supply Board Law enacted](#)' (NLM: 23/11/05)

Htet Aung, IRROL, 09.03/11. Excerpt. Rewritten. http://www.irrawaddy.org/article.php?art_id=20901
Burma's new government will allocate will allocate 9.93pc of its total budget for fiscal 2011-12 to the two ministries of electric power. Together, they have been allocated a total of Kyat 669.93 billion (US\$ 760 million) of a total budget amounting to K 6.772.52 trillion (US\$ 7.65 billion). Electricity ranks fourth in spending priority after Defence which will receive 19.48pc, Energy, 14.9pc and Finance and Revenue, 13.72pc.

Kyaw Ye Min, NLM, 20/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-20.pdf>

EPM-2 is now implementing grid projects and main power station projects in states and divisions. Under the ministry are 18 small-scale hydropower plants generating [approximately] 35,859 [kWh] annually. **[Compiler's note:** Apparently, responsibility for supplying and servicing these small-scale hydropower projects is assigned to the Electric Power Supply Enterprise (EPSE) of EPM-2. Cf NLM, 07/02/09. Lt-Gen Khin Zaw of the Ministry of Defence inspects the Laingbar hydropower plant of EPM-2 in Falam township. . . . Later he inspects the Ngasickbar [Ngasitvar] hydropower plant of the Electric Power Supply Enterprise under EPM-2 [also in Falam township]. <http://www.burmalibrary.org/docs6/NLM2009-02-07.pdf>]

NLM, 11/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071211.htm>

A co-ordination meeting on power supply to the states and divisions including Yangon division was held at the meeting hall of the ministry in Nay Pyi Taw, on 8 December. After EPM No 2 Khin Maung Myint made an opening speech, Chief Engineers Tin Maung Tun and Aung Khine briefed the minister on work in progress. MD Tin Aung of EPSE, MD San Oo of MEPE and D-G Thein Tun of HEPD gave supplementary reports. After hearing the reports, Deputy EPM No 2 Win Myint reported on dealing with the public and efficient use of funds in running the project and timely completion of project tasks. Next, the minister called for close supervision in the supply of power as consumption is on the increase. He said the public should be made aware of [matters related to] power supply starting immediately.

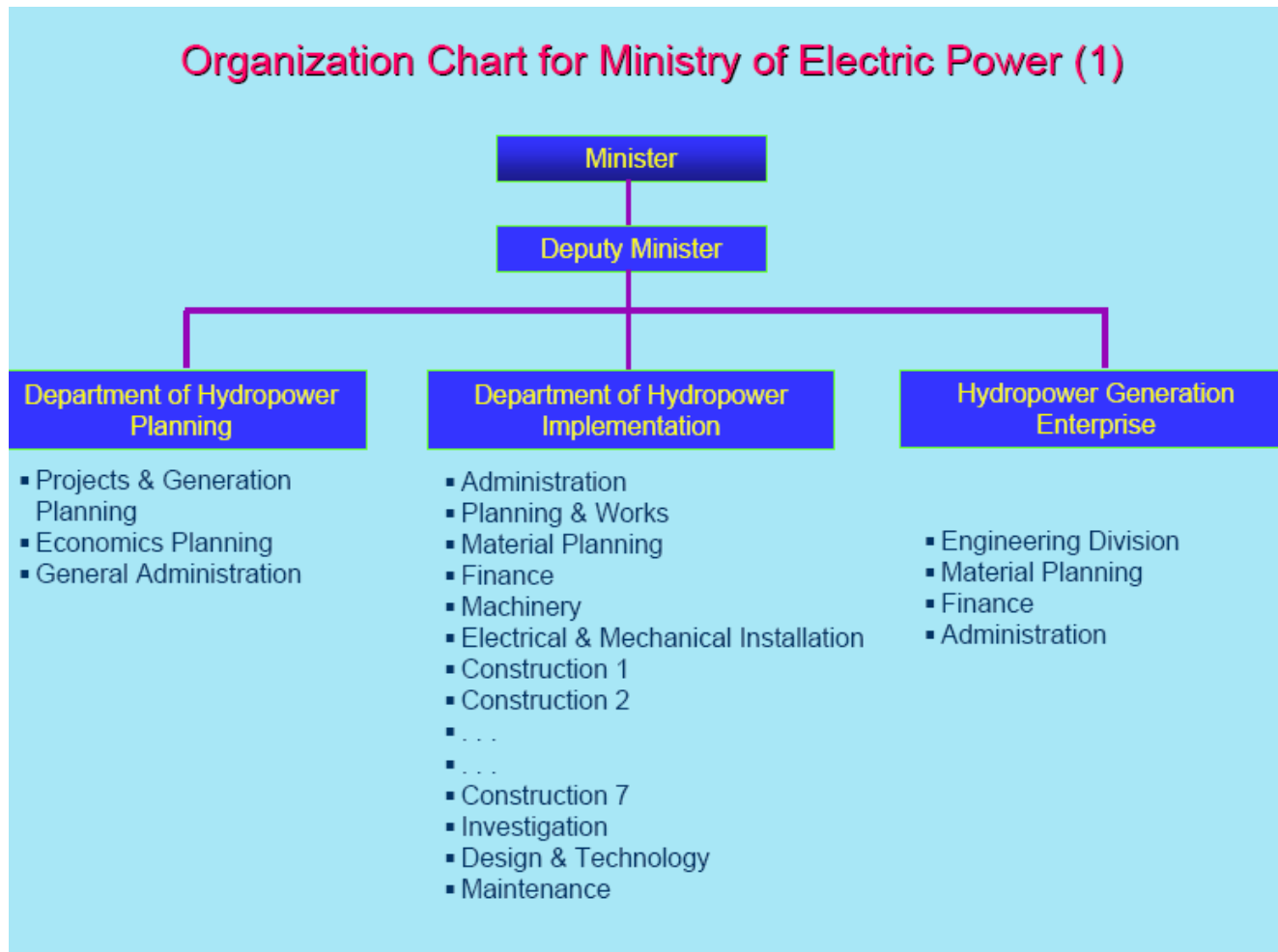
NLM, 05/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071105.htm>

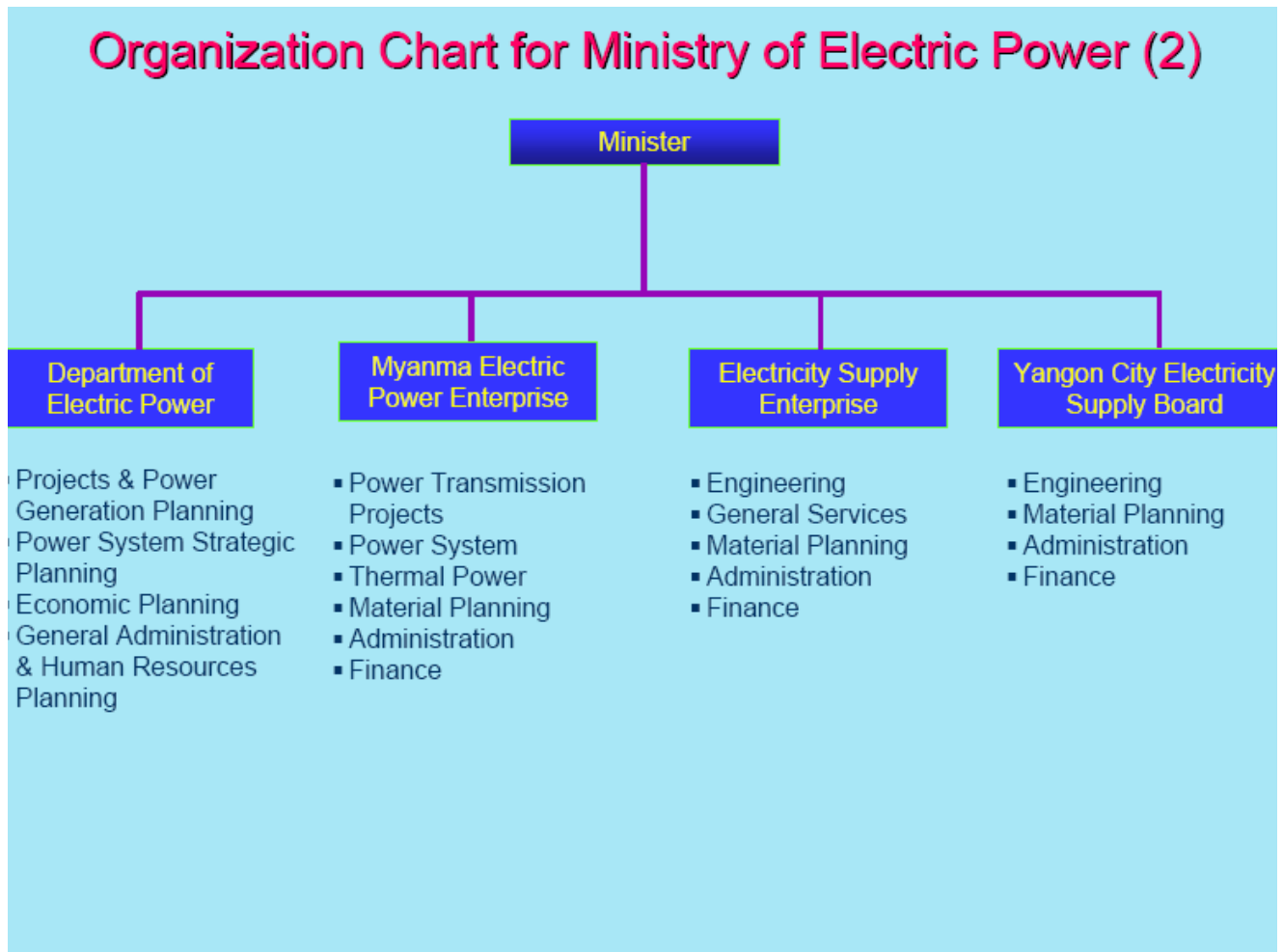
EPM-2 Khin Maung Myint accompanied by MD Tin Aung and officials of the EPSE inspected the 230/33/11 kV Naypyitaw-Pyinmana main power station on 31 October. Officials reported to the minister on supply of power from the station. The Naypyitaw-Pyinmana main power station is one of four important stations in Nay Pyi Taw. It has been installed with a 100-MVA transformer and a 60-MVA transformer and will supply

electricity to the Naypyitaw-Pyinmana region. Arrangements are being made to link it with the 230-kV power lines from the Shweli and Yeywa hydropower projects. The minister said that emphasis was to be placed on the communication system at the power station which the head of the station was to supervise.

Country Presentation Myanmar: Franco-ASEAN Seminar, 6-7 September, 2007.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf





Country Report on Infrastructure Development with a Focus on Public Private Partnerships (PPP)
http://www.unescap.org/ttdw/ppp/reports/Myanmar_6july2007.pdf

The Myanma Electric Power Enterprise under EPM No 2 is responsible for carrying out the construction of transmission lines and substations and the operation and maintenance of gas turbine power stations and combined cycle power plants.

Ye Lwin, Myanmar Times, 04/06/07. <http://mmtimes.com/no369/n002.htm>

The 11 hydropower stations and a coal-fired thermal power plant are operated by EPM No 1, which is responsible for supplying the national grid. The natural gas turbines and the remaining thermal plants are under EPM No 2, which is responsible for transmission.

Ye Lwin, Myanmar Times, 02/04/07. <http://mmtimes.com/no361/n003.htm> [Not available on-line]

The Ministry of Electricity was split into two separate entities last May, with EPM No 1 responsible for hydropower projects and EPM No 2 overseeing the transmission and distribution of electricity, in addition to managing the generation of electricity by natural gas.

MIC, 22/01/07. <http://www.myanmar-information.net/infosheet/2006/070122.htm>

Director-General of Myanma Electric Power Enterprise Dr San Oo and General Manager of IGE Pte Ltd signed an agreement to import construction materials for building Myaungdaga sub-power station on 18 January. Also present at the signing ceremony were the D-G of the Electric Power Dept, Dr Thein Tun, the D-G of Myanma Electric Power Enterprise Dr San Oo and the MD of the Electric Power Supply Enterprise U Tin Aung.

NLM, 30/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nln/n060730.htm>

The meeting (1/2006) of the State Electric Power Development Project Work Committee took place at the PM's office with an address by General Soe Win, chairman of the committee. It was attended by ministers, deputy ministers, directors-general and officials of the SPDC office and the PM's office, departmental heads and officials of the Ministries of Electric Power Nos 1 and 2. The Prime Minister said the development of electric power goes together with that of the socio-economy of the State. That is why the leading committee and the work committee for the State Electric Power Development Project were formed. The work committee is responsible for presenting the conditions of the projects being implemented and to be implemented to the leading committee. Presently, the State is taking steps to change the nation's agro-based economy to a system in which different kinds of industry can be set up. To bring this about, emphasis has been placed on boosting the power supply in order to develop both the agricultural sector and the industrial sector. This is why the Ministry of Electric Power itself was reconstituted into the two ministries, one to focus on generating electric power and the other to getting it distributed.

NLM, 17/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nln/n060717.htm>

A co-ordination meeting of EPM No 1 was held in Nay Pyi Taw and addressed by EPM No 1 Zaw Min. It was attended by Deputy Minister Myo Myint, directors-general, deputy directors-general, directors, plant managers and officials. The minister said the power supply sector plays a very important role in progress of the industrial sector. Strenuous efforts are to be exerted to complete construction of power plants. He urged officials to train junior engineers in order to increase their work efficiency. There were reports on the progress of projects, future tasks, arrival of heavy machinery and materials and the supply of power by project directors and plant managers. The GM of the Hydroelectric Power Production (aka Generation) Enterprise (HPGE) and the D-G of the Hydroelectric Power Administration Dept (HPAD) gave supplementary reports.

NLM, 07/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nln/n060607.htm>

Lt-Gen Kyaw Win of the Ministry of Defence met with responsible personnel at the meeting hall of Mandalay Division PDC and discussed matters on the use of electricity and fuel. The meeting was attended by divisional representatives, officials of EPM No 2 and the Ministry of Energy and others. Manager of Mandalay division MEPE U Kyaw Thauung reported on distribution of electricity in the division, steps being taken to prevent the loss and wastage of power and thrifty use of power in the division. After that, Head of Tagundaing Sub-power Station U Win Maung and Head of Aungpinle Sub-power Station Daw Aye Aye Min reported on acquisition of power and distribution of it.

NLM, 02/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nln/n060602.htm>

EPM No 2 Khin Maung Myint held a meeting with responsible personnel of YESB and gave necessary instructions. First, Col Khin Maung Soe of Yangon City Electric Power Supply Board briefed on formation of YESB and its set up and departmental functions. Responsible personnel replied to the questions raised by the minister regarding the tasks of the Board. Next, the minister made a speech saying that YESB launched its initial tasks on 1 April and it was set up with Yangon Division Electrical Engineering Office under it. Responsible personnel were to strive for supplying more electric power to Yangon City round the clock and speedy installation of electric meters. He said that they were to take action against those who were using electric power illegally. He also said that the staff were to cooperate with other related departments and should go on field trips.

NLM, 01/04/04. <http://www.myanmargeneva.org/04nln/n040401.htm>

The Work Committee for National Electricity Development held a coordination meeting that was addressed by the chairman, Lt-Gen Soe Win. Among those present were Sec'y No 2 Thein Sein, A&I Minister Nyunt Tin, Energy Minister Lun Thi, Finance Minister Hla Tun, EP Minister Tin Htut, D-G of the SPDC Office Pe Nyein, deputy ministers and officials. Sec'y No 1 Soe Win said that as electricity is the basic requirement for national modernization and regional development a Leading Cte for National Electricity Development led by General Than Shwe and a nine-member Work Cte had been formed to supervise and implement power projects. The work committee has two sectors – one for supervising the power projects and another for approving new projects. As there are plenty of the hydro-electric power projects to be implemented, it is impossible for the EPM alone to look after all of them because some are immense. They are to be

undertaken with the combined efforts of ministries concerned under the supervision of the SPDC. Therefore, the leading committee and work committees had been formed to implement the projects systematically. The work ctes are to provide necessary assistance for implementation of the projects providing correct priority.

ADB Power Interconnection and Trade Report (EGP-9), 18/11/03.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/egp9.asp>

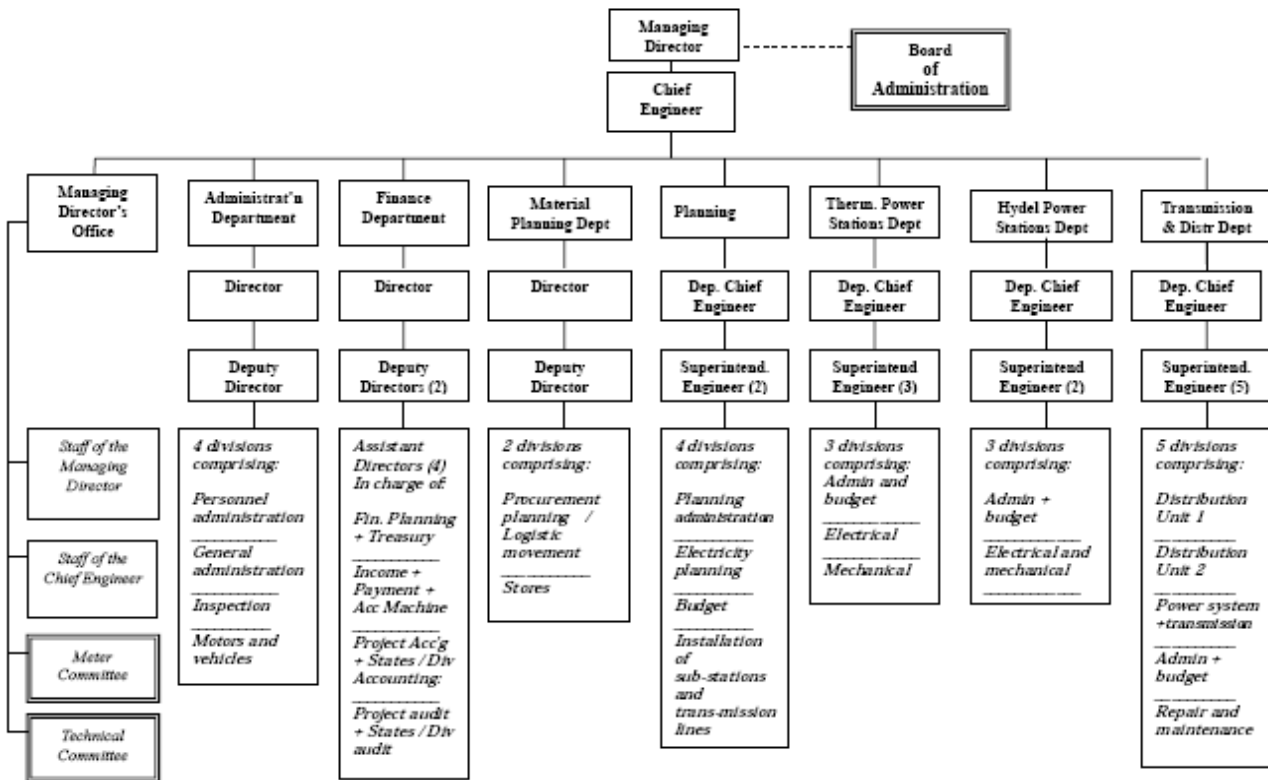
Section 22. Dr. Thein Tun, Director General, Ministry of Electric Power (EPM), recalled that the EPM was established in November 1997 to promote effective operation of the power sector. He said that MEPE was put under the EPM and that a newly established Dept of Electric Power acted as policy-making body as well as Secretariat to the Ministry. In January 2002, he noted that the DHP had been established to increase capacity for implementing hydropower projects. He gave a quick review of the policy and strategies of the EPM and presented the demand and supply situation of Myanmar's power industry. He gave the demand forecast for the next 10 years. He stressed that to meet future power demand, the EPM had laid down a 5-year short term and a 30-year long-term strategic plan. The first was to meet rapidly rising domestic demand, and consisted of plans to develop 14 hydropower stations and a coal-fired thermal plant, and 28 transmission lines and substations. He enumerated the objectives of the 30-year plan, which is to consider power trade with GMS, ASEAN and the BIMSTEC region.

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Final Report: Volume 1: Summary*, pp 5, 6, 20, 21, September 2003.

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=0000000000&filename=11734100_01.pdf&seqno=1](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=0000000000&filename=11734100_01.pdf&seqno=1)

Section 2.1. Introduction. Power Sector. The power sector is administered by the Ministry of Electric Power (EPM), under which there are two departments and one enterprise: the Department of Electric Power (EPD) responsible for policy making; the Department of Hydroelectric Power (DHP) responsible for investigations, designing and implementation of hydropower projects; and the Myanma Electric Power Enterprise (MEPE) responsible for operation and maintenance of hydro and thermal power stations, construction and maintenance of transmission and distribution networks, and management of electricity business such as tariff collection.



Source: MEPE

Figure 3 Organisation Diagram – Myanmar Electric Power Enterprise (MEPE)

As a State Economic Enterprise (SEE), MEPE relies on funds provided by the government. Its focus is not on increasing income, which is essentially allocated by the government, but rather on controlling expenditure to keep income and expenditure in balance. There has been no finance from the private market since 1989, when the authorities shifted all their financial requirements to the budget, and in effect finance became an inter-governmental budget allocation. MEPE's picture of financial performance in its financial statements is very different from reality for two major reasons. One is the gap between the official exchange rate and the real market exchange rate. The other is the subsidization on prices of fuels. MEPE's income statement has very low figures of interest and depreciation charges. This is because all foreign loans that the Government (not MEPE, since 1989) has taken out for power plant construction and equipment are charged to MEPE at the official exchange rate of only K6.3 to the US dollar. Another gap is in the fuel prices. MEPE buys fuels from MOGE at fixed prices, which are far below the inflation-sensitive market prices. The government prices of gas, oil and diesel are respectively K10/1000 cubic feet, K12/gallon, and K160/gallon. The market prices, which have been rising under inflation, are around \$1.00/gallon for oil and diesel and \$3.00/1000 cubic feet for gas. Assuming K1000=\$1.00, the government prices of gas, oil and diesel are only 0.3%, 1.2%, and 16% of the respective market prices.

Business Tank, July 2002. <http://mission.itu.ch/MISSIONS/Myanmar/t&b/electric.htm.html>

After Myanmar attained independence in 1948, the government established an 'Electricity Supply Board' in 1951, which held a monopoly in the electric power sector. The Electricity Supply Board was re-organized as the 'Electric Power Corporation' (EPC) in 1972 by the Revolutionary Council Government. The Ministry of Energy, formed in 1985, was responsible for exploration of oil and gas as well as electricity generation and distribution throughout the country. Finally, an independent entity was created by the State Law and Order Restoration Council government on the 15th November 1997 to deal more effectively with the electric power sector. Since then, the EPM and the state-owned MEPE under the ministry are responsible for the generation, transmission and distribution of electricity. **Compiler's note:** Other useful information and

pictures relating to the development of the hydropower potential of Myanmar is available on this site. An alternative website that hosts the same information is available at
<file:///D:/B%20Drive%20Folders/Burma/Electricity/ElectricitySectorBizTank00.htm>

ELECTRICITY RATES RAISED, SUBSIDIES FOR CIVIL SERVANTS DROPPED

Aye Aye Win, AP, 15/05/06. www.burmanet.org/news/2006/05/15

Myanmar's military government has raised electricity prices while at the same eliminating special lower rates for civil servants and the elderly, an official of the state electric power department said Monday. The move has been touted as a free market reform by the government, and comes directly after massive salary increases announced for civil servants on April 30. The new salaries appear to have been an effort to placate civil servants who in many cases were making less than US\$10 (euro 8.30) a month and were hit hard by fuel price increases last year. "As the country has adopted an open-market economy, everything has to be adjusted according to the market economy. However, the government will make a gentle and step by step increase so that the people will not face hardship," said Information Minister Kyaw Hsan last week when asked about the possibility of electricity rate increases.

Effective May 1, every household and religious building will pay the same rate of K 25 (US\$ 0.02, euro 0.015) per unit while industries will pay K 50 (US\$ 0.04, euro 0.03) per unit, said the official, who insisted on anonymity because he is not authorized to speak to the press. Under the previous rate table, there had been a sliding scale, ranging from K 2.50 (US\$0.002 or euro0.0015) to K 25 kyats (US\$ 0.02, euro 0.015) per unit, depending on the category of consumer and the amount used. The price for civil servants and pensioners had ranged between 50 pyas (US\$ 0.0004 or euro 0.0003) and K 25 (US\$ 0.02, euro 0.015).

"The new rate will have a bigger impact on government servants, retirees and low-volume consumers," said high school teacher Myint Soe, who is now getting K 44,000 (US\$ 33.80, euro 27.97) a month compared to K 10,900 (US\$ 8.38, euro 6.92) before the salary hikes. It is unclear how the electricity rate increases will affect the problem of power shortages, caused by inadequate domestic fuel supplies and a shortage of money to import oil. The government for years has been forced to use electricity rationing, even in the country's commercial capital and biggest city, Yangon.

Additional references

Grant Peck, AP, as published in the International Herald Tribune, 02/10/07.

<http://www.ihf.com/articles/ap/2007/10/03/asia/AS-FEA-GEN-Myanmar-Generals-Lair.php>

Rent is free for civil servants' quarters in both Rangoon and Naypyitaw, but in Naypyitaw the apartments are bigger. Water and electricity are also free here and the city enjoys a 24-hour supply of electricity, a rarity outside of military bases. **Compiler's Note:** Based on interviews in the new administrative capital of Naypyitaw in April 2007.

Mizzima, 06/09/07 http://www.bnionline.net/index.php?option=com_content&task=view&id=2419&Itemid=6

The recent hikes in fuel and electricity costs run contrary to the advice of leading academics asked to serve as consultants to the Union of Myanmar Federation of Chambers of Commerce Industry (UMFCCI), according to U Myint, a member of the advisory group. "The Central Executive Committee of the UMFCCI and its academic advisory group never presented a formal proposal to the authorities that energy prices should be doubled to meet rising public expenditures," writes U Myint. In a letter addressed to leading regional news agencies he reveals that the first meeting of the 10-member advisory team with UMFCCI officials was in April of 2006. The question to be addressed was how to generate revenue to cover the salary increase for public employees. Chief among the recommendations of a UMFCCI research team shown to the advisory group for feedback was a proposed increase in the price of gasoline from K 1,500 per gallon to K 3,000 along with an increase in the per unit charge of electricity from K 25 to K 100. Everyone in "the advisory group had considerable difficulty with the research team's proposals for meeting the additional budgetary costs of the public sector pay increase, especially with the recommendation to raise energy prices," reads the letter. U Myint, while acknowledging that energy prices in Burma are among the lowest in

the region, argues that the paltry per capita GDP of Burmese, estimated by the International Monetary Fund as \$170, is incapable of shouldering the burden of an increased financial liability resulting from a hike in energy charges. This, combined with a desperately lacking public services sector, U Myint states, is the primary reason why he could not support the UMFCCI research team's proposals. Though a document is now in circulation that makes it appear that the decision to raise energy prices was made in consultation and conjunction with UMFCCI and the 10-member advisory team, U Myint states this is patently "not true". "Academics like us play no role and are completely out of the picture in the decision-making process regarding issues that are of major concern to the people of Myanmar," continues the letter. For that reason, the consultancy group states it cannot be held responsible for policies unfolding in Burma be they positive or negative.

See above: '[Petrol subsidies](#) and the price of electricity' (Burma Digest: 02/09/07)
 'Fuel [price increase](#) impacts industrial use of electricity' (IRROL: 15/08/07)
 See below: '[Special privileges](#) alleged in electricity distribution system' (NCGUB: 21/05/01)
 '[Experts differ](#) over how to finance improvements in power supply' (MT: 11/12/00)
 'Generation, distribution, consumption of [electricity in Myanmar](#)' (World Bank: 18/08/99)
 'Myanmar reels under [huge electricity price hike](#)' (AFP: 03/08/99)

[THAHTAY CREEK DAM AND OTHER HYDROPOWER PROJECTS IN ARAKAN](#)

NLM, 20/04/06. <http://mission.itu.ch/MISSIONS/Myanmar/06n1m/n060420.htm>

General Than Shwe and party arrived at the site of Thahtay creek hydel power project under construction by the HPD on Thahtay Creek, 12 miles from Thandwe. At the briefing hall, Deputy EPM U Myo Myint reported to the Senior General on aims of the project, feasibility survey works, the site for construction of the main embankment, future tasks and facts about the project. A&IMin Htay Oo briefed the Senior General on tasks in connection with hydel power projects and dam projects. In response, General Than Shwe gave guidance saying that officials of the two ministries are to collaborate by applying appropriate technology for timely completion of the projects without delay.

General Than Shwe and party inspected samples of rock extracted from the project, the site chosen for construction of the dam, and construction tasks being carried out with the use of heavy machinery. Thahtay Hydel Power Project will be connected to the national power grid and will supply power to regions of Rakhine state and other areas. The dam will also serve to prevent floods in the region. The dam will be 1,740 feet long and 280 feet high. Three 34-megawatt turbines will be installed. **Compiler's Note:** A picture of construction activity at the site accompanies the article.

Topographic map references:

Burma 1:250,000: Series U542, U.S. Army Map: NF 46-08: Prome
 Thahtay [Thade] creek dam, 12 mi NE of Thandwe [18° 28' N, 94° 22' E], grid sq reference: 9\6, 23\6 [?]
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne46-8.jpg>
 Burma 1:250,000: Series U542, U.S. Army Map: NF 46-03: Kyaukpyu
 Ann creek dam, 10 miles from Ann [19° 47' N, 94° 02' E], grid square reference: 11\2, 23\2 [?]
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne46-8.jpg>
 Burma 1:250,000: Series U542, U.S. Army Map: NF 46-12: Henzada
 Kyeintali creek dam, 38 miles SE of Kyeintali [18° 00' N, 94° 29' E], grid square reference: 8\5, 23\9 [?]
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne46-12.jpg>
 Burma 1:250,000: Series U542, U.S. Army Map: NF 46-14: Akyab
 Saingdin Falls in Buthidaung township [co-ordinates n.a.], grid square reference: 12\4, 21\6 [?]
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-14.jpg>

Additional references

Data summary [Ann creek](#)
 Data summary [Thahtay creek](#)

See above: 'Sai Tin hydropower project plans announced' (NLM: 28/01/09)
 'Mini-hydro facilities slated for [dams in Kyauktaw township](#)' (NLM: 26/11/08)
 'Bangladesh, Myanmar to sign hydropower deal' (Xinhua: 15/07/07)
 See below: 'Electric power supply in Arakan state' ([Appendix 10A](#))

Agreement signed during visit of General Than Shwe to India, 29/07/10.

<http://www.burmanet.org/news/2010/07/29/mea-government-of-india-joint-statement-during-the-visit-of-chairman-state-peace-and-development-council-of-myanmar/>

Myanmar expressed its appreciation for the line of credit of US\$ 64 million by India for transmission lines to be provided executed through India's M/s. PGCIL [Power Grid Corp of India Ltd].

NLM, 10/06/10. <http://www.burmalibrary.org/docs09/NLM2010-06-10.pdf>

On an inspection tour of Thahtay dam project, EPM-1 Zaw Min checks on construction of tunnels 1 and 2, earth work on the diversion tunnel and steel lining and rock bolt installation. He also inspects work on the main embankment and diaphragm wall and is briefed on follow-up tasks. [The print edition of NLM includes an aerial photo of the dam site.]

NLM, 19/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-19.pdf>

Prime Minister Thein Sein visits the worksite of Thahtay hydropower project. The dam across Thahtay creek will be 2028 feet long and 298 feet high. Two diversion tunnels are being dug. The power plant will have a generating capacity of 111 megawatts and is expected to produce about 386 million kilowatt hours a year. So far, the project is 20.24pc complete. Power produced will be able to satisfy the electricity demands of the whole southern part of Rakhine State. [A photo of the embankment is included in the print edition of NLM.]

Power Grid Corp of India Ltd, Annual Report of the Board of Directors: 09/09/09.

<http://deadpresident.blogspot.com/2009/10/annual-report-power-grid-2008-2009.html>

Powergrid has been identified as the implementing agency for a 230-kV transmission project in Myanmar to be funded by the Gov't. of India through a soft loan. The project involves construction of a transmission network of 230-kV transmission lines approximately 300 miles long, 50 miles of 66-kV transmission lines besides construction of 3 nos. new 230/66/11-kV new substations, one no. 230-kV substation extension and one no. 66/1- kV new substation.

NLM, 04/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-04.pdf>

EPM Zaw Min inspects the An creek hydel power plant project being constructed on An creek north of An on 30 March. The project will be equipped with two five-megawatt generators and will supply power to central Rakhine State as well as to the national power grid. He also tours the Saidin hydel power project in Buthidaung township on 31 March. It will be equipped with generators with a combined capacity of 76.5 megawatts and will produce 236 million kilowatt hours per year. [A photo of work at the dam site of the An project is included in the print edition of NLM.]

NLM, 03/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-03.pdf>

EPM No 1 Zaw Min visits Thahtay hydropower project which will supply electricity to the southern region of Rakhine State through the power grid. When completed, the power plant of the project will have a generating capacity of 37 MW (sic) and produce 386 million kWh a year. [An excellent frontal aerial view of the dam project accompanies the news item in the print edition of NLM.]

NLM, 08/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-08.pdf>

In a box listing projects for the development of Rakhine state, Thahtaychaung in Thandwe township (111.0 MW) and Anchaung in An township (15.0 MW) are noted as hydropower projects under implementation. Kyeintali in Kyeintali township (28.0 MW), Thandwechaung in Thandwe township (39.0 MW) and Sai Tin in Buthidaung township (70.0 MW) are noted listed as projects to be implemented. Photos of the sites of the Thahtaychaung and Sai Tin hydropower sites are included in the print edition of NLM. The Laymyo [Lemro] hydropower project (see NLM: 16/11/08 below) is not mentioned.

NLM, 28/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-28.pdf>

On a visit to Sittwe, PM Thein Sein announces that the Sai Tin (Saingdin) hydropower plant is to be built soon in Buthidaung township to provide electricity in the northern part of Rakhine state. A lake is to be created where rainwater will be stored. This will make it possible to generate power during the summer when water is scarce. It is expected that the plant will be able to produce 236 million kilowatt hours a year which will be supplied to Sittway, Buthidaung, Maungdaw, Kyauktaw, MraukU and Minbya. On the same occasion, EPM No 2 Khin Maung Myint reports on arrangements to link the power grid system in the rest of the country to the Rakhine, Kachin, Chin and Shan East states and Taninthayi division.

NLM, 13/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-13.pdf>

SPDC Vice-Chairman General Maung Aye and senior officials of the military regime visit the hydropower project on Thahtay creek on 11/01/09. EPM No 1 Zaw Min presents a report on the water resources in Rakhine State from which electric power can be generated, including the 111-megawatt Thahtay Creek project and the 10-megawatt capacity An Creek project, both presently under construction, and the 500-MW Laymyo and the 76.5-MW Saidin projects which are in the planning phase. The Thahtay creek preproject will have three 37-MW turbines. Work is underway on two diversion tunnels, the first, 2326 feet long, and the second, 1875 feet long. Construction of the main is also being carried out. The spillways and pen stocks already exist in skeletal form. Deputy minister U Myo Myint explains the design of the main dam and the plan to use a Bauer trench cutter for inserting 'retaining walls' in the dam. Retaining walls may have to be used in the Ngahlight [Maleik?], Mong [Mone?] and Thapansaik dams. Gen Maung Aye presents gifts to the foreign technicians assigned to the project. After a 'foundation' ceremony, the trench cutter is put into place and its earth cutting capabilities are demonstrated..

Compiler's note: Photos of the trench cutter are included in the print edition of NLM. For a brief, non-technical description of the use of trench cutters in dam construction see the article, "Cut-off wall construction at Peribonka dam" in Waterpower Magazine (19/01/07).

<http://www.waterpowermagazine.com/story.asp?storyCode=2041550> For technical details, consult the article, "Bauer trench cutting systems". <http://www.bauer-foundation.com/en/maschinenbau/produkte/schlitzaendgeraete/schlitzwandfraesen/pdf/uebersicht.pdf>

Singu Soe Win and Tin Soe, NLM, 26/11/08. <http://www.burmalibrary.org/docs6/NLM2008-11-26.pdf>

The Myanmar Alin team visited Thahtay hydropower project under construction by Group 6 of the hydropower department near Shwehlay village, about 25 miles northeast of Thandwe in southern Rakhine state. Work continues on the main dam, which is now 76.9pc complete, and two 33- foot-diameter tunnels that are 46.6 pc complete. No 1 tunnel is 2326 feet long and No 2 tunnel is 1875 feet long. The twin spillways are 7.7pc complete and the intake structure, 20.9pc. A 29-foot-diameter, 485-foot-long highpressure steel pipeline [will serve as the penstock for the powerhouse]. Three 37-MW vertical Francis-type turbines will be installed. The hydropower station will be able to generate 386 million kWh per year. The project was launched in 2005 and is due to be finished in 2012. [This feature article originally published in Myanmar Alin on 24/11/08 is accompanied by several photos in the print edition of NLM. Two of them show "land consolidation work . . . being carried out to prevent stored water from seeping through the dam".]

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

At the co-ordination meeting (1/2008) of the Special Projects Implementation Committee in the office of the Commander-in-Chief (Army), EPM No 1 Zaw Min gave a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the Committee. [Among the fifteen are] the Laymyo [Lemro] hydropower project (500 megawatts) in Rakhine state.

NLM, 28/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-28.pdf>

Maj-Gen Khin Zaw of the MoD visits the An creek hydropower project of HPID, 3.5 miles north-east of An. [A photo showing the current state of the embankments under construction at the An dam is included in the print edition of NLM. There is little sign of activity at the site.]

P. S. Suryanarayana, The Hindu, 18/10/08

<http://www.thehindu.com/2008/10/18/stories/2008101888881800.htm>

[During his visit to Burma], Union Minister of State for Commerce, Industry and Power, Jairam Ramesh held discussions with Burma's Electric Power Minister Zhaw Min. These centred on the timelines of two India-

aided projects and the overall competitiveness of Indian expertise. Myanmar was assured that there would be no slippage in respect of the ongoing 1,200-MW Thamanthi project in the Chindwin basin and the 111-MW Rakhine unit. Col. Zhaw Min pointed out that the cost-per-MW in China-aided projects was almost one-half of that in regard to the Indian venture.

Asia Pulse, 15/10/08. <http://www.burmanet.org/news/2008/10/15/>

The Exim Bank of India has concluded an agreement with the Myanmar Foreign Trade Bank to provide a Line of Credit of \$84US.07 million for financing exports from India and to fund the setting up of three transmission lines and an aluminium factory in Myanmar. Under the agreement . . . the Exim Bank has extended \$64US.07 million for the three transmission lines Thahtay Chaung Oakshitpin 230KV, Thahtay Chaung Thandwe- Maei Ann 230 KV and Thandwe-Athoke 230 KV to be executed by Power Grid Corporation of India in Myanmar. Out of the total credit by Exim Bank under this agreement, it said, the goods and services of the value of at least 85pc of the contract price shall be supplied by the seller from India, and the remaining goods and services (other than consultancy services) may be procured by the seller for the purpose of eligible contract from outside India.

NLM, 29/09/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080929.htm>

A Baucer [Bauer] trench cutter (BC-32) needed for construction tasks at the Thahtay hydropower project is being sent from the Htamanthi hydropower project near Tazone village, 30-miles north of Homalin. [See notes above (NLM, 13/01/09) for more details on the use of trench cutters in dam construction.

NLM, 24/07/08. <http://www.burmalibrary.org/docs5/NLM2008-07-24.pdf>

Thahtay hydropower project is on Thahtay Creek, 12 miles north-east of Thandwe. The project covers a watershed of 442 square miles. In the dam area, the creek flows at a rate of 3,391 cuft/ secs on average, supplying 2.332 million acre feet of water yearly. The dam's gravel-filled embankment will be 2,028 feet long and 298 feet high. It will be able to store 0.696 million acre feet of water at high high level mark and 0.221 million acre feet at still water level. The embankment will have two 33-foot-wide, ogee-type spillways and two 33-foot-wide water diversion tunnels. Three 37-MW generators will generate 386 million kilowatt hours yearly. An creek hydropower project will have a 10-MW generator. Power lines will connect the two plants to all parts of of Rakhine State. [A good aerial photo of the Thahtay dam site is included in the print edition of NLM.]

Sanjay Jog, Financial Express, 17/07/08.

<http://www.financialexpress.com/news/PowerGrid-Corp-transmission-network-to-light-up-Myanmar/336477/>

The state-run PowerGrid Corporation of India has embarked upon a plan to set up transmission lines in Myanmar. The power ministry and PowerGrid Corporation, which is a central transmission utility in India under the Electricity Act, have already held talks in this regard. The power ministry has asked the PowerGrid Corporation to send a delegation to Myanmar in regard to the execution of the transmission works there. Sources at the power ministry and PowerGrid Corporation said, "PowerGrid Corporation will be the executing authority for three transmission lines in Myanmar. The Centre has supported Exim Bank of \$64.07 million to Myanmar for setting up of the transmission infrastructure. The distribution of this credit amount among different transmission network is as follows. Thahtay Ghauung-Oakshitpin 230 kv transmission line (\$13.577 million), Thahtay Chaung-Thandwe-Maei-Ann 230 kv transmission line (\$30.5 million) and Thandwe-Athoke 230 kv transmission line (\$20 million)."

Thet Khaing, Myanmar Times, 30/06/08. <http://www.mmtimes.com/no425/n008.htm>

India agreed last week to provide US\$84 million in loans to Myanmar to finance upgrades of electricity supply infrastructure in Rakhine State and Ayeyarwady Division. According to the agreement, which was signed in Nay Pyi Taw on Tuesday, India will loan Myanmar \$64 million to install three power transmission lines connecting Thahtay Chaung hydropower project in Thandwe, Rakhine State, to other areas in the state as well as to Ayeyarwady Division. An additional \$20 million will be loaned for the construction of a factory that will produce 14,000 tonnes of power cables a year. The loans, which will be implemented by the state-owned Power Grid Corporation of India, were granted by the government-owned Export-Import Bank of India.

The Hindu, 28/06/08. <http://www.thehindu.com/2008/06/28/stories/2008062854731600.htm>

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NLM, 25/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-25.pdf>

An Indian delegation led by Minister of State for Commerce and Power Shri Jairam Remesh called on Minister for National Planning and Economic Development U Soe Tha at the ministry in Nay Pyi Taw where they frankly discussed matters on bilateral co-operation in economic and trade sectors. After the meeting, the two ministers signed a Bilateral Investment Promotion Agreement. A credit line agreement between the Exim Bank of India and the Myanmar Trade Bank for \$ 20 million for financing the establishment of an aluminium conductor steel reinforced (ACSR) wire manufacturing facility and a credit line agreement between the Exim Bank of India and the Myanmar Foreign Trade Bank for \$ 64 million for financing three 230-kV transmission lines in Myanmar were signed by Managing Director of the Myanmar Foreign Trade Bank Than Yi and Sunil Trikha of the Exim Bank. The Agreement for providing the banking arrangement was signed by managing directors of the Myanmar Foreign Trade Bank and Myanmar Investment and Trade Bank and Mr Ashok Rai of the United Bank of India.

NLM, 26/01/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080126.htm>

EPM No 2 Khin Maung Myint meets with MD Ajay Krishna Goyal and party of Angellque International Ltd of India with regard to 230-kV power line projects such as the Thahtaychaung-Okshitbin, the Thahtaychaung-Maei-An and the Thahtaychaung-Gwa-Athok projects.

Times Of India, 02/11/07. <http://www.rebound88.net/>

India's Export-Import Bank (Exim Bank) has extended a US\$60 million Line of Credit (LoC) to the Myanmar Foreign Trade Bank to finance the Thahtay chaung hydropower project. The agreement was signed in Rangoon on Oct 29 by S R Rao, on behalf of Exim Bank, and Than Ye, MD of Myanmar Foreign Trade Bank. Under the LoC, Exim Bank will reimburse 100pc of the contract value to the Indian exporter, upfront on the shipment of goods.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%20Tin%20-%20Myanmar%20-%20Presentation.pdf

Thahtay dam and power station with a planned capacity of 102 MW is under implementation by the HPID. It will generate 394 million kWh annually when it comes on line in Dec 2009. Ann dam and power station with a planned capacity of 15 MW is under implementation by the HPID. It is expected to generate 65 million kWh annually when it comes on line in 2009.

NLM, 03/04/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070403.htm>

EPM No 1 Zaw Min visits Thahtay hydel power project in Thandwe on 30 March; it will be equipped with three 37.5 MW generators. Zaw Min also visited An Chaung Hydel Power Project on An Creek on 31 March; work on the main dam is underway at the project about 3.5 miles north-east of Ann; the generators there will have a capacity of 15 MW and are expected to produce about 65 million kWh per year.

Myanmar Times, 13/11/06. [Issue 342 of MT is not available on-line]

An official of EPM No 1 said the Dept of Hydroelectric Power (DHP) is conducting a feasibility study to build a hydropower station about 16 km (10 miles) upstream from the village of Ann in Rakhine State. "The department is building camps and roads to facilitate the project," the official said, adding that the station will include three turbines capable of producing a total of 15 MW of power.

Thiha Aung, NLM, 25/04/05. <http://www.ibiblio.org/obl/docs3/NLM2005-04-25.pdf>

Thahtay Chaung Hydropower Project will be implemented on Thate Creek 15 miles north-east of Tandwe; it will supply electricity to southern Rakhine State and contribute power to the grid. It will be a 'zone-type' dam with a central [earth] core, 1,300 feet long, 250-feet high. Maximum water storage capacity will be 340,000 acre feet, 216 feet deep. It will be able to generate 100 MW and provide 318 million kilowatt hours annually. The project will assist in the development of Thandwe and hotel services on the Ngapali Beach Resort. In addition, An Chaung hydropower project will be launched on An Creek, 3.5 miles north-east of An. It is designated for regional development. The dam there will be 1,600 feet long and 140 feet high and will have a storage capacity of 399,400 acre feet. During the first phase, it will be able to generate 5 MW and

produce 33 million kilowatt hours a year; in its second phase, it will generate 10 MW and produce 53 million kilowatt hours a year.

NLM, 18/04/05. <http://www.myanmargeneva.org/05nln/n050418.htm>

Thahtay Creek hydro-electric power project will be on the Thahtay Creek, about 15 miles north-east of Thandwe; it will be a zone type dam with a central earth core, 1300 feet in length and 250 feet in height. The water storage capacity of the dam will 340,000 acre feet; the hydropower station will be able to generate 100 MW; annual power supply is estimated at 318 million kWh.

Narinjara News, 11/05/05. www.burmanet.org/news/2005/05/11/

Three power plants are being built in Arakan State, but the people have little faith these plants are for their benefit. One project is in Ann township where the headquarters of the regional military command is located and at least five battalions and a brigade are based; the Ann Chaung hydro-power plant will be 3.5 miles north-east of Ann, and will produce 53 million kilowatt hours annually, a second plant in Sandoway (Thandwe), near the well-known beach resort centre of Ngapali is targeting the tourist sector, it will generate 318 million kilowatts hours annually; a third plant will be built in Gwa township where the Khaung Tha beach resort is located. In 1989, the military junta also attempted to build a well-publicized hydro-power project at Sai Dunn Water Fall, in Buthidaung township; however, it was withdrawn 3 years later without any explanation; every government, since that of U Nu, has tried to woo the people of Arakan with the promise of building a power plant at Sai Dunn.

NLM, 03/12/04. <http://www.myanmargeneva.org/04nln/n041203.htm>

Using maps and charts, EPM Tin Htut reports to Gen Than Shwe on the the Thahtay creek, Thandwe creek, and Kyeintali creek hydel power projects to be carried out in the southern Arakan region. Than Shwe gives guidance that priority should be given to the Thahtay creek project. He wants a feasibility study and survey for the An Creek project carried out as soon as possible. A preliminary survey showed that a 15-MW power station could be built on An creek. The Thahtay creek project, 15 miles north-east of Thandwe, will have a 100 MW capacity; priority will be given to supplying power to the Thandwe region and the hotel industry in Ngapali beach. The 30-MW Thandwe creek hydel power station will be on Thandwe Creek 13 miles SE of Thandwe town. Kyeintali creek hydel power project will be located 38 miles south-east of the town. It will be installed with 28-MW turbines.

YAZAGYO DAM TO CONTRIBUTE TO DEVELOPMENT OF MYITTHA VALLEY

NLM, 12/04/06. <http://burmalibrary.org/docs2/NLM2006-04-12.pdf>

Lt-Gen Ye Myint of the MoD, A&IM Htay Oo and EPM Tin Htut visited the Yazagyo Dam Multi-purpose Project site near Yazagyo Village on 7 April. Minister Htay Oo reported on the significance of the project for the development of the Myittha valley area and its potential for crop irrigation and the generation of electric power, while Director U Victor of Construction Group 4 of the ID reports on construction of the diaphragm wall of the dam.

The earth dam will be 4,745 feet long and 165 feet high. It is situated on Nayyinsara Creek, [which empties into the Myittha river near Kalaymyo]. Water storage capacity at full brim will be 52,000 acre feet. It will be able to supply water to 6,500 acres. Two Kaplan-type turbines installed at the dam will generate 21 million kwh annually.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-03: Mawlaik Yazagyo [23° 30' N, 94° 06' E] and the Nayyinsara creek, can be seen in grid square reference: 34\5, 30\0. <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-3.jpg>

Additional references

NLM, 21/10/10. Edited and condensed . <http://www.burmalibrary.org/docs09/NLM2010-10-21.pdf>

Work on the diaphragm of the Yazagyo dam on Nerinzara Creek, which was started in 2004, was completed in October 2010. There is an inflow of 244,780 acre-feet from the Khamauk and Talon hills of the Chin mountain range into the creek. The dam will be able to store 80,000 acre-feet and has a watershed area of 130 square miles. Altogether the embankments will be 13,690 feet long including the 4745-foot-long main embankment. There are three saddle dikes. The concrete spillway, which will 330 feet wide and 568 feet long, is under construction on saddle dike no. 3. The hydropower plant will be built on saddle dyke no.1. Plans call for the intake structure of the power plant to be completed in 2010-11. The steel penstocks will be 1562 feet long. Two 2-MW generators will be installed in the powerhouse in 2011-12. The power will be supplied to Kalay. Although Kalay township receives 63 inches of rainfall annually, but is dry in the summer. The dam will irrigate 2000 acres in 2010-11 and 4500 acres 2011-12. It will be used to cultivate summer paddy. [Aerial photos of the dikes are included in the print edition of NLM.]

NLM, 06/02/10. <http://www.burmalibrary.org/docs08/NLM2010-02-06.pdf>

PM Thein Sein visits the project site of Razagyo multipurpose dam project on Nerinzara Creek, two miles north of Razagyo village in Kalay township. The dam will be able to store a maximum of 52,000 acre-feet of water. The earthen embankment will be 4745 feet long and 165 feet high. The main embankment will be 13,690 feet long and three saddle dikes, 8,945 feet long. The main canal will be nine miles long and the tributary canals, 8.25 miles long. The dam will have 80 canal structures and will irrigate 6500 acres of farmland. A 4-MW generator at the dam is expected to produce 21 million kwh annually. [An aerial view of the Razagyo dam project is included in the print edition of NLM.]

NLM, 11/09/09. <http://www.burmalibrary.org/docs07/NLM2009-09-11.pdf>

On a tour of Kalay township, Lt- Gen Tha Aye of the MoD looks into work being carried out on Kongyaw and Tanngyaw dams, mentioned as being part of the of Yazagyo multi-purpose dam project.

NLM, 04/02/08. <http://myanmargeneva.org/NLM2008/eng/2Feb/n080204.pdf>

Work on the spillway is underway. [A photo on the first page of the print edition of NLM shows the site where extensive land clearing operations have taken place.]

NLM, 29/11/05. <http://burmalibrary.org/docs2/NLM2005-11-29.pdf>

PM Soe Win visits the site of the Yazagyo dam. It is reported that it will benefit 6,500 acres and that the power plant at the site will have a generating capacity of four megawatts. After hearing the target date for completion of the facility, the PM gives instructions on full power supply in the rainy season, full irrigation water supply for monsoon and summer crops cultivation and efficient use of water from the spillway. [A photo of earth work being carried out at the site is included on the back page of the print edition of NLM.]

NLM, 07/12/02. <http://myanmargeneva.org/02nlm/n021207.htm>

On a visit to Kalaymyo, Gen Than Shwe is briefed by A&IM Nyunt Tin and EPM Tin Htut on the Yazagyo dam project and its hydel power generation potential. The Myaungchaung (Kyawywa) dam project, which is intended to irrigate farmland, is also reported on. In his guidance the senior general stresses that "survey work is to be conducted as to how much electricity will be produced by the Yazagyo dam project". It will be necessary to implement the two projects at the same time, he says. Yazagyo dam will be built on Nayrinsara creek about two miles north of Yazagyo village in Kale township. Myaungchaung (Kyawywa) dam will be constructed on Myaunhaung creek about four miles north-west of Kyawywa village in Kale township. On completion, it will irrigate 6,500 acres of farmland in the region.

TRIBE'S HOME TO BE A VALLEY OF THE DAMMED

Richard Lloyd Parry, The Times of London, 22/03/06 [Abridged].

<http://www.timesonline.co.uk/tol/news/world/asia/article743880.ece>

Even in the dry season, and even in this time of war and uncertainty, the Salween River is a majestic waterway. It runs 1,900 miles (3,060 km) from the high Tibetan mountains to the Gulf of Martaban, and along its great length there are few places more remarkable than Weigyi, on the border of Burma and Thailand. Here the god of the Salween shows himself in the form of a notorious whirlpool that churns the

waters and can even drag a boat under. Locals leave offerings of rice, flowers and bananas to appease the deity and to thank him for the prosperity he brings. But now ominous signs have appeared, signs that promise disaster for the people of the Salween and their god.

They come in the form of yellow marks painted on the rocky banks and a concrete plaque laid by Thai engineers. If their plans go ahead Weigyi will be transformed from a jungle shrine into a massive hydroelectric dam. The rocky cliffs will be replaced by concrete walls and throbbing turbines. The jungle will be penetrated by rumbling roads and high security fences.

Five dams are jointly planned by the Thai and Burmese Governments; far upstream China proposes building 13 more. If only a few go ahead, the Salween, the longest undammed river left in south-east Asia, will be chained. Conscious of the potential for bad publicity, the Thai and Burmese governments have kept secret their precise plans for dam building. But The Times has obtained a copy of the MoU between them last December.

"As long as I have lived here my family has been totally dependent on the Salween for our livelihood," says Htoo Lwee, a member of the Karen ethnic group that lives in the village of Hoekey, a few miles below the proposed dam site at Weigyi. "The river gives us a living from fishing and from boating. It is our life and our mother. If the dam is constructed we will not be able to live." The Salween is home to 70 species of fish including catfish, eel, featherback and carp who thrive in its surging rapids and deep pools. The dam would create a still-water lake to which they are ill-adapted.

The dam's opponents calculate that the reservoir will be 640 sq km — the size of Singapore. It will destroy rice paddies, vegetable fields, 26 villages and two entire towns. Temples and palaces will be submerged; 22,000 people will lose their homes and 8,000 more will lose their livelihoods.

It will destroy forever the towns of Pasaung and Bawlake, the historical capital of the Karenni people, and the site of royal palaces and Buddhist temples and stupas (holy sites). The traditional homelands of one entire tribe, the dwindling Yintalai, who number just 1,000, will disappear. The river's backed-up waters will flood rice fields and the garden plots of beans, tobacco, and chilli with which families support themselves during the dry season. It will block what locals refer to as the "Salween highway", and the trading boats which carry rattan, honey and buffalo from the Karen and Karenni territories across the river to Thailand.

Still worse, in the eyes of many of the locals, the dam project will draw into the area the notorious armed forces of the Burmese junta, which have been enslaving, raping and killing the local tribespeople for decades. "These dams will not only spell the gradual genocide of indigenous peoples, but will also inflict a death sentence on endangered animal plant and plant species," says Pascal Khoo Thwe, author of the acclaimed memoir of his Burmese childhood *From the Land of Green Ghosts*.

"There is no better way to destroy a country than by the combined power of guns and bulldozers. Show me a cup of dam water and I will tell you stories of human misery, and cries of dying animals and plants."

This is one of the most isolated and chaotic corners of Asia, a place of guerrillas and refugees, where no government holds sway. The tribespeople of eastern Burma, particularly the Karen and the Karenni, have always resisted government by the rulers in Burmese capital, Rangoon, whether they be British imperialists or their successors, the generals of the military junta called the State Peace and Development Council (SPDC).

Karen armed groups have fought a scrappy war against the Burmese since independence 58 years ago but have recently found themselves driven into an ever-narrower strip along the Thai border to where tens of thousands have fled the fighting. It is in one of these pockets, a sanctuary from the depredations of the SPDC, that the Weigyi dam will be built. When an earlier dam was built on the Baluchaung river in the 1960s, 24 Burmese battalions moved into the area. Human rights groups have gathered numerous accounts of the rapes, forced labour and arbitrary killings and arrests that were inflicted upon the local Karenni population.

Among the biggest victims were members of the Padaung tribe, famous for the “long neck” women who stretch their necks with brass rings. Numerous local people were killed or injured by landmines scattered as a security measure in the fields around the dams. But despite the energy generated by the hydroelectric plant, villages lying literally underneath the power lines received no electricity. “Instead of getting benefits from the dam, we will have only curses,” says Seem Wen, a local village head and a major in the Karen National Liberation Army. “Human rights abuses, forced labour, killings. There will be many more refugees. If the dam is built, we will definitely show a military response.”

But it is not only the Burmese junta, one of the world's most cruel and obdurate regimes that will benefit from the dam. The 5,000 megawatts of electricity generated will be channelled into the growing and energy-hungry towns of neighbouring Thailand. It is this that gives the anti-dam campaigners some hope. For, while the SPDC cheerfully flouts human rights with little apparent concern for the opinion of the outside world, Thailand is a lively democracy. “The SPDC does whatever it likes,” says Nay Thablay, of the organisation, Karen Rivers Watch. “But in Thailand are many people who sympathise with us and we must motivate them to put pressure on their own government.”

The anti-dam campaigners are mobilising what few resources they have. A group of young people have formed a pop group, Salween Angels, and recorded songs protesting against the dam's construction. Activists are sailing down the river, warning local communities and organising demonstrations. “Even if we cannot stop this,” says Htoo Lwee, “we have to try for the sake of our river.” But they are a few thousand stateless, almost voiceless, people against two powerful governments, and they are realistic about their chances of success. If the dam at Weigyi is stopped, it will be a triumph of local determination. If not, then the rest of the world may hardly notice that the turbulent, vigorous god of the Salween has been reduced to a placid pond.

Topographic map references: Thailand 1:250,000: Series L509, U.S. Army Map: NE 47-06: Chiang Mai Weigyi dam, just west of Hokki [18° 18' 49" N, 97° 34' 49" E], grid square reference: 20\2, 3\4
Dagwin dam, near Dagwin [18° 04' 07" N, 97° 40' 55" E], grid square reference: 19\9, 3\6
http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-ne47-6.jpg

Additional references

See above: 'Agreement on [four hydro projects signed with Datang](#)' (PRC Commerce: 15/01/10)
See below: 'The [Weigyi](#) dam: A great barrier and a way to safety' (KDRG: March 2006)
'Potential impacts of the [Weigyi and Dagwin](#) hydropower dams' (FER: June 2003)
'Power purchase [deal between Thailand and Burma](#) on the way' (Nation: 27/05/97)
'[Lawpita](#) power plants and associated dams' (Appendix 1)

THE [WEIGYI](#) DAM: 'A GREAT BARRIER AND A WAY TO SAFETY'

Karenni Development Research Group, *Dammed by Burma's Generals: The Karenni Experience with Hydropower Development From Lawpita to the Salween*, March 2006, pp 53-66 [edited and abridged].
http://www.burmacampaign.org.uk/reports/Damned_by_Burma%27s_Generals.pdf

The proposed Weigyi dam is located at a large whirlpool in the Salween river in Papun district, Karen State, just across from the Mae Sariang district of Mae Hong Son province in Thailand. It has a proposed height of 168 meters [with maximum water level height (masl) of 220 m], and an estimated power capacity of 4,540 - 5,600 MW. Although the dam will be in Karen State, the greater part of the reservoir it will create lies in Karenni [Kayah] State. It will be at least ten times higher than Moby dam and will flood many of the best lowland forests and agriculture lands in the state.

Papun District in Karen State has been the site of repeated military offensives and anti-insurgency campaigns by the troops of Burma's military junta. Before 1992, there were only ten Burma Army garrisons in the district. Today there are fifty-four garrisons fortified with heavy artillery, including twelve along the banks of the Salween. Of 85 original villages in the area directly adjoining the sites of the Weigyi and

Dagwin dams, only a quarter remain. Most of the villagers fled to Thailand leaving their fertile farmland lying fallow; however, 5,000 remain hiding in the jungle, facing severe food shortages and health problems. Roads to the planned dam sites have been built using forced labor, and landmines have been planted along the roads. It is these local residents who will suffer most from the impacts of these dams, in particular Shan, Karen, Karenni villagers and displaced persons who live in hiding alongside the river. They have not been given information, let alone consulted, as to how the projects will affect their lives.

The expected flood area of the Weigyi dam will impact four of the seven townships in Karenni state, completely submerging 28 villages, including the entire towns of Pasaung and Bawlake. Many other villages in the flood area have been relocated over the years of civil conflict. Even so, based on surveys carried out by Karenni agencies, the current village population that will be directly impacted by the flood is conservatively estimated at 8,300. IDPs hiding in the flood zone are estimated at 13,500. The number of villagers either relocated or in hiding in the Demawso and Ywathit areas who rely on paddy fields in the flood zone number 3,700. Refugees and migrants from the flood zone who have not been able to return home number approximately 8,400. Altogether, it is estimated that the flood zone will impact a total of 30,250 people.

The valley that the Salween cuts through in eastern Karenni State provides fertile lowland farm fields for the majority of people living there. Wet rice (more productive than upland rice) is the primary crop, with sesame, corn, peanuts, peas, and chili also cultivated for subsistence as well as trade. As most people depend on mountain creeks during the rainy season, usually only one seasonal crop is planted. However, vegetable gardens along the fertile river banks are extensive in the dry season and fruit can be harvested from various types of trees throughout the year. Bawlake township, in particular, has well-established stands of mango and coconut trees, and plum trees spread naturally in abundance; it supplies coconut and plum juice to various towns. Mae Set township is well-known for its high yields of paddy and sesame compared to other areas. Due to Karenni state's mountainous terrain, there are few other areas that are suitable for wet paddy production and lowland agriculture in the state. Most of these areas lie within the flood zone of the proposed Weigyi dam. Given the Lawpita experience, it is highly unlikely that any compensation will be offered for this devastation and it is not clear where, or if, residents will be able to find new farm lands.

The transformation of the Salween and Pawn from fast flowing rivers with seasonal changes to large reservoirs will have negative impacts on fish migrations and spawning, and ultimately on fish populations and species diversity. Residents in all of the affected areas by the flooding depend on fishing to provide protein in their diet and some rely on it to supplement their incomes. Virtually all the residents along the Pawn river (that will also be affected by the flood waters) fish, as dry and wet farming cannot fully address their subsistence needs. Since modern fishing means are out of reach, their gear consists mainly of hook and line, round loaded nets, and conical nets. They sell their catch to surrounding villages or to such towns as Loikaw, Demawso and Pruso, or have it dried for kitchen use. They save the money they earn to buy clothing, pay for their children's schooling, or for emergency needs. Some barter for other goods. The Pawn river serves as the habitat of many species of valuable fish such as catfish, long-finned eel, spiny eel, featherback, carp, Hamilton's carp, fork-tailed catfish, and snakehead. These fish come up from the Salween to nest and hatch in the Pawn.

There has been almost no research done on the number of fish species and habitats in the Pawn and Salween in Karenni State due to the unstable situation there. However, a recent study by Thai-Karen villagers on the Salween and its tributaries in Mae Hong Son province in Thailand found 70 different fish species. The study also found 18 different ecological systems, including rapids, different fish habitats, and beaches, just on the stretch of the Salween that borders Thailand and Burma alone. Local villagers along the Pawn River in Karenni State describe a similar diversity. There are hundreds of small caves and specialized habitats for fish in the Pawn near Bawlake. This area will be flooded, filling in the caves and destroying unique habitats.

Karenni people rely on forests for a large part of their livelihood. The forests provide sufficient fuel and construction materials for homes, countless varieties of wild fruits, vegetables and mushrooms, and seasonally edible products for humans and animals, biomass for fertilizing lowland farms, non-timber forest products for income generation, animals for meat, and herbal medicines for health -- to name but a few.

Before most of Shadaw township was relocated to military sites, local residents there traded rattan, resin, honey, wax, stick lac, thanaka, and manufactured medicinal herbal plants for tonic uses and for curing malaria. The forests are an integral part of villagers' lives and livelihoods, but large swathes of forests will be flooded and destroyed by the reservoir. Most Karenni men go on a week-long hunting trip just before the rice harvest in order to have meat at the time of harvest. Usually they travel by boat down the river and up side streams in groups of about five. They bring fishing nets to get fish during the day; in the evenings they hunt frogs and wild animals. Of the larger animals, wild pigs and deer are commonly hunted. The group then preserves their catch: fish is made into paste and dried; meat is also dried or cured in salt. They then store everything in bamboo and divide it equally. Frogs are kept alive in cages and sold for income, as well as any surplus meat. During the rest of the year, most people are struggling with their farms and only hunt smaller animals nearby their paddy fields.

No full-scale studies have been carried out of the forests along the Salween in Karenni State. It is certain, though, that all the remaining forests in the flood area, including important habitats for wild animals and birds, will be permanently destroyed by inundation. The entire reservoir area lies within an ecoregion of outstanding biodiversity. This potential will never be fully understood or realized once the forests lie under water. In addition to the primary effect of destroying hundreds of square kilometers of forests, many secondary effects will also impact forests that do not lie in the flood zone itself. An estimated 25,500 people currently relying on the land and forests in the flood zone will be displaced, causing encroachment into remaining forests. While lowland areas can support a larger number of people on smaller areas of land, upland areas (those that will be left for settlement after the flood) are not as productive. Therefore, in order to sustain the same populations, more land than is currently under cultivation will be sought, land most probably in previously undisturbed forests. If history is a lesson, people will also seek safety deeper and deeper into forests, thus further disturbing a previous balance in the ecosystem. Forests will likely be cut in order to build roads for dam infrastructure and to replace old roads and trading routes that will be flooded. These roads will enable, and most probably stimulate, logging in previously unreachable areas, particularly as Karenni state is home to some of the last stands of mature teak in the world.

Of the four main rivers navigable by motorized boats in Karenni -- the Salween, Prawn, Baluchaung, and Pai -- the Salween is the principal one used for trading. Most of the trade is small-scale and provides local farmers with a market for their products, especially in the absence of good roads. The town of Pasaung is an important crossroads and trading center for Karenni people. It is the focal point of transportation to Thailand through Mae Set, to the central plain of Toungoo, to Shan State via the Loikaw by-road, to Karen State and Shan State along the Salween, and to Thailand along the Pai River. The entire town, as well as Bawlake, another important center of economic activity, will be submerged under the reservoir. Mae Sam Laep, which lies in the Mae Sariang district of Mae Hong Son province in Thailand near the proposed Weigyi dam project, is a key center for trading cattle and goats, and local products such as onions, beans, sesame, dry chili and other dry goods from Burma, and commodities such as cooking oil, seasoning powder, household goods, clothing, medicines, and other consumer goods from Thailand. The Weigyi dam will cut off Mae Sam Lap from Karenni state, disrupting a generations-old trade route. Another trading center called Thakawhta on the Salween at the border of Karen and Karenni State, where local people trade homemade candles, will also be submerged.

The Yintalai are a sub-group of the Kayah; their language is slightly different, and they have no written alphabet. Only about a thousand people from the Yintalai now remain. Their ancestral lands are in Pasaung and Bawlake townships and the flooding caused by the Weigyi dam would completely submerge their sacred land, cultural heritage, livelihood, homes, and forests. The Yintalai believe that there are spirits guarding the mountains, jungles, and big trees. These spirits are powerful, hence when cultivating farm plots, offerings and appeals are made for plentiful crops and less damages. The Yintalai are primarily devoted to farming, breeding livestock, and hunting for their livelihood; they occasionally turn to handicrafts. They settle in regions surrounded with rocks and boulders and, as the soil is infertile, only subsistence cultivation is possible. As irrigation is impossible, they rely on rain water for their farms and practice shifting cultivation. They fend for their living by selling products from the dry farms for extra income. As a people, they will proportionately suffer most from the impact of the Salween dams.

Compiler's Note: The pdf version of this report has many excellent pictures, maps and charts.

Topographic map references: Thailand 1:250,000: Series L509, U.S. Army Map: NE 47-06: Chiang Mai Weiggyi dam, just west of Hokki [18° 18' 49" N, 97° 34' 49" E], grid square reference: 20\2, 3\4
Dagwin dam, near Dagwin [18° 04' 07" N, 97° 40' 55" E], grid square reference: 19\9, 3\6
http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-ne47-6.jpg

Additional references

See above: ['Tribe's home](#) to be a valley of the dammed' (London Times: 22/03/06)
See below: 'Potential impacts of the [Weigyi and Dagwin](#) hydropower dams' (FER: June 2003)
'Power purchase [deal between Thailand and Burma](#) on the way' (Nation: 27/05/97)
'[Lawpita](#) power plants and associated dams' (Appendix 1)

Saw Blaw Htoo et al, *Khoe Kay: Biodiversity in Peril*. (Chiang Mai, Karen Environmental and Social Action Network, July 2008). Page numbers cited below refer to the published edition. See also the online version available at http://www.salweenwatch.org/images/stories/downloads/brn/2008_009_24_khoekay.pdf

This study documents an original piece of research into the biodiversity of Khoe Kay, a hilly, forested area of approximately 90 sq km in Burma adjacent to the "big bend" of the Salween River. Researchers from the Karen Environmental and Social Network found that "Khoe Kay is studded with plant and animal diversity". Forty-two of the 194 plant species and 200 animals identified are considered endangered, while endemic and unknown species are also represented. The authors fear that threats posed by the construction of the Weigyi hydropower dam "may seriously degrade" the rich biodiversity they have documented. They argue persuasively that dam planning not only of the Weigyi but also of other dams along the Salween should not proceed "until more complete studies of the area[s involved] are completed." (p.71) This report is abundantly illustrated, documented and accompanied by numerous maps and diagrams.

The Khoe Kay region on the Burmese side and the adjacent Salween Wildlife Sanctuary in Thailand are the site of one of the larger dams planned for the Salween. "The Weigyi dam would stand 220 meters high, cost US\$ 3 billion, rated at 4500 megawatts and create a reservoir as large as 1000 sq km. The planning process for this dam and hydropower station, to be built by Thailand on Burmese territory with Chinese capital is shrouded in secrecy, but initial steps have been taken. . . . Thailand's Salween Wildlife Sanctuary has [already] allowed the Electricity Generating Authority of Thailand (EGAT) to build an initial access road through the heart of the sanctuary to the dam site on the river bank. . . . Plans call for this road to be upgraded to a multi-lane highway for large trucks. The forest will be cut down, and the land will be torn apart and submerged underwater." (p.9)

"There [can be] no doubt that dam construction and operation [on the Salween will] have a largely negative effect on biodiversity [in the region]. There are at least 5 dams proposed for the Salween in Burma with Khoe Kay situated between the proposed locations of the Wei Gyi and Dagwin dams. Given the flourishing biodiversity currently found in both the river and the surrounding mountains, proceeding with dam construction without appropriate analysis will likely predicate a decline in Khoe Kay's ecosystems. Unfortunately, the impacts of these dams have not been analyzed in an Environmental Impact Assessment (EIA) prior to the start of construction. Some efforts at EIA preparation have been indicated, but there has been no comprehensive effort that includes public preparation." (p.61)

Citing a study by the World Commission on Dams (WCD) [*Dams and Development: A New Framework for Decision-Making*, November, 2000] <<http://www.dams.org>>, the authors of the 'Khoe Kay' report contend that "there is little in the way of past success in overcoming the impacts of dam construction to terrestrial ecosystems. If the [proposed] dams are constructed on the Salween river, . . . similar impacts will occur as have been seen elsewhere and related in the WCD report. (p.62) "The WCD report indicated that dams produce emissions of greenhouse gases, and these may be a significant contribution to climate change. . . . Given the tropical location of the Salween River and the nature of the link between dams and climate change more study of these impacts is necessary prior to beginning dam construction. (p.62)

"Perhaps the most destructive element of the dams proposed for the Salween River is the cumulative impact of building five dams in Burma and up to 13 more in China. The ecological impact of multiple dams on large river is unequivocally bad." (p.66) The WCD report found that within a river basin, "the greater the number of dams, the greater the fragmentation of river ecosystems".

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MOTOR AND ELECTRICAL APPLIANCE FACTORIES OPENED IN INDAGAW

NLM, 21/03/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060321.htm>

The Ministry of Industry-2 opened its motor and electrical appliance factories in Indagaw IZ in Bago township, today. Accompanied by Lt-Gen Myint Swe of the Ministry of Defence and officials, SPDC Secretary No 1 Thein Sein heard a report on the production of disc wheels, water tanks, bearings, inlet and aluminum cables, 18-hp diesel engines for power tillers and generators and auto parts presented by Minister for Industry No 2 Saw Lwin. He also briefed the Lt-Gen Thein Sein and party on the operations of the ministry's existing factories, its research and development project and on the new electric motor and auto-used electrical apparatus factories.

In response, the Secretary-1 said that adequate investment and technology is required in setting up industries for national development. The country is in the process of developing the various economic sectors with agriculture as the base. Farm machines are required to reach the goal and for farm mechanization. The ministry should strive for mass production of farm machinery and trucks. While the Ministry of Industry No 2 needs advanced machinery it also needs qualified technicians and should conduct training programmes for the staff. The machines manufactured should meet the required standards and the ministry should make efforts to run the factories at full capacity. The staff should make constant supervision to minimize loss and wastage due to negligence and misconduct. It should also introduce innovative methods to run the machines it produces with biodiesel extracted from physic nut oil. Research is needed to ensure the new machine can run on bio diesel. Afterwards he inspected the machinery being used to convert diesel engine to operate on physic nut oil engine and test-running of engines and tractors using physic nut oil.

Next, the opening ceremony of the motor factory of Myanma Machine Tool and Electrical Industries was held at the factory. MD of MMTEI U Kyaw Win, MD of Myanma Industrial Construction Services U Aung Kyi and V-P of Angelique International Ltd of India Pradeep Kumar Arya formally opened the factory. It is expected to produce 30,000 single-phase electric motors and 10,000 three-phase motors in a year.

Afterwards, the electrical equipment factory of the MMTEI was formally opened and Secretary No 1 inspected the production process of the factory. It s expected to manufacture 10,000 starter motors and 10,000 alternators for tractors, trucks and jeeps, 5,000 pieces of ignition coil and 5,000 pieces of electronic fuel pump for petrol cars per year. Lt-Gen Thein Sein and party also went to the aluminium wires factory and inspected its production process. The factory can produce 1,600 tons of wires a year.

Additional references

NLM, 19/11/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051119.htm>

In the compound of the Ministry of Industry No 2 on Kaba Aye Pagoda road, PM Soe Win and party were conducted around the booth of MMTEI where a 5-kw hydel power generator to be used with a 15-foot-high water fall, a 40-kw hydel power turbine to be used with a 60-foot-high water fall, and 60-kw and 200-kw hydel power turbines to be used with 120-foot-high water falls were on display. A Francis water turbine Model-HL-160-WJ-42 that can be used at a 130-foot-high water level was also displayed, as were various capacity motors manufactured by the electric motor factory in Indagaw. An ignition coil, fuel pump, alternator and starter motor manufactured at the automobile electronics factory in Indagaw as well as single-phase 2-wire electric meters and triple-phase 4-wire meters produced at the electric meters factory in Sinde in Padaung township were also on display.

See below 'Cable factory and foundry' opened in Indagaw industrial zone (NLM: 04/04/05)

DELTA HOLDS GREAT POTENTIAL FOR TIDAL POWER GENERATION

Voice Weekly, 13/02/06, as excerpted in the Myanmar Times, 20/02/06.

(Compiler's note: Issue 305 of the Myanmar Times is not available on-line.)

A report in Voice journal said Myanmar had great potential geographically for the generation of large amounts of electricity from tidal movements, owing to more than 1700 miles of coastline and vast delta areas. The Myanmar Engineering Society had already succeeded in building two hydroelectric facilities powered by tides in the Ayeyarwaddy division town of Ngaputaw in 2005, it said. The report also said the generator could be operated for two six-hour periods each day when the tide was going out, adding that the capacity of electricity generation depended on the difference of the water level between high and low tide, with a greater difference translating into more power generation.

Additional references

Xinhua: 12/03/09.

http://www.macaudailytimesnews.com/index.php?option=com_content&task=view&id=24005&Itemid=32

A project implemented by the Myanmar Engineering Society to apply the force of ocean tides to the generation of electricity is to resume. The project was initiated in a village in Ngaputaw township in 2006, but was set back by flooding in the area caused by Cyclone Nargis last year.

Htar Htar Khin, Myanmar Times, 16/06/08. <http://www.mmtimes.com/no423/b006.htm>

Myanmar Engineering Society (MES) and the Ministry of Energy have chosen three entrants for ASEAN energy management awards, which will be handed out in August. . . . Among the three is the tidal power project underway in Kanbalar village in Ngaputaw township, Ayeyarwady Division, which has been nominated in the rural electrification category.

Win Khaing, *Renewable Energy and Rural Development in Myanmar*, pp 33-42. Presentation made at TCDPAP & FIDIC/ASPAC) Conference (22-25/04/08) in Seoul. Edited.

www.mes.org.mm/.../RE%20&%20Rural%20%20Development23April%2008,%20Seoul.pdf

Myanmar has more than 2800 km of coastline with numerous small creeks suitable for harnessing tidal energy where there is a difference between high and low tides of one to six metres. With the application of appropriate technology the tidal currents could be harnessed for the generation of electricity in villages which are remote from the national grid along the coast of Myanmar.

The village of Kanbalar in Ngapudaw township in the delta area of Ayeyarwaddy division with 220 households and a population of 1,200 was chosen as the site for a tidal generation project. It is about 150 km from the nearest grid connection. It was decided to use an old style barrage to suit local conditions and the facilities available in Myanmar. A small earthen dam about three metres high and 10 metres wide was constructed across the branch of the creek. A wooden open channel 0.35m high by 0.35m wide by 8m in length was connected to a turbine casing through the outlet gate. A draft tube was installed at the outlet of turbine. The intake-exit channel which is about 20m far from the dam is 80 ft long, one metre high and one metre wide. The sluice gate is 1.2 m by 1.1 m. The spillway near the intake structure is 0.70m by 0.70 m.

According to available discharge 10,117 m³ and with turbine flow rate $Q = 0.3 \text{ m}^3/\text{sec}$, operation time can be around 10 hrs with a full load. During actual performance, because of variation in tide level, for six hours the consumption is only 1/12 of available discharge. That leads to possibility of running ten turbines working in parallel. The cost for turbine and accessories is only US\$ 500. The necessary carpentry works and earth works were carried out by volunteers from the village. The generating hours daily are the times between high and low tides. So there are approximately six hours each for purposes between the two tides everyday for purposes of generation. Day time generation is used to charge the batteries, night time generation is

used for direct lighting. The generator used has a single phase permanent magnetic type alternator. Material had be chosen for its resistance to saline water.

Compiler's note: The pictures and diagrams which accompanied this part of the presentation at the Seoul conference are not available in the html version usually available on the Net. Check the website of the Myanmar Engineering Society for the pdf www.mes.org.mm/ For a brief and well-illustrated explanation of how a tidal barrage works, see Wikipedia entry for 'tidal power'. http://en.wikipedia.org/wiki/Tidal_power

Flower News weekly journal, 04/05/05, as excerpted in the Myanmar Times, 09/05/05 (Issue 265)
<http://www.ibiblio.org/obl/docs3/MT265.htm>

A group of Myanmar engineers has succeeded in generating electricity from tidal movements in the Ayeyarwaddy delta, reports Flower News journal. The report said the group began working on the K500,000 project early this year at Kabala village in Ngaputaw township, about 75 km from the coast. Residents helped the project by building a dam filled by the incoming tide that drives a three-kw turbine. The generator operates twice a day for six hours when the tide is going out. The project took a month to complete and the electricity is being provided to the village. It was initiated by the Yangon branch of the Young Men's Christian Association and funded by the engineers. The group plans to install a total of 10 turbines at the site. The report said there were many villages in delta area of Ayeyarwaddy division with the potential to generate electricity from tidal movements. [Compiler's note: This section of the Myanmar Times Issue no 265 is no longer available on-line.]

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CALL FOR [ENERGY CO-OPERATION](#)

Khin Hnin Phyu, Manmar Times, 13/02/06

(Compiler's note: Issue 304 of the Myanmar Times is no longer available on-line)

The director-general of the Energy Ministry's Planning Dept, U Soe Myint, has stressed the need for co-operation between the gov't and private organisations to help develop renewable energy technologies in Myanmar. He said many sectors in Myanmar, including gov't, NGOs and private organisations, were interested in promoting wider application of renewable energy technologies.

He was speaking on February 5 on the second day of a two-day paper reading conference organised by Myanmar Engineering Society at the Myanmar Info-Tech building in Yangon. "There is much potential and capability in this field but we lack mutual co-ordination," U Soe Myint said, adding that co-operation among the various sectors would boost manufacturing capacity, reduce the cost of renewable technologies and enable Myanmar to cope with rising fossil fuel costs and environmental pollution.

The general secretary of the society, U Win Khaing – whose paper was based on the country report he presented at recent ASEAN and Bay of Bengal Initiative regional meetings – said Myanmar had abundant sources of renewable energy. These included hydro, biomass, solar, tidal and wind power, he said. Myanmar produced an abundance of agricultural residue, including rice husks and livestock waste, that can be used to generate biomass energy, said U Win Khaing.

Meanwhile, many small hydropower plants, as well as biogas and tidal power systems, have already been established in the country by local experts and organisations, he said. He said many programs to promote renewable energy have been established by various government ministries, co-operatives, private sector interests and NGOs, but there is "no focal body or national policy at this time to co-ordinate and concentrate all of these resources". "A national policy on renewable energy is urgently needed if Myanmar is to comply with ASEAN expectations for member countries to get 10pc of its required energy from renewable sources by 2015," U Win Khaing said.

Additional references

See below: ['Private Sector Promoting Interest in Renewable Energy'](#) (MT: 12/07/04)
['Rural Areas Encouraged to Make Greater Use of Renewable Energy'](#) (MT: 05/01/04)

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NATIONAL UPDATE ON ELECTRIC POWER PLANTS

NLM, 18-22/01/06. www.ibiblio.org/obl/docs2/NLM2006-01-18.pdf
www.ibiblio.org/obl/docs2/NLM2006-01-19.pdf
www.ibiblio.org/obl/docs2/NLM2006-01-20.pdf
www.ibiblio.org/obl/docs2/NLM2006-01-21.pdf
www.ibiblio.org/obl/docs2/NLM2006-01-22.pdf

Compiler's note: This five-part series was published on successive days in the New Light of Myanmar under the title: 'Electric power sector witnesses sustained progress: Increased generating of power in the time of the Tatmadaw Government'. Tables accompanying the articles provide lists of power plants already operating, under construction or in planning. Good photos accompany each article. Otherwise, there is very little new information in this series. Any new facts from the series are included with the appropriate articles throughout the compendium.

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INDUSTRIALISTS URGED TO DIVERSIFY PRODUCTION

Ye Lwin, Myanmar Times, 09/01/06.

(Compiler's note: Issue 299 of the Myanmar Times is no longer available on-line.)

The industrial sector has been urged by the Government to advance its position alongside other economic sectors, such as the agricultural and service sectors, and play a more dominant role in Myanmar's economic growth. Speaking at the 12th annual general meeting of the Myanmar Industrial Association (MIA) in December, Lt-Gen Myint Swe, chairman of Yangon DPDC, said diversifying Myanmar's economic base was a key platform to growth. Myanmar's economy is currently largely dependent on the agricultural sector, which accounts for more than 50pc of gross domestic product (GDP), Myint Swe said. "The development of industry plays an important role in achieving economic growth and becoming a developed nation," he said.

MIA president U Myat Thin Aung said the industrial sector contributed 9pc of GDP in fiscal 2004/05 of which 72pc was contributed by the private business sector. As the majority of Myanmar's industrial exports were raw materials or semi-finished products, more emphasis should be placed on producing fully-manufactured goods for export, he said. The MIA was established in 1993 to represent private sector industrialists and has 3,100 members, up from 2,900 in 2004.

Lt-Gen Myint Swe said that import substitution measures currently in place were meant to stimulate the domestic production of agricultural machinery, consumer goods and food that were previously being imported. Eighteen industrial zones had been established throughout the country to promote the industrial sector and create job opportunities, he said. "At present, the most important thing for the industrial zone is to get an adequate electricity and fuel supply," said the general. More than 450 MW of electricity are needed for the 10 industrial zones and residents in the Yangon are but only 420 MW is currently being provided. Only 380 MW can be applied at a time. "Projects are underway to provide 5,000 MW nationwide, not only for consumption by the industrial sector but also for domestic, personal consumption. So far, more than 840 megawatts can be provided across the country," Lt-Gen Myint Swe said.

Additional references

NLM, 06/07/08. <http://www.burmalibrary.org/docs5/NLM2008-07-06.pdf>

PM Thein Sein, accompanied by the director-general of the Government Office and dept heads visits the factory of the Myanmar Lighting Manufacturing Co Ltd in the Shwepyitha IZ. They are welcomed there by Lt-Gen Myint Swe of the MoD, Chairman of Yangon DPDC Win Myint, Yangon Mayor Aung Thein Lin and officials, Chairman Sein Wam of Mynamar Lighting and responsible persons. The PM is briefed on

production at the factory by U Sein Wan, on the supply of electricity by U Khin Maung Soe of the YESB and on arrangements for the factory building by D-G Aung Win of DHSHD. In response to the reports, the PM explains that power generated by hydropower projects will be supplied to the factories in the IZs. Industrialists are to strive to develop sound agrobased industries that will foster the economic growth of the State. Priority is being given to the emergence of national industries and industrial zones have been set up to promote the industrial development. Technical universities have been established to produce the needed intelligentsia for the industrial sectors. Industrialists are to redouble their efforts to keep abreast of all the latest industrial developments. The PM urges industrialists to produce high-quality and low priced items for domestic and global markets.

NLM, 21/04/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040421.htm>

At a meeting of the MIDC, Lt-Gen Soe Win, chairman, said that during the current five-year plan, the industrial sector development had grown by 21.8pc in fiscal 2001-2002; 26.8pc in 2002-2003; and 22.6pc in 2003-2004. Over 100,000 private factories are employing over 2 million workers. Ninety per cent of the private sector industries are small or medium enterprises. Only when SMEs are promoted will it be possible to change from an agro-based economy to being an agro-based industrial nation. Myanmar should not be content with an annual increase of 10pc - 20pc in the industrial sector. The goal is to raise the industrial production at high pace beginning with the current five-year plan; and to markedly increase its participation in the national economy. All the needed infrastructures have been built to reach this end. Some large hydel power projects will be completed in 2004, while others will be completed in 2005-2006 and 2006-2007. The electricity needed for industrial development has been generated. During the current economic plan, the Government has been giving priority to the development of the electric power sector in accord with the extension of the industrial sector. Discussions will have to be made to materialize the motto - leapfrog with the might of industrial power.

Irrawaddy Magazine, September 2003. http://www.irrawaddy.org/article.php?art_id=3049

The bulk of Burma's private manufacturing firms are small- and medium-sized light industrial operations. Using labor-intensive methods, they provide products for the domestic market. "There is considerable domestic purchasing power," a business journal editor explains. "Burma's industry is not able to meet domestic demands for soap and medicine." Shortages of capital and the lack of foreign currency are two obstacles to the development of industry. Low production standards are also affecting industrial growth and the development of new export markets. The owner of an electrical equipment factory in Rangoon explains: "We don't have any processes for quality standards on our products. Because we produce cable wires for the domestic market, we don't have to worry about meeting standards." The factory owner knows that shoddy wires can be dangerous for customers, but he argues that testing procedures at the government's Electric Inspection Dept are obsolete. "For some products, they don't even have testing equipment. We could never export our products," he adds. Lack of technology is also a significant factor in Burma's stunted industrial growth. Observers point out that Burma's technological level is poised at the mechanical stage, and that the country has yet to enter the electronic age. Factory owners say the biggest problem is constant power shortages. A Rangoon plastic manufacturer describes his frustration at running a machine for extruding plastic. "When the power is cut off suddenly, the machine stops and we lose everything -- money, time, raw material -- and we waste labor." He says that while the government claims to be providing enough electricity for the whole country, capacities are far too low for heavy machinery.

NLM: 30/03/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020330.htm>

At a meeting of the MIDC, Lt-Gen Khin Nyunt, V-C of the Central Committee for Industrial Development, said that development in the nation's industrial zones had fallen short of expectations, [even though] the Ministry of Finance and Revenue had extended loans to industries and the Ministries of Industry had provided technical assistance, machinery and raw materials. For its part, the State had given special priority to agro-based industries, machinery producing industries and import-substitute industries, [but] the industrialists would have to increase investments and introduce innovative means as well as nurture human resources and develop technologies.

NLM, 13/08/99. <http://mission.itu.ch/MISSIONS/Myanmar/99nlm/n990813.htm>

At a meeting of the Central Committee for Industrial Development, General Maung Aye chairman, said encouragement is to be given to private industrialists to establish industries in the industrial zones. Priority is

to be given to the development of industries contributing to mechanized farming, industries manufacturing machinery and equipment and import-substitute industries. Exemption from some forms of taxation is to be granted and for reduction of other taxes. The interest rate for loans disbursed by the banks for [industrial] investment is to be reduced.

NLM, 15/06/99. <http://mission.itu.ch/MISSIONS/Myanmar/99nlm/n990615.htm>

Minister for Industry No 1 Aung Thaung met with industrial entrepreneurs in Hlinethaya Industrial City. He said Myanmar is changing from manual to mechanized agriculture. The Myanma Industrial Development Committee (MIDC) had been formed [to guide] the development of the industrial sector in line with [these changes in] agriculture. He also spoke of the need to produce personal goods to meet the demand of the increasing population, urging the industrialists to produce quality goods which meet market requirements. The entrepreneurs presented their requirements and the minister gave suggestions.

See below: 'Impact of [unreliable power supply](#) on industrialization in Myanmar' (IDE: 10/05)

See also other entries under 'Industrial Use of Electricity'. [IU](#)

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[POWER CUTS AFFECT ECONOMY IN RANGOON](#)

Aye Aye Win, AP, 04/01/06. www.irrawaddy.org/article.php?art_id=5335

A shortage of funds, lack of rainfall and rising demand for energy have resulted in frequent power cuts in Burma's capital, disrupting livelihoods and affecting the economy. Rangoon, a city of some 5 million residents, needs 450 megawatts of electricity daily, but generating capacity at present stands at only 385 megawatts, according to the local journal Weekly Eleven, which quoted the military commander of the Rangoon region General Myint Swe.

An official of the Electric Power Department said that electricity rationing began in several parts of the city in mid-December and could last until June, a month after the monsoon rains set in. Last year regular power cuts began on March 26 and lasted until June 28, the official said, speaking on condition of anonymity. He said the generators at the Lawpita hydroelectric plant could not operate at full capacity due to lack of rainwater in the reservoir, while others are broken down and cannot be repaired for lack of funds. Shortage of natural gas has shut down some gas-powered generators. Lawpita, located 210 miles (350 kilometers) north of Rangoon, is one of the main sources of electricity for the city.

The cuts and brownouts have affected everyone from noodle vendors to apartment block dwellers. "Some of my fish perished when the water heater, oxygen pumps and water purifier stopped during a blackout," said Tun Tun, the owner of pet fish shop. Other small-time businessmen, many of whom can't afford their own generators, said damage to their businesses was particularly acute since the timing of the power cuts was unpredictable.

"On the days when we have no electricity in the day time, we have to get up at midnight to fill our water tanks. When everyone begins to draw water at the same time, there's often an electric overload and it damages water pumps," said Aung Myint, who lives in an apartment. "The timing of electricity supply and timing of government water supply has to coincide. Otherwise, we have to buy water to fill up our water tanks," said another Rangoon resident who relies on the government water supply which he said is available only between 6:00 am and 12:00 pm in his neighborhood.

In neighborhoods spared power cuts, brownouts occur frequently, with the voltage as low as 150 volts, rendering most electrical and electronic appliances like refrigerators and air conditioners inoperable without voltage regulators and other specialized equipment. But power rationing does not affect so-called "VIP areas" -- main roads and residential areas where senior government and military officials reside. Some expatriates who used to prefer living in quiet residential areas now seek out these areas or hotels and service apartments which have their own high-powered backup generators.

The power cuts aren't new. The military regime has been distributing electricity under a rationing system for the past eight years, barely keeping up with rising demand. Total national output of electricity is 845 MW, less than the installed capacity of 1,200 MW and short of the country's electricity needs. The crisis is exacerbated by the draining of foreign exchange reserves needed to buy fuel and spare parts for antiquated generators. Among the only people benefiting are entrepreneurs who sell electric generators and candles. But use of candles among the many poor who live in wood and thatched huts makes their neighborhoods particularly vulnerable to fires. Carrying loudspeakers on vehicles during the dry season, officials warn residents of the danger of blazes in their homes.

Additional references

See above: 'Myanmar cashes up on energy but locals [in the dark](#)' (AFP: 15/04/07)

'Myanmar learns to live with the [lights out](#)' (Reuters: 09/04/07)

See below: 'Impact of [unreliable power supply](#) on industrialization in Myanmar' (IDE: 10/05)

See also other entries under the category 'Consumer Concerns and Power Shortages'. [PS](#)

[Start 06](#)

[NIBBAN ELECTRONICS EXPECTS 'IP' PROTECTION FOR ITS PRODUCTS](#)

Compilation of Manuals, Guidelines, and Directories in the Area of Intellectual Property (IP) Portfolio Management Customized for ASEAN Member Countries, [Draft], 2006; pp. 241-47

http://www.wipo.int/edocs/mdocs/mdocs/en/wipo_asean_ip_bkk_06/wipo_asean_ip_bkk_06_draft.pdf

Nibban Electric and Electronics (NEE) started trading under the name Shwe PAHO Industry in 1972, and entered the electronics market by successfully producing its PAHO adaptor with a DC output in the range 0 to 12V. Its high frequency DC to AC converters for fluorescent lights was first locally produced in 1975. NEE produced two types of high frequency converters, one for industrial use that could illuminate from five to ten fluorescent tubes and another for domestic use that could illuminate a single fluorescent tube of various sizes. However, NEE had to stop production of fluorescent converters, when other local brands entered the market, offering the same quality at lower prices. Around 1976, battery-powered fluorescent tube ballasts came into use countrywide and NEE started to produce the PAHO battery charger that was urgently required in local markets. NEE was successful with this product and demand increased year by year.

In Myanmar, only water-driven electric generators had been used to supply electricity for the country for over one hundred years. Increasing demand for electricity because of the growing population has caused shortages in the last decade. As a result, a quota system was used to supply electricity. Sometimes, the voltage was out of the specified range (220V-240V) and so voltage regulators (step-up transformers) were needed to adjust it. Safeguards for power-line interruptions for unstable voltages were also needed to prevent unexpected damage due to incorrect voltage supplies for items such as refrigerators, airconditioners etc, while using the voltage regulator. The PAHO step-up transformer was put on the market and was able to compete with other local products due to its superior quality, durability and reasonable price. NEE produced different models of transformers according to market needs and adjusted the functions and sizes to harmonize with the end use.

Later, NEE has produced several types of safeguards (power line interruptors for low and high voltages) for electronic items such as audio-visual systems, computers, copiers, air conditioners, TVs, DVDs and VCDs, refrigerators, washing machines, radios, phones and overhead projectors. An uninterrupted power supply (UPS) for computers was also produced. PAHO electronic items were accepted as quality products in the local market and attracted consumers with their quality and price. NEE also produced the Auto Star 5 KVA automatic voltage regulator, an electronic circuit motor drive to compete with the Japanese-made Stavol 2.5 KVA type regulator. It met with success in the market due to its high quality and low price. However, production of the automatic voltage regulator was stopped due to lack of raw materials and price increases after the first year.

In 1982, Myanmar television programming was first introduced by MRTV and second-hand Japanese-made television sets which ran on 110/120 volts entered the market. NEE produced a step-down transformer which could convert 220 volts to 110/120 volts, since the Myanmar power supply system only provides 220 volts. At the time, NEE gained a reputation for its PAHO trademark in electronic markets. Japanese-made TV antennae which help to receive good-quality pictures and sound also entered the market. Growing use of television led to an increasing demand for new TV models from Japan and other countries. In 1984 NEE introduced its first model BXR TV antenna onto the local market to compete with foreign products under the Nibban trademark. Although the NIBBAN antenna could compete with foreign products in quality, it was sold at a very low price to attract consumers. After a year, people accepted the NEE antenna and its reputation spread throughout the country. At the time, there was only trademark registration to protect the company from unfair competition and infringing goods.

In 1994, when Myawaddy TV started transmission, a new type of TV antenna was required to receive the programs transmitted by both government stations. NEE created a new TV antenna called the TXR series that gave good-quality sound and vision reception from both MRTV and Myawaddy stations. In the following year, a new model 2-in-1 antenna booster was introduced onto the market to meet consumer needs. In cities, TV antenna have to be set up at the top of buildings to receive clear sound and vision. There is however some difficulty in setting an antenna up on high apartment blocks. NEE introduced a new 2-in-1 TV antenna together with a booster to meet market needs. This model can be set up in front of an apartment to receive programs transmitted from the two broadcasting stations. It also includes a booster amplifier to offer visual clarity and higher volume as well as a noise filter to prevent interference.

Up to now, NEE has produced four durable electronic items: the PAHO battery-powered fluorescent tube, the PAHO step-up transformer, the PAHO battery charger, and the NIBBAN TV antenna. In Myanmar there is at present no statutory law to protect intellectual property assets such as trademarks, inventions or designs. However, NEE has registered the trademarks PAHO and NIBBAN at the Registration Office of Deeds and Assurance through a Myanmar trademark law firm. NEE has tried to preserve its reputation for quality products and to satisfy consumers with its electronic products. It has invested heavily in advertising the brand name of its products using such means as leaflet distribution, advertising on TV and FM radio, taking part in exhibitions, opening of showroom and service center and setting up a sales promotion program. According to the present IP (intellectual property) system in Myanmar, NEE has no chance of protecting its IP assets, especially for product design. However, it has used a special procedure to control the design of its software to prevent unauthorized copying. Moreover, agreements such as nondisclosure in order to protect its IP are included in contracts with employees or partners.

Myanmar became a fully-fledged member of ASEAN on July 23, 1997 and joined the ASEAN Free Trade Area (AFTA) to take advantage of the benefits accorded under the Common Effective Preferential Tariff Scheme (CEPT) which has 15-year time frame running from January 1, 1993. Myanmar anticipates that large quantity of products from other ASEAN countries, including electronic goods, will enter its market in 2008 and that this will lead to an increase in foreign investment in manufacturing in the country. NEE is trying hard to keep abreast of market forces by controlling product quality, improving awareness of its trademark and applying new strategies especially in Research and Development (R&D).

Additional references

NLM, 07/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-07.pdf>

Nibban Electric & Electronics introduces new products at a dinner in the Western Park Royal restaurant in Yangon. It now distributes new models of colour TVs and antennas, DVD and EVD players, speakers, digital home and on-line UPS, Baho voltage regulators, inverters and LED lamps that utilize Japanese technology. It also distributes the Nibban digital TV set-top box. There are show rooms in Yangon and Mandalay.

NLM, 10/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-10.pdf>

The print edition of NLM includes two photos showing the interior and exterior of the Nibban plant in the East Dagon industrial estate.

NLM, 28/02/06. www.myanmargeneva.org/06nlm/n060228.htm

Dealers' Night 2006 took place at Traders Hotel to honour agents who put the sale of goods produced by Nibban Electric and Electronics top on their lists of priorities. Entrepreneur U Thein Kyi of Nibban Electric and Electronics introduced new items such as Nibban auto and manual voltage regulator, Nibban auto voltage regulator and safeguard, Nibban auto inverter and Nibban digital AVR.

NLM, 07/09/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040907.htm>

A ceremony to honour Nibban Electric and Electronics of Myanmar for receiving (ISO 9001:2000) was held at Traders Hotel yesterday. Present were cabinet ministers, the Yangon Station Commander Brig-Gen Myo Myint, heads of departments, sale agents and guests. Dr Aung Thein of Nibban Electric and Electronics reported on procedures involved in qualifying for ISO 9001:2000 certification and MD Ho Yoon Sin of Daya Manusia Sdn Bhd of Malaysia on the certificate. Proprietor U Thein Kyi of Nibban Electric and Electronics presented gifts to those who rendered assistance in receiving the certificate. The guests viewed new product UPS and antenna.

NLM, 23/05/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040523.htm>

General Soe Win and party visited Nibban Electric & Electronics factory in Thakayta IZ. GM Dr Aung Thein reported on production of TV antenna and related accessories, generators, inverters, chargers and safeguards, and on efforts to produce satellite disc antennae while the proprietor, U Thein Kyi, gave a report on technical know-how. Afterwards, the visitors went to the automobile factory of Nibban UD Group Industries where they inspected production of light trucks and 20-kW generators.

PADDY HUSK POWER PLANT TESTED TO CUT RICE MILLING COSTS

Win Nyunt Lwin, Myanmar Times, 19/12/05.

(Compiler's note: Issue 297 of the Myanmar Times is no longer available on-line.)

The A&I Ministry and Japan's New Energy and Industrial Technology Development Organisation (NEDO) have begun talks on plans for a model project to generate power from rice husks. The power generated by the US\$ 6-million project would be for use by rice mills. The talks follow the completion of a four-month feasibility study which identified Dedaye in Ayeyawaddy division, the country's main rice growing area, as being the best site for the project, said Mr Keisuke Noguchi, the Japan-based deputy director of NEDO's international projects management division. Mr Noguchi told a coordination meeting at the MiCasa Hotel on December 7 that the feasibility study was conducted at Dedaye as well as Pyapon and Kyaiklat in Ayeyawaddy division and at Kungyangone and Hlegu in Yangon division, where there are many rice mills.

A senior executive from Japan's Shikoku Electric Power Co, Shigehiko Hayashi, told the meeting that Dedaye was selected because of its suitability for the power plant and the installation of power lines, as well as the ready availability of rice husks and the co-operation of concerned organisations. The government is yet to grant approval for the project, for which Japan has offered to supply machinery, equipment and technology worth ¥ 701 million (about \$5.7 million). Should the project be approved by both sides, Myanmar would contribute about ¥ 43 million (\$360,000) to build the plant, power lines and other infrastructure.

Mr Noguchi said another study next month would be followed by further discussions aimed at leading to agreement on where and when the project would be implemented. He said the project aimed to reduce the reliance of rice mills on diesel by providing a cheaper power source that would also help them to upgrade production standards. The project was welcomed by government officials at the meeting, who said increased diesel and petrol costs had resulted in higher milling charges that indirectly affected the price paid for rice by consumers.

Additional references

NLM, 20/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-20.pdf>

Treasure Engineering Group, a member of Myanmar Industries Association, held a demonstration of the company's Yadana gasifier at Letkhaik village in Kawhmu township on 28 March. MD Khin Win of the

Treasure group, showed how the gasifier can be used for pumping water, milling rice, generating electricity and running an oil mill and a saw mill. Whereas, the operation of a water pump normally requires eight gallons of diesel in a 24-hour period, Treasure's Yadana gasifier uses only one gallon of diesel and [the methane gas] produced by 10 viss of paddy husks for similar work. [A photo of the demonstration accompanies the article in the print edition of NLM.]

Kyaw Thu, Myanmar Times, 11/09/06

(Compiler's note: Issue 333 of the Myanmar Times is no longer available on-line.)

The Myanmar Inventors Cooperative Society met with a Japanese delegation and an official from the Myanmar Rice Millers' Association on August 30-31 to discuss the implementation of a large-scale rice-husk electricity generator for Dedaye in Ayeyarwaddy Division that would be able to produce as much as 1500 megawatts.

May Thandar Win, Myanmar Times, 14/11/05.

(Compiler's note: Issue 292 of the Myanmar Times is no longer available on-line.)

Myanmar Rice Millers' Ass'n has provided NEDO with information and assistance that will help determine the site of a biomass power station that will supply energy to privately owned rice mills, according to U Tin Win, the association's president. Tin Win said the site will be chosen based on convenience of installation and distribution of electrical power lines, transportation, the availability of raw materials, and the number of rice mills within 60km of the power station. He said the main reasons for building the biomass power station are that biomass energy is environmentally friendly and that using biomass will allow rice mills to operate without relying on increasingly expensive diesel fuel. The new power plant will use rice husks for fuel, which are abundantly available in Myanmar and are currently used to operate some small steamed rice mills, vermicelli mills and local breweries in rural districts. The Japan-based Shikoku Electrical Power Company has been subcontracted for the construction of the power station.

San Thein, Biomass energy production: Prospects and Potential in Myanmar', Myanmar Sugarcane Enterprise, [undated].

<http://unit.aist.go.jp/internat/biomassws/02workshop/reports/20051213PP01-01p.pdf>

See above: `Rice husks used to power [urban wards](#)` (Myanmar Times: 23/08/10)
 `Village rice husk power plant will serve as [research centre](#)' (MT: 24/09/07)
 `Plans for [7-million-dollar](#) rice husk power plant edge forward' (MT: 27/08/07)
 `[Rice-husk generators](#) slated for villages in Yangon division' (MT: 11/06/07)
 `[Inventor co-op](#) society exports first rice-husk generators' (MT: 21/08/06)
 `[Interest growing](#) in rice-husk generation' (MT: 10/07/06)
 See below: `[Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)
 `Biomass gasifier used for [tobacco curing](#) in Myingyan (TERI: 08/04)

COLLABORATE ON CONTRACTS, [ICT SECTOR](#) URGED

Khin Hninn Phyu, Myanmar Times, 12/12/05.

(Compiler's note: Issue 296 of the Myanmar Times is no longer available on-line.)

Collaboration in the ICT sector is essential to promote its software outsourcing capability, said the president of the Myanmar Computer Industry Association, U Aung Zaw Myint. "We should not work against each other but instead work in collaboration to compete against other countries," he said.

U Aung Zaw Myint said ICT was the world's largest industry and provided opportunities for Myanmar software firms to earn export income by outsourcing products and to help accelerate the development of the sector rather than competing on the domestic market. He said collaboration among software firms would enable them to overcome challenges in handling big outsourcing projects because of a limited number of qualified personnel. "We need to cooperate and support one another for the development of our industry," U Aung Zaw Myint said.

He was speaking at a workshop held at Myanmar Info-Tech on November 5 to foster collaboration among software companies. Specialists from five leading software outsourcing companies – Myanmar Information Technology Pte Ltd, Myanmar.net, Azure Net, Computer Marketing and the Myanmar Computer Company Group – gave presentations at the workshop to assist in planning the steps needed for closer co-operation.

The managing director of Azure Net, U Win Maw, said co-operation within the sector would strengthen its ability to win big outsourcing contracts from other countries because most ICT companies had about 20 employees. “Co-operation among companies would enable 100 or 200 people to work on big projects,” said U Win Maw. The chief executive officer of the MCC Group's SoftSys Division, U Aung Soe Lin, said developing a reputation for quality was the most important factor for winning overseas outsourcing contracts. Companies that had focussed on raising quality and skill levels would find it easier to gain trust in the market, he said.

The assistant general manager of Myanmar Information Technology Pty Ltd, U Nay Linn Than, said the strengths of the sector included the speed at which it upgraded its capacity and applied new technology. However, one barrier to overcome was a need for more highly trained personnel as most foreign companies sought business partners whose employees had internationally-recognised qualifications. “It is important for the industry to clearly understand that we need to invest in human resources development,” U Nay Linn Than said.

Additional references

See above: [Homegrown software](#) industry struggles on (MT: 12/03/07)

See below: ‘Electronics industry [spreading roots](#) in industrial sector’ (NLM: 06/06/04)
[‘Software growth](#) badly in need of human touch’ (MT: 16/10/00)

HYDROPOWER DEPT AND EGAT INK AGREEMENT ON [HUTGYI](#) PROJECT

NLM, 10/12/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051210.htm>

An agreement signing ceremony between the Hydroelectric Power Department and EGAT Plc Ltd of Thailand on the Hutgyi hydropower project to be implemented on the Thanlwin river in Kayin state took place at Hotel Nikko [in Yangon] this morning. It was attended by Ministers, Deputy ministers, Heads of Departments, Thai Minister for Energy Viset Choopiban, the Head of departments of the Ministry of Energy of Thailand, Thai Ambassador Suphot Dhirakaosol and embassy staff, CEO Kraisri Karnasuta and officials of EGAT Plc Ltd. Mr Kraisri Karnasuta and Director-General Win Kyaw of the Hydroelectric Power Department extended greetings and Minister for Electric Power Tin Htut and Minister for Energy Viset Choopiban made addresses on the occasion. Director-General Win Kyaw and Mr Kraisri Karnasuta signed the agreement and exchanged notes. Hutgyi Hydropower Project will jointly be implemented by the Hydroelectric Power Department and EGAT Plc Ltd. The power plant will be equipped with a 600-MW turbine that can produce 3,820 million kwh yearly.

Topographic map reference: Thailand: 1:250,000: Series L509, U.S. Army Map: NE 47-10: Li
 Hutgyi dam, 33 km downriver from confluence of Salween and Moei, grid square reference: 19/4, 3/6
http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-ne47-10.jpg

Website reference:

Aaron T. Wolf and Joshua T. Newton, *Case Study of Transboundary Dispute Resolution: Salween River*, (Oregon State University, 2007)

http://www.transboundarywaters.orst.edu/research/case_studies/Salween_New.htm

“China, Myanmar, and Thailand do not yet have an agreement on the use of the Nu/ Salween river, thus allowing each of them free use of the river. Each of these countries has unilateral plans to construct dams and development projects along the Salween, but these sets of plans are not compatible.” Includes a case summary, a brief presentation of the problem, a statement on the issues involved, a map of the Nu/Salween

river basin, a table on features of the river. Especially useful is a timeline section summarizing plans by the three countries to develop hydropower projects on the Nu/Salween.

Additional references

Data summary: [Hatkyi](#) ([Hutgyi](#))

See above: 'Controversial Hatgyi dam to go ahead' (Bangkok Nation: 16/02/10)

'Chinese firm takes 51% interest in Tasang hydropower project' (MT: 19/11/07)

NLM, 28/08/09. <http://www.burmalibrary.org/docs07/NLM2009-08-28.pdf>

EPM-1 Zaw Min meets with Acting MD Prutichai Chonglertvanichkul of EGAT International Co Ltd and MD Zhang Lei of Sinohydro (Thailand) Co Ltd and party. The meeting focused on joint projects.

Saw Yan Naing, IRROL, 19/08/09. http://www.irrawaddy.org/article.php?art_id=16600

Survey work at the Hat Gyi dam site resumed in July-09 when a group of about 30 EGAT engineers and other workers visited the area, bringing with them construction equipment. Survey work originally began in 2004 but was suspended after two Thai employees of the EGAT died in the area—one after stepping on a landmine and the other killed in a grenade attack. Law Plah, general coordinator for Karen River Watch, a community-based environmental organization said the survey work was continuing every day. "They are now learning about the condition of the land and the river," Law Plah said.

Saw Yan Naing, IRROL, 17/08/09. http://www.irrawaddy.org/article.php?art_id=16584

Since the Karen National Liberation Army (KNLA) Brigade 7 headquarters in southern Karen State was overrun in July, some border trade including logging and surveying for dam construction has resumed, border sources said. A joint Burmese army and Democratic Karen Buddhist Army (DKBA) force plans to resume its offensive in northern Karen State in September, and take over the remaining KNLA bases along the Thai-Burmese border.

Saw Yan Naing, IRROL, 04/08/09. http://www.irrawaddy.org/article.php?art_id=16475

The Karen National Union (KNU) has appealed to the Thai government to halt its involvement in the construction of the Hat Gyi Dam on the Salween River, warning that the project will cause "huge" environmental damage and human rights abuses. The KNU made the appeal in a letter to Thai Prime Minister Abhisit Vejjajiva. David Takapaw, KNU vice chairman, said: "The dam will result in huge environmental impacts and human rights abuses. It will force local villagers to flee to Thailand and become refugees. So we asked him: please, don't continue the dam construction."

Apinya Wipatayotin, Bangkok Post, 31/07/09. Edited and condensed.

<http://www.bangkokpost.com/news/local/21209/salween-dam-plan-draws-heavy-flak>

Ministers attending an ASEAN energy minister's meeting in Mandalay have adopted a Thai-drafted Plan of Action for Energy Co-operation 2010-2015. The plan, which will serve as a guideline for supporting Asean energy co-operation, includes measures such as the use of clean coal technologies and nuclear energy cooperation to generate power. It also mentions co-operation on multi-billion-baht hydropower developments in the region. During the meeting, Thai Energy Minister Wannarat Channukul and representatives from the Electricity Generating Authority of Thailand reportedly held talks with Burmese government officials on the development of the Hut Gyi hydropower dam on the Salween River, which forms part of the Thai-Burmese border. Non-government organisations, including the Burma Rivers Network (BRN) and OilWatch Southeast Asia, issued statements when the energy ministers meeting began on Tuesday calling for energy development projects in Burma to be terminated.

Lawi Weng, IRROL, 29/07/09. Condensed, http://www.irrawaddy.org/article.php?art_id=16428

A spokesperson for the Thai energy ministry told the Irrawaddy that the Thai delegation to an ASEAN regional energy meeting in Mandalay this week would raise the subject of the Hat Gyi and Tasang hydropower dams with the Burmese delegation at the conference. "We are worried that if we don't get back to work on the Hat Gyi project with Burma, China will take over. This is why we have set up a subcommittee to consider and study the effects of building the Hat Gyi hydropower dam," said the spokesperson. Concerns about the environmental impact of the projects have caused delays in construction. Environmental

activists say that the dams will displace thousands of local people and adversely affect the livelihoods of many more.

Matichon Daily, 13/07/09. Translated, edited and condensed. <http://www.burmariversnetwork.org/news.html>
A public forum on the Hutgyi Dam was held at Ban Sobmoey in Sobmoey district, Mae Hong Son province on 12/07/09. A petition signed by more than 2,000 people from 19 villages addressed to Prime Minister Abhisit Vejjajiva was delivered to Changthong Ophassirwit, Deputy General Inspector, Office of the Prime Minister, who was in attendance at the event. The letter draws attention to the importance of the river to the livelihood and prosperity of local communities in the area and the deterioration of the environment that will result from the construction of dams on the river. Further, the construction of the Hutgyi dam, in particular, will inevitably cause impacts on the Karen people and lead to an increasing number of them to flee to Thailand as a result of the militarization of the area around the proposed dam. In the petition the villagers demand that the Electricity Generating Authority of Thailand (EGAT) and the Thai government immediately stop the Hutgyi dam construction project.

Irrawaddy On-line, 18/06/09. http://www.irrawaddy.org/article.php?art_id=16078

The Karen National Union (KNU) will abandon its Brigade 7 military bases [opposite Mae Salit in Thailand's Tak province]. Karen sources said that the KNU will let the joint Burmese army and Democratic Karen Buddhist Army (DKBA) force take over the military bases because it does not want Karen people to kill each other. The DKBA soldiers split from the Karen National Liberation Army (KNLA), the military wing of the KNU in early 1995. Sources said the KNU prefer to use guerrilla tactics instead of confronting the combined troops as it will cost fewer lives. The joint force has already seized three military bases belonging to KNLA Brigade 7, since the combined force started the offensive in early June. The seized bases belonged to KNLA Battalion 21, 22, and 101. The offensive launched by the joint force has forced at least 4,000 Karen villagers to flee their homes in Pa-an District in southern Karen State and escape to Thailand. The DKBA is recruiting soldiers as the Burmese regime has ordered their troops to become border guard militias. They have also been asked to clean up KNLA military bases along the Thai-Burma border by 2010, when the regime plans to hold the general election, according to Karen sources. **[Compiler's note:** Given the location of the 7th Brigade's military base in proximity to the proposed Hutgyi hydropower dam, it seems safe to assume that the operation was undertaken to secure the area for the safety of civilian workers who will be involved in planning and construction activities related to the project.]

Mizzima, 10/06/09. Edited and condensed. http://www.salweenwatch.org/index.php?option=com_content&view=article&id=212:thai-government-briefs-people-on-salween-dam-project-&catid=34:news&Itemid=56

On a tour of villages to be affected by the Hatgyi dam on the Salween river on June 8th, officials of several ministries of the Thai government said it was expected that about 1,800 persons in six villages would have to be relocated as a result of flooding created by the dam reservoir. Local people believe that as many as 24 villages could be affected. The ministry officials told villagers in Kha Lekho that the project would take up to seven years to complete. A final agreement to go ahead with the project had not yet been reached, they said, and it was still possible that it could be cancelled. It was expected that Thailand would receive 90pc of the electricity generated by the Hatgyi power plant, while the remaining 10pc would be used in Burma.

NLM, 05/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-05.pdf>

EPM-1 Zaw Min meets with Secretary Pornchai Rujiprapa of the Thai Energy Ministry, MD Prutichai Chonglertvanichkul of EGAT International and GM Zhang Goulai of Sinohydro Corp in Nay Pyi Taw with regard to implementation of the Hatgyi hydropower project.

Watcharapong Thongrungs, Nation (Thailand), 17/12/08.

http://www.nationmultimedia.com/2008/12/17/business/business_30091196.php

The Electricity Authority of Thailand has targeted early next year to set up a joint venture to develop the Hatgyi dam construction project on the Salween River of Burma. Egat governor Sombat Santijaree said yesterday that the feasibility study and the environmental impact assessment had been completed and the project would yield a high return while bolstering the country's energy security. Next, Egat, the Burmese government and Chinese state enterprise Sinohydro Corp will enter into tripartite negotiations on forming the

consortium to manage the 1.4-gigawatt plant. According to the Energy Ministry's preliminary plan, Egat will hold 45pc of the joint venture, Sinohydro 40pc and Burma 15pc. The average production cost will be Bt1.60 per kilowatt per hour. The project will promise a return on investment of 19pc. China will fully finance the total cost of construction, estimated at about US\$1.4 billion (Bt49.4 billion), with project loans. The plant will sell its output to Thailand and is expected to start feeding energy into the national grid in 2015 or 2016. The electricity from the project is expected to be offered at a low price, since the power-purchasing agreement will be settled on a government-to-government basis. However, the project has been opposed by NGOs on concern that it will violate human rights, given that part of the project lies in an area occupied by minority groups in Burma. According to the NGOs, Sob Moei village in Mae Hong Son is expected to be affected because the dam will block the Salween River that runs into Burma and will induce flooding in Sob Moei and other villages in the area.

China Southern Power Grid. 15/07/08. http://www.sp.com.cn/dlyw/gndlyw/200807/t20080715_109473.htm
In order to implement the tasks under the "Framework Agreement on Myanmar's Salween River Basin Hydropower Development Strategic Cooperation", the China Southern Power Grid Co, Sinohydro Corp and China Three Gorges Project Corp held the first joint working meeting on Myanmar's Salween River Basin, and decided to form a tripartite joint working group. The meeting confirmed the membership, working place, working mechanism and the initial plan for the next phase work of the joint working group. This strikes the foundation for the implementation of the Myanmar's Salween river basin hydropower projects, particularly Tasang Hydropower Project. The working group will then develop the working objectives, responsibilities and obligations, and start the assessment of the initial project technology and business risks. They will also arrange joint market field research, and start the pre-project work among Chinese, Thai and Myanmar sides.

Li Xiqiong and Li Jin-jin, China Economic Times, 28/04/08. Translation: Kevin Li.

<http://info.rj.com.cn/news/2008-04-28/000003585891.html>

China's Sinohydro Corp, the China Southern Power Grid Co and the Three Gorges Project Development Corp will work together in developing hydroelectric resources along Myanmar's Salween river following the signing of a formal co-operation agreement at Sinohydro's headquarters in Beijing. Sinohydro will draw upon its experience in overseas hydropower and mining projects, while China Southern Power Grid Co has previous involvement with projects in the Greater Mekong Sub-region area. The Three Gorges Project Development Corp has accumulated a wealth of experience in the construction and management of large-scale hydropower projects, watershed development and cascade hydropower operation. The arrangement is expected to become a model of economic co-operation between China, Burma and Thailand.

Shu Huaying, Sinohydro Corp news release, 11/03/08.

[http://www.sinohydro.com/english/portlet?](http://www.sinohydro.com/english/portlet?pm_pl_id=7&pm_pp_id=19&COLUMNID=11424148920001&CHCOLUMNID=11424149100001&ARTICLEID=12054551070001)

[pm_pl_id=7&pm_pp_id=19&COLUMNID=11424148920001&CHCOLUMNID=11424149100001&ARTICLEID=12054551070001](http://www.sinohydro.com/english/portlet?pm_pl_id=7&pm_pp_id=19&COLUMNID=11424148920001&CHCOLUMNID=11424149100001&ARTICLEID=12054551070001)

On 10/03/08, EGAT and Sinohydro International signed a supplemental memorandum to the agreement on the Hajji (Hutgyi) hydroelectric power station project on the Salween river in Burma. The original agreement was signed in June 2006 in the Great Hall of the People in Beijing. The supplemental memo allows Sinohydro Corp to become the majority shareholder in the Hajji dam project. It was agreed that the change will be of mutual benefit to all parties to the agreement. **Compiler's Note:** Thanks to ERI's China Burma Development Project for translation of the Chinese version of this report.

William Boot, IRROL, 08/03/08. http://www.irrawaddy.org:80/article.php?art_id=10753

The new Thai government of Samak Sundaravej has given the green light to large-scale infrastructure projects such as hydro dams on Burma's Salween River. Samak's first visit to Burma as prime minister, scheduled for the second week in March is expected to offer reassurances on the existing agreements between the two countries. "There was some breath holding in recent months, during the previous Bangkok-installed military government phase, on projects such as the hydroelectric dam on the Salween at Tasang," said Bangkok-based power industries consultant Collin Reynolds. "But I think the China link on this project has to keep it afloat, even though it is highly expensive and of questionable value given the environmental problems almost certain to ensue on both sides of the border."

William Boot, IRROL, 16/02/08. http://www.irrawaddy.org/article.php?art_id=10422

Suggestions that Thailand's new government is having second thoughts about supporting major hydro-electric projects on key Burmese rivers are "rather unlikely," according to energy industry analysts. "Thailand has already programmed these projects into its future energy needs," said industry analyst Sar Watana in Bangkok this week. "And this government is more pro-business and less environmentally concerned than its predecessor."

Kyaw Thu, MT, 11/02/08. <http://www.mmtimes.com/no405/b003.htm>

Hydropower projects underway on the Thanlwin river between Thailand and Myanmar are on hold while the Thai government changes hands. According to an energy expert close to EPM No 1, the Myanmar side still has not received any official information concerning the continuation of hydropower projects being developed between the two nations. The Hutgyi project in Kayin State is worth US\$1 billion and is a joint venture between Myanmar's Department of Hydropower Implementation (HPID), the Electricity Generating Authority of Thailand (EGAT) and China's Sinohydro Corp. It is hoped to produce 1200 megawatts (MW) of electricity when finished. The Tasang hydropower project in Shan State is worth \$6 billion and is expected to generate up to 7110MW. It is being jointly developed by Thailand's MDX Group and HPID. Work started last March and is expected to finish in 2022.

Bangkok Post, 11/11/07 http://www.bangkokpost.com/Perspective/11Nov2007_pers001.php

Construction work on the Bt-36-billion-(US\$1.1 billion-) Hut Gyi dam was scheduled to begin in 2008. But Egat has not sent any employees to the Hut Gyi site since an artillery attack that killed a Thai engineer in September. "The decision on the status of the Hut Gyi dam is likely to be made when the new (Egat) governor takes office," said an Egat official. Another reason for the present lull may be that an overall decision on the involvement of Thailand in developing dams on the Salween would probably have to be made by an elected government some time after the December 23 general election in Thailand. Activists like Pianporn Deetes of the Living River Siam-Southeast Asia Rivers Network (SEARIN) say that Hut Gyi was chosen as the first dam construction site because its inundation area would be completely inside Burma, and that consideration of the adverse environmental and social effects of a dam at Hut Gyi has not been a priority for the Thai government, much less the Burmese. However, in light of the strong opposition from environmental and human rights organisations, Egat finally hired the Environment Institute of Chulalongkorn University to conduct an Environmental Impact Assessment. But the EIA has been classified as confidential, with only Egat having disclosure rights. Egat has also declined to discuss details of the agreement with the Burmese authorities on the construction of the Hut Gyi dam. Egat says it can't reveal details unless it receives permission from its counterpart in Burma. In late October, Dr Thaweewong Sriburi, chairman of the Environment Institute, claimed that only 42 families in Burma would need to be relocated because of the dam. He also said that leaders of the Karen National Union (KNU) and the Democratic Karen Buddhist Army (DKBA) support the construction. Environmental activists have proposed that the Thai government authorise an independent EIA so that the full impacts of the proposed dam to the river and the locals can be revealed. They cite as an example the Chinese-initiated project to blast reefs and shoals in the Mekong River. In 2003, the Thai cabinet called for an EIA study which has halted the explosions until now.

Sai Silp, IRRROL, 31/10/07 http://www.irrawaddy.org/article.php?art_id=9156

Pornchai Rujiprapha, secretary-general of Thailand's Energy Ministry, also chairman of EGAT, told a press conference on Tuesday that the Hutgyi electricity generating project is essential to energy stability because Thailand now mainly uses natural gas to produce electricity. "Natural gas supply is decreasing and the cost is increasing, so other sources and kinds of energy are needed from both Laos and Burma," he said, according to a TNA report. He said Egat has designated Bt120 million (US\$3.6 million) to assist in public health, education and employment for local villagers in the Hutgyi dam area. Meanwhile, the Thailand Human Rights Commission organized a public forum on the dam that included people from the affected area. Pianporn Deetes of the Southeast Asian Rivers Network told the Irrawaddy that the commissioners have agreed to ask the government to stop the project because of its negative impact on villagers and the environment in both Thailand and Burma. Thaweewong Sriburi of the Environmental Research Institute of Chulalongkorn University in Bangkok told the forum that a survey of the sites in Karen state found it is a conflict zone between the DKBA and the KNU. "The leaders of these groups support the construction, but urge assistance for quality of life developments for the villagers," he said. An impact survey on the Thai side of the border has not been completed, he said.

BKK Post, 29/10/07. <http://www.rebound88.net/>

Thailand's National Human Rights Commission (NHRC) has completed an initial environmental and social impact study of the controversial Hutgyi hydropower dam project on the Salween river. EGAT, the developer of the dam, has yet to come up with a report on the proposed dam's potential impact on the environment and local communities. However, EGAT has conducted an environmental impact assessment study for the Burmese side. The NHRC report includes damage to the livelihoods of ethnic groups living on Thai territory along the Salween river who might have to be relocated and possible devastation to the river's ecology. The Thai and Burmese governments signed an MoU to study the possibility of building dams along the Salween river in 2005. The Hutgyi project, about 30 km from the Thai border in Mae Hong Son, has an estimated capacity of 1,200 MW. Work on the 36-billion-baht dam was scheduled to begin in 2008 but survey work was temporarily suspended after a Thai engineer was killed in an artillery attack in Sept 2007.

Salween Watch Coalition Statement, 05/09/07. <http://www.burmanet.org/news/2007/09/05/statement-of-salween-watch-regarding-the-attack-on-the-egat-workers%e2%80%99camp-of-the-hat-gyi-dam-site/>

The blast at the workers' camp at Hat Gyi happened because EGAT's operations have been shrouded in secrecy. They have totally disregarded voices from civil society warning about the lack of security and extensive human rights abuses in the Salween River basin, where civil war between ethnic forces and the Burma Army has been continuing for over five decades. EGAT's investment in dam projects has never taken into account the real costs and risks of operating in areas where fighting and human rights abuses are taking place. The power plants will be located in exceptionally volatile areas, where numerous armed forces are in conflict. There is a constant risk of attack from various forces at any time. This incident is now being used to justify the increased deployment of Burmese troops in the area, directly contributing to the conflict. EGAT must take responsibility for [its] failure to transparently and comprehensively consider the risks of operating in a war zone.

AFP, 05/09/07. <http://www.burmanet.org/news/2007/09/05/agence-france-presse-thai-firm-says-attack-wont-stop-myanmar-dam/>

EGAT, Thailand's biggest utility company, vowed Wednesday to press ahead with its one-billion-dollar dam project in eastern Myanmar, despite an attack by ethnic rebels that killed a worker last weekend. "We will continue with the project after the Myanmar side promised to step up security to ensure the safety of our staff," said EGAT official Apichart Dilogsopon. "The project is a joint venture between Thailand and Myanmar. We must go ahead with it despite the risks," he told AFP. Apichart said that Myanmar could send its own technicians to finish the survey work, while the company reassures its staff about their safety in Myanmar.

Bangkok Post, 04/09/07. <http://www.burmanet.org/news/2007/09/04/bangkok-post-thai-dam-project-in-burma-suspended/#more-8693>

Thailand's state-run utility EGAT decided Tuesday to suspend its exploration for a new hydropower dam on Salween River until safety is ensured. Kraisi Karnasuta, EGAT governor, revealed the Hatgyi project had to be put on hold indefinitely after EGAT employee Samarn Kantameun was killed in an attack over the weekend. He was the second victim after the first fatality, a geologist, stepped on a landmine near the project site last May.

Saw Yan Naing, Irrawaddy On-line, 04/09/07. http://www.irrawaddy.org/article.php?art_id=8484

Saman Kantameun, 53, a Thai engineer employed by EGAT, was killed on Sunday (02/09/07) in a grenade attack by an unidentified group at the construction site of the controversial Hat Gyi dam near the Salween river in Karen state. Forty-two EGAT workers left the site and returned to Thailand for security reasons. The state-run New Light of Myanmar claimed the Karen National Union fired heavy artillery shells into the camp, but Apichart Dilogsopon, a spokesperson for EGAT, told AP he didn't know whether the rebels were from the KNU or if EGAT officials were the intended target. "We will work with officials in both countries to see how we can step up security measures," Apichart said. The general secretary of the KNU, Mahn Sha, recently met with EGAT officials and gave the company permission to conduct a survey near the construction site, but rumors have circulated that some KNU leaders who control the area around the Hat Gyi dam strongly oppose the project.

NLM, 04/09/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070904.htm>

On 2 September, a group of KNU terrorist insurgents fired heavy weapons at Malaryu in Hlaingbwe township where 13 Thai nationals engaged in the Hatkyi Hydropower survey project and an interpreter are accommodated. A shell from the heavy weapons landed on the site and exploded, leaving Mr Smarn, 54, a Thai national, dead.

Reuters, 03/09/07. <http://www.alertnet.org/thenews/newsdesk/BKK297351.htm>

The KNU has denied responsibility for an attack in which a 50-year-old surveyor was killed on Sunday (02/09/07). It said the attack was orchestrated by Myanmar troops with the intent of discrediting the group. "How could we do it when it is an area tightly secured by Myanmar troops?" KNU secretary-general Mahn Sa-la-pah told Reuters. "They want the Thais to hate us."

Nation (Bangkok), 03/09/07. <http://www.burmanet.org/news/2007/09/03>

A Thai EGAT worker at the construction site of the Hat Gyi dam in Burma died in a grenade attack on 02/09/07. Two men on a motorbike threw two grenades into the Egat camp where some 40 workers live. The bomb killed a worker identified only as Saman and injured others.

Saw Yan Naing, Irrawaddy On-line, 29/08/07. http://www.irrawaddy.org/article.php?art_id=8416

The KNU gave permission for an EGAT team to conduct two-day survey mission on the Salween despite continuing opposition to project by local villagers. The team had attempted to reach the dam site by boat along the Moei but had been turned back at a KNU checkpoint on the Moei, but the KNU later relented and gave permission, according to KNU Gen-Sec'y Mahn Sha. Karen River Watch Director Saw Nay said the project will involve mass relocation and use of forced labor. Construction is due to start in Nov-07 and end in 2013. Half the construction costs will come from Thailand, 40pc from China and 10pc from Burmese government.

Violet Cho, Irrawaddy On-line, 23/08/07. http://www.irrawaddy.org/article.php?art_id=8327

Thailand's energy authority EGAT held talks with leaders of the KNU on Thursday on a controversial proposal to build the Hat Gyi dam on the Salween River. The dam has run into strong opposition by local villagers. According to the Karen River Watch, the KNU gave EGAT permission last month to conduct a feasibility study on the dam. At the talks in Mae Sot, the EGAT delegation consisting mostly of engineers, appealed to the KNU to help the project proceed. The KNU's Lt-Col Roger Khin said no decision had been taken at the meeting, and KNU leaders would now consult with other executive committee members. The EGAT delegation was promised a decision within two weeks, he said.

Xinhua, 06/08/07. http://news.xinhuanet.com/english/2007-08/07/content_6486386.htm

Soil tests were conducted recently at three ports along the banks of the Thanlwin with the co-operation of experts of EGAT, in connection with the Hutgyi hydropower project. The generating facility will have a 600-MW turbine that can produce 3.82 billion kWh. The project was agreed to between two countries in June 2005, quoting the Weekly Eleven News.

Salween Watch Newsletter, August 2007

http://www.salweenwatch.org/downloads/Salween%20Watch_Vol%201%20August%2020071%20FINAL.pdf

The Hat Gyi dam will be located 33 km downstream from the Salween-Moei river confluence. The area has been largely depopulated due to forced relocations. At a meeting with the EIA [Environmental Impact Assessment] team [of EGAT], Salween Watch learned that the installed capacity will be 1,200 MW, while the dependable capacity of Hat Gyi dam throughout 24 hours will only be 200 MW. The routes for the power grids have not been fixed and long term security concerns will have to be considered. Without integrated water management, the installation of large dams upstream will inevitably affect water management at the Hat Gyi dam. The EIA team has not come up with a clear analysis of the impacts of the dam on the whole ecological system of the Salween. The team admitted that they are unfamiliar with various issues they are studying, which have not arisen at dam sites in Thailand. Geographical and environmental conditions differ significantly between the two countries, including the extreme depth and strong torrents of the Salween and its large delta which are different from those found in Thailand. The team promised that after completion of the initial study report in the next two months, they would convince EGAT to hold public forums to present the information and receive inputs from concerned parties.

Irrawaddy On-line, 20/07/07. http://www.irrawaddy.org/article.php?art_id=7943

EGAT confirmed its engineers returned to the Hat Gyi dam site to work, but they refuse to stay overnight and insist on Burmese army escorts.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information see '[Power Profile](#)'.

In December 2005, an MOU was signed between MEP and EGAT for the \$1-billion, 600-MW Hutgyi dam and hydro project with construction scheduled to begin in December 2007. Output from this plan is expected to be 4 TWh/yr with most power exported to Thailand.

Mizzima, 19/07/07. <http://www.mizzima.com/MizzimaNews/News/2007/July/44-July-2007.html>

EGAT renewed activities related to a feasibility study at the Hat Gyi dam site on 03/07/07. Thirty EGAT engineers and employees travel back and forth to the site from Pa-an on a daily basis; they travel 44 miles by car from Pa-an to Myaingyingu, thence by boat to the dam site. They are currently measuring the highest level reached by the water during the rainy season. LIB 549 is now responsible for security at the site, alongside battalion 555 of the DKBA. The number of government troops is expected to increase by 800 at the site and along the main route to the dam, Karen Rivers Watch reports that the old road from Hat Gyi to Mae Ta Rit will be repaired or rebuilt to improve access to the site.

Kyau Thu, Myanmar Times, 21/05/07. [Issue 367 of the MT is not available on-line.]

An official of EPM No 1 said on 15/05/07 that surveying at the Hutgyi dam site in Kayin State had been stopped over the rainy season. A draft feasibility report for the project will be finished by July-07. Additional information required to finalise the report will be acquired when surveying work resumes after the rainy season. The Hutgyi hydropower plant is expected to cost US\$ 1 billion and will generate 600 MW. It is being developed by Myanmar's Dept of Hydroelectric Power, Thailand's EGAT and China's Sinohydro Corporation.

Myanmar Times, 19/03/07. [Issue 359 of the MT is not available on-line.]

A group of environmental-assessment experts from Thailand's Chulalongkorn University will interview villagers near the site of the Hutgyi hydropower project on March 28, according to an official from EPM No 1. A team of ten will consider the social and environmental impact of the US\$1-billion project. They will study how people at the dam site might be affected by construction of the project. Group discussions with villagers will be included. The Thai academic group will be assisted by a group from EPM No 1 who will help collect information by providing translation services and data from other Myanmar gov't depts.

Network Media Group, 14/03/07. http://www.bnionline.net/index.php?option=com_content&task=view&id=1426&Itemid=6

Over 500 local residents staged a demonstration on the Thai-Burma border near the Salween River on the 'Global Day of Action against Salween Dams in Burma' (14/03/07) demanding that the Burmese military junta and foreign companies put a halt to the planned Salween dam project. The demonstrators included people from about 30 villages in Burm'as Papun district and Thai hill people as well as NGOs. Saw Karen of Karen Rivers Watch said the protest was to emphasize the disadvantages that will result if dams are built on the Salween. "There will be human rights abuses and thousands will be displaced and homeless if the dams are built. We want to send a message not to build the dams," Saw Karen said.

Pianporn Deetes, Nation (Bangkok), 28/02/07. www.burmanet.org/news/2007/03/02/

All planning and decision-making concerned with five proposed EGAT dams on the Salween have been conducted discreetly. The deals have been brokered with no public participation or transparency. EGAT has refused to disclose agreements made with the Burmese junta claiming obligations of confidentiality. Ordinary villagers who will be directly affected by the dams have not been kept informed by the state. The claim by Thai Energy Minister Piyasvasti Amranand' that work on construction of the dams is still far away contrasts with the reality on the ground. Preparatory work at the dam sites in Burma's Karen and Shan states has not ceased. Chulalongkorn University's Environmental Research Institute was commissioned by EGAT to conduct an environmental impact assessment in Burma in Nov 2006, the same month that Piyasavati claimed the dam plan would not be re-assessed by the Thai gov't.

Sai Silp, Irrawaddy On-line, 22/02/07. http://www.irrawaddy.org/article.php?art_id=6755

Thailand's giant electricity investor Ratchaburi Electricity Generating Holding Plc (RATCH) is negotiating with various business alliances to fund and construct multiple hydro-electric dam projects in Burma. Narong Sitasuwan, chairman of RATCH, said negotiations on shareholding agreements between companies are ongoing. RATCH is ready to invest in the 1,200-MW Hutgyi dam project with EGAT, along with a Chinese business counterpart, if EGAT supports RATCH's co-operation. RATCH is a registered company on the Stock Exchange of Thailand. EGAT holds 45% of the shares in RATCH which has many projects ongoing in Thailand and overseas. RATCH is currently conducting feasibility studies on co-investing opportunities in hydro-electricity projects in Burma. A report will be released in the final quarter of 2007. The interim PM of Thailand, Surayud Chulanont, told his Burmese counterpart in Nov-06 that Thailand's interim gov't will respect agreements between the two countries approved by the gov't of deposed PM Thaksin Shinawatra. Environmental and rights activists are preparing to stage protests on 28/02/07 against the controversial Hutgyi Dam project on the Salween River. Activists from more than 10 cities worldwide will stage protests against the construction of the dams at Thai embassies and consulates in cities worldwide, including in Tokyo, Washington, San Francisco, Sydney, Delhi, Berlin and Paris. Opposition groups claim the investment of about US \$1 billion for the construction of the dam will help to support human rights violations against ethnic groups in Burma.

Kyaw Thu, Myanmar Times, 05/02/07. [Issue 353 of the MT is not available on-line.]

Myanmar and Thai survey teams are at the Hutgyi dam site to help complete a feasibility study leading to construction of a hydroelectric power plant on the Thanlwin River according to an EPM No 1 official. The additional field work follows survey work done by EGAT from Feb to May in 2006. The survey report will be completed in August, 2007.

Kyaw Thu, Myanmar Times, 18/09/06. [Issue 334 of the MT is not available on-line.]

The Hutgyi hydropower project will be moved two km downstream in order to raise its projected output, according to an official of EPM No 1. The move will allow for increased water storage and will raise power output to 1100 MW – 1500 MW. The dam will be located about 30 km from the Thai border. "Thailand needs more power so we changed the design and location," the official said. The cost of the project, initially estimated at about US\$1 billion, will also change as a result of the move. Work, such as building and repairing roads to the site, will begin when the rainy season ends. A joint venture company will be formed to carry out the construction of the dam and power plant. Myanmar will receive 25% of electricity generated by the project.

AFP, 27/06/06. <http://www.burmanet.org/news/2006/06/27>

China's Sinohydro Corp will co-operate with EGAT to build a billion-dollar hydropower station at Hutgyi on the Salween River near the Thai border, according to a statement from the PRC's State-owned Assets Supervision and Administration Commission. The plant will have an installed capacity of 600 MW and will be the first of five that Thailand, China and Myanmar have previously said they would build on the 2,800-km-long (1,750-mile) river, the longest undammed waterway in south-east Asia.

Karen Rivers Watch, 17/06/06. www.searin.org/Th/SWD/swd_d2e.html

Local villagers hired to work at the [Hat Gyi] dam site were paid K 4000 per day during survey operations. They are not in favour of building the Hat Gyi (Taung Kyar) dam, since it will result in the displacement of many villages including Htee Paw Mu Naw and Mae Par which will all be inundated. Some have moved away from area, taking their belongings, cattle and buffaloes. They are simple farm workers who depend on the fertile silt carried down by the river for their farms. The slowing of the current when the dam is finished would mean less silt being available, also much of the farmland would be flooded. The villagers feel unable to do anything about the decision to go ahead with the dam. Since the the explosion that killed a Thai surveyor, checkpoints have been set up and every boat going up or down river is closely checked.

Jessicah Curtis, Mizzima, 31/05/06. <http://www.burmanet.org/news/2006/05/31/>

Egat has cut short the survey phase of the Hat Gyi dam in Karen State after a worker died from injuries sustained in a landmine accident in Burma. Surveyor Chana Mongplee lost a leg on May 3 after stepping on a landmine near the proposed dam site. He died as a result of his injuries on May 9th. "We didn't feel very secure and the survey was almost complete anyway," a company spokesman said. The project will continue without the completed survey.

Sai Silp, Irrawaddy On-line, 01/03/06. <http://www.burmanet.org/news/2006/03/01>

A group of Thai senators plans to resubmit an official letter to the Ministry of Energy urging disclosure of details of an MoU signed by Egat Plc for construction of a hydro electric dam on the Salween River. A previous request was denied in a meeting between environmental groups and representatives of EGAT. The legislators, who are represented on the Senate's Committee for Social Development and Human Sustainability, were prompted to take the action by an unofficial report by local environmentalists that ethnic minority populations who could be adversely affected by the dam had fled the proposed construction area for Mae Hong Son in Thailand. According to Senator Tuenjai Deetes, the company claimed that it could not discuss the project without getting permission from the Burmese government. The senate group also wants Egat Plc to allow for public participation and input by openly declaring the scope and progress of the dam project.

Salween Watch, March 2006. www.salweenwatch.org/dam_site.html

The first of four giant dams to be built by EGAT and the Burmese and Thai governments on the Salween river will be near Hat Gyi about 33 km downstream from the confluence of the Salween and Moei rivers. The dam site is at a point on the Salween where there is a powerful rapids that becomes a waterfall when water flow in the river is reduced in the dry season. The area is part of the Kahilu Wildlife Sanctuary. Work on the dam is expected to commence in late 2007. Distribution of power to Thailand scheduled to begin in 2013-14. The Thai and Burmese governments have agreed to keep all data and joint studies on this project strictly confidential. A pre-feasibility study carried out by Japan's NEWJEC group in 1999 recommended a low height, run-of-river dam having a capacity of 300 MW. On 14/11/05, a statement by the Thai energy minister cited a new feasibility study which indicated that "electricity production could be increased to 1,200 MW" by construction of a substantially higher dam which would create a much larger reservoir.

Kyodo, 10/12/05. http://findarticles.com/p/articles/mi_m0WDP/is_2005_Dec_12/ai_n15957111

On 10/12/05, officials from Thailand's EGAT and Myanmar's Dept of Hydroelectric Power signed an MoU about a hydropower project on the Salween river in Yangon. The ceremony was attended by Myanmar's Minister of Electric Power and Thailand's Energy Minister Viset Choopiban. Thai media reported that EGAT plans to eventually build five dams along the Salween that would generate a total of more than 10,000 megawatts of power. According to sources at Myanmar's electric power ministry, about 90pc of the power generated by hydropower plants along the Salween is expected to be exported to Thailand.

Thai News Agency (TNA) as reported in the Bangkok Post, 07/12/05.

http://www.bangkokpost.com/breaking_news/breakingnews.php?id=66217

Thailand and Burma plan to sign an MoU on building a series of hydroelectric dams in Burma on Friday (10/12/05), according to the president of Egat Plc, Kraisi Kanasuta. Mr. Kraisi said that the construction of five dams that will generate over 10,000 MW was planned along the Salween River. The project would not only secure electricity for Thailand, but also provide much-needed income for Burma, Kraisi said. The project will also support an integrated power grid plan of ASEAN, according to Kraisi. Egat [Plc], previously known as Electricity Generating Authority of Thailand (EGAT), would sign the MOU with Myanmar's state electricity organisation to jointly invest in construction of the series dams along the Salween River, he confirmed. The Hat Gyi hydroelectric dam, the first of the series, will take five to six years to complete, and will have a capacity of 1,200 MW. China is expected to participate in the project and this will help reduce the cost of construction. China has nearly completed the Three Gorges Dam along the Yangtse River; so equipment there could be used for the Salween dams project, Mr. Kraisi said. But further discussions would be needed before deciding on China's participation.

Thai Press Reports: 14/11/05 <http://www.burmanet.org/news/2005/11/16>

Energy Minister Viset Choopiban said talks between his ministry and the electricity ministry of Myanmar were held recently about possible construction of five or six hydroelectric dams on the Salween River which could generate electricity up to a total of 20,000 MW. The Hat Gyi dam is expected to be the first of the series. According to a feasibility study, its production could be increased to 1,200 MW from an earlier estimate of 700 MW. The planned joint investment in hydropower production with Myanmar will benefit both countries and create a stable energy supply for Thailand, while Yangon would gain additional revenue, Mr Visert said.

The recently privatised Egat Plc, formerly the Electricity Generating Authority of Thailand (EGAT), has expertise in production of electricity and will provide joint investment in the project with the Myanmar government.

See also: 'Hydropower planned for [border industrial zones](#)' (MT: 31/05/04)

Images Asia - TERRA report, November 1999. <http://www.angelfire.com/rock3/shanyouth/body/status-of-salween-dam-plans.html>

A pre-feasibility study for the Hutgyi hydropower project on the Salween River places it 33 km downstream from the confluence of the Salween and Moei rivers near the former Karen resistance headquarters of Manerplaw. The study resulted from an agreement between MEPE and a group of developers including Marubeni Corp of Japan and Italian Thai Development Plc of Thailand. It was carried out by a Japanese consulting group, NEWJEC Inc, a subsidiary of Japan's Kansai Electric Power Co, and was completed in August 1998. It proposes a concrete gravity dam 37 m (121 ft) high from base to top. It would be a so-called "run-of-river dam" that would not have a large reservoir. The 'normal high water level' of the dam would be 48 metres (157 feet). The dam would have eight 37.5-MW turbines for a total installed capacity of 300 MW and is expected to produce 2,150 gigawatt hours of electricity per year. A 230-kVA power transmission line would connect the dam to the Burmese power distribution point at Thaton (or Pa-an). Another 230-kVA line could connect the Hutgyi station to a Thai electricity substation in Tak, some 230 km away. The Burmese side appears to be more interested in the project than the Thais.

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WIND POWER [SYSTEM IDEAL](#) FOR VILLAGES, SAYS ENGINEER

Khin Hninn Phyu, Myanmar Times, 05/12/05.

(Compiler's note: Issue 295 of the Myanmar Times is no longer available on-line.)

A Yangon engineer says a low-cost wind power system he has built offers an ideal solution for rural communities needing a cheap source of energy. U Nyan Htoo, who took about two-weeks to build the system at his workshop on Saya San Road, said it was designed to generate power at wind speeds as low as eight miles an hour. "I made the system to be very simple so that village people can run it easily," he said. "All of the parts except the generator can be easily maintained and repaired."

U Nyan Htoo said the system was made mainly from easily available raw materials. The blades for the wind-mill were made from polypropylene sheets fitted to pieces of timber. The system can be used to charge eight or 12 volt batteries or power four 10-watt fluorescent tubes and a black and white television, he said.

Unlike solar power systems which can operate only during the day, the advantage of using wind power was that it was available around the clock, subject to wind speeds. As the system needed only low wind speeds, it was suitable for use in most areas of the country, said U Nyan Htoo, who has been experimenting with wind power for nearly eight years.

U Nyan Htoo said he built the system with funding support from an NGO, the Friends of the Rainforests in Myanmar. The prototype cost K 300,000 but future versions would be available for FEC100 to make it affordable for use at village level, he said. The prototype made its debut at a village electrification exhibition held at the Sayar San Plaza at Bahan township from November 2nd to 4th. It is due to be installed at a project site of Friends of the Rainforests in Myanmar in central Myanmar.

Website references

United Engineering [n.d.]. <http://www.united-engineering.net/MSEStuff/myanmarandsolar.htm>

During 1999, a research project was carried out by NEDO of Japan in collaboration with the New Japan Engineering Corp. to collect data and study the feasibility of a solar-wind power hybrid system at Letkokekon Beach, Chaungtha Beach, and Nyaungdon and Daypauk Village. There is huge potential for disseminations of PV systems in Myanmar with carefully designed projects.

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Appendix A: Project Sheet*. pp 23-26. September 2003

[http://lvzopac.jica.go.jp/external/library?](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5)

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5)

Descriptions of two proposed pilot projects to provide electricity to rural villages using wind power. The first is a hybrid PV solar and wind power project at Kaungmulon in Machanbaw township in upper Kachin state that would provide power to 382 households, a school and a clinic in three villages. Specifications and performance descriptions for the generators and battery charging system are not in the published report but are said to be available from the project's co-sponsor, REAM (Renewable Energy Ass'n of Myanmar(ELSF017)). This project, also under the co-sponsorship of REAM would see a windpower project set up in the village of Ahlae-thaung on a wind-swept island in the Ayeyawaddy river near its junction with the Chindwin.

"4. Solar and Wind Power", pp 23 – 30. Part of an unnumbered volume entitled, *Visual Guide for Planning Village RE Schemes*, of the series, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar* (Sept 2003), published by JICA, MEPE, Nippon Koei and the Institute of Energy Economics Japan.

[http://lvzopac.jica.go.jp/external/library?](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159767&volno=000000000&filename=11734050_02.pdf&seqno=2)

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159767&volno=000000000&filename=11734050_02.pdf&seqno=2](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159767&volno=000000000&filename=11734050_02.pdf&seqno=2)

This is background material designed for a non-technical manual to be used by field workers in presenting basic information about solar and wind power generation at the village and private home level. The advantages and disadvantages of each system are compared. The possibilities of a hybrid generating system are explored and the basics of a solar battery charging station are explained. The uses of solar panels in schools, rural health centres, and water pump stations are touched on.

Win Khaing, *Renewable Energy and Rural Development in Myanmar*, pp 14-21. Presentation made at TCDPAP & FIDIC/ASPAC) Conference (22-25/04/08) in Seoul. Edited.

www.mes.org.mm/.../RE%20%20Rural%20%20Development23April%2008,%20Seoul.pdf

In 1997, the New Energy and Industrial Technology Development Organization (NEDO) of Japan carried out a study on the renewable energy potential of the Greater Mekong Subregion (GMS) that estimated that Myanmar has a potential wind energy capacity of 360.1 TWh per year. Promising areas to harness wind energy are in three regions, 1) the hilly regions of China [=Kachin?] and Shan states, 2) the coastal regions in the south and west of the country and 3) the central part of Myanmar. Use of wind energy is at a very initial stage. Due to the high initial cost, the utilization of wind energy needs to be implemented in co-operation with foreign participants through a program of technology transfer and financial assistance. General observation shows that the wind power potential of Myanmar is relatively low and irregular. Considerable stagnant periods occur even in generally windy areas. Some potential areas were identified by a joint JICA/NGO survey in 2001. Coastal areas, islands, inland wind corridors and high plateau areas have potential but particular surveys as to the size and design of systems are essential before implementation. Solar power is found to have a higher potential than wind power in hybrid schemes in Myanmar. Only a very few small wind generators are in use in Lower Myanmar. Ready made wind generators of around 300-600 W-capacity are available in the private market. Most are imported from China. [Slides of two projects involved with generating electricity using hybrid renewable energy sources are included.]

Myat Myat Soe, *Design and Manufacturing of Wind Turbine Blade*. [From the proceedings of the] GMSARN International Conference on Sustainable Development: Issues and Prospects for the GMS: 12-14 Nov. 2008.

<http://dl.gmseenet.org/bitstream/handle/123456789/971/GMSARN08-ME12.pdf?sequence=1>

This technical paper presents the case for using DesignFOIL and ANSYS software in the aerodynamic design of blades to be used in generating electricity. "This horizontal axis wind turbine includes the ability to vary the blades' angle of attack to maximize the amount of energy extracted from the wind." Wind power should be considered as a viable alternative energy source in rural settings in Myanmar where most rural people do not have access to electricity. A six-step program is presented that could be used in preparing the blades in a rural setting. Amply illustrated. The author is with the Mechanical Engineering Dept of Mandalay Technological University.

Additional references

See above: 'Thailand to assist Myanmar in [study of wind generation](#) of electricity' (Xin: 12/03/09)
'[Wind energy](#) boosts rural development' (MT: 05/03/07)

See also the section on wind energy in '[Electricity potential](#) of energy sources available in Myanmar'.

Hla Kyaw et al., *Status and Potential for the Development of Biofuels and Rural Renewable Energy: Myanmar* (ADB: Greater Mekong subregion Economic Cooperation Program, Manila, 2009, p 19.)
<http://www.adb.org/Documents/Reports/Biofuels/biofuels-mya.pdf>

The New Energy and Industrial Technology Development Organization (NEDO) of Japan estimated the potential available wind energy in Myanmar to be 365.1 terawatt-hours per year. A diesel and wind energy hybrid community power system and a wind energy power system were installed in two locations: the Chaungthar hybrid power supply system project under the Ministry of Electrical Power, and a hybrid system at Chaungthar by NEDO. The project can be used for street lighting, clinic lighting, and other economic and social activities.

NLM, 13/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070613.htm>

While in Kunming, EPM No 2 Khin Maung Myint met with the chairman of Sichun Tonghui Industrial Group, Hongyuan Jin, and they discussed a power grid project and establishment of windmills in the Myanmar coast.

Khit Myanmar, 25/11/05. http://burmalibrary.org/docs3/Khit_Myanmar2005.html

The engineering division of Myanma Agricultural Produce Trading is testing a trial wind-power electricity generator at its operations base in Hmawbi Township.

NLM, 12/11/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051112.htm>

Secretary Myint Oo of the Bilin Township USDA, Mon State, reports to the national assembly of the USDA in Hmawby that a wind-power electricity generating station was inaugurated by the USDA in Gadoe village of Mawlamyine township on 15/09/05. Wind-powered generators were also put into service at Kyaungywa and Asin model villages in Ye township on 03/10/05. In Bilin township, wind-powered electricity supply began on 14/10/05 at Gadaing village. Moreover, 30 more wind-power electricity supply projects will be implemented at Balauk Nyaungwaing, Wegali and Kawparan in Mudon township; Setse, Kyaikkhami and Hnitkaing villages in Thanbyuzayat township; Lamaing, Lagoat and Daminzeik villages in Ye township; Htanbinchaung, Ahlup and Thegon villages in Paung township; Zokgali, Pauktaw, Muthin, Dargwin and Paingdawei villages in Bilin township; and Tarana village of Kyaikmaraw township, all in Mon state. In addition, 200 wind-power electricity generators have been installed on coastal vessels.

NLM, 06/10/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051006.htm>

At the inauguration of a windmill in the model village of Kyaungwa in the eastern part of Ye township along the border with Thailand, Daw Ywet Wah Myint spoke words of thanks. She said that the development of the economy and improvement of living standards in the region had made it possible to have diesel and petrol generators to produce electric power. Now, a windmill had been installed at the village power station. Kyaungwa has a station hospital, a high school, a TV re transmission station and a self-reliant library. There are cold storage facilities, ice factories and fish meal plants established in the village and local residents have jobs and earn a lot of money. In Asin model village in the western part of Ye township, VPDC Chairman U Maung Myint formally opened a windmill generator. Town-elder U Kyaw Maung spoke words of thanks. He said that in Asin Village residents were involved in fish farming. As the price of oil was increasing, they were finding it difficult to maintain the supply of electricity needed. The people were very pleased that the village now had a power station equipped with a wind mill

NLM, 19/09/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n050919.htm>

Minister for Industry No 1 Aung Thaung and officials inspected Mibamyitta Dynamo and Electrical Appliance Factory in South Dagon IZ No 2. While inspecting spare parts for producing of generators, the minister heard a report presented by the deputy director-general of Industrial Supervision and Inspection Dept on measures being taken for production of windmills and wind-power generators to be used in projects under the ministry and ways and means for using them to produce electricity.

NLM, 17/09/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nml/n050917.htm>

Mines Minister Ohn Myint attended the opening ceremony of a wind power generator in Kadoe/Kawhnat village of Mawlamyine township on 15 September. VPDC Chairman U Maung Shwe and Village USDA Organizer Daw Aye Aye Myint formally opened the generator. Village-elder U Kyee Myint spoke words of thanks. He said the village faced difficulties in supplying power with the use of a diesel-fired generator. He thanked the government for launching the wind-powered generator as power was essential for the development of the industrial sector of the village. Besides the new generator education facilities in the village had been upgraded, a station hospital worth K 60 million had been built, an earth road constructed, drinking water was now available.

May Thandar Win and Su Myat Hla, Myanmar Times, 04/07/05

(Compiler's note: Issue 273 of the Myanmar Times is no longer available on-line.)

Renate Schlemmer, the managing director of the Aureum Palace Hotel and Resort which owns hotels under development at Ngwe Saung, Ngapali and Bagan said diesel consumption to generate electricity at her hotel usually takes up about 10pc of the total income. She suggested that establishing windmills at beaches would be the best way to provide electricity for hotels. A windmill costs only US\$300,000, while beach hotels must spend about \$60,000 a year on electricity, she said. "If you put in one or two windmills, you can fire the whole stretch of the beach. You don't need diesel – it's one-time investment and you have power," Mrs Schlemmer said. "And it's environmentally friendly, which could be a marketing point," she added.

Kumudra, 13/09/02. [not available on-line]

Retired electrical engineer Tin Maung Aye has built a wind-powered turbine from truck engine parts. It is being used to provide power for fish farms in Maubin tsp. The turbine, or windmill can generate 1000 kW. He has offered to make another five for Maubin township Development Affairs Committee. The turbines, which are made from second-hand truck dynamos, cost K500,000 to make, not including the blades and stand. A wind velocity of at least 15 m/p/h is needed to produce electricity and it takes five hours to store 1000 watts in two batteries connected to the turbine.

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YANGON CITY ELECTRIC POWER SUPPLY BOARD LAW ENACTED

NLM, 23/11/05. <http://www.ibiblio.org/obl/docs2/NLM2005-11-23.pdf>

The following are some of the key provisions of the Board of Yangon City Electric Power Supply Law, enacted by the SPDC on the 22nd November 2005 and published the following day without further comment by official media.

3. The Ministry of Electric Power, with the approval of the Government: (a) shall form the Yangon City Electric Power Supply Board comprising from a minimum of seven members to a maximum of fifteen members with technicians and suitable citizens, in order to carry out electric power works effectively within the area of the Yangon City Electric Power Supply.

4. The Board shall be directly responsible to the Minister of the Ministry of Electric Power.

7. The Board shall perform the following functions and duties within the area of the Yangon City Electric Power Supply:

- (b) carrying out measures for enhancing the development of the electric power sector for Yangon City on a par with international standard;
- (c) carrying out measures to supply sufficient electric power to the consumers of electric power;
- (d) carrying out measures to prevent cut off of the supply of electric power, the loss of electric power and to collect electric power fees fully;
- (e) distributing electric power to the consumers of electric power in line with prescribed voltage and current systematically, in accordance with the stipulations;
- (g) inspection of the electric power works owned by the Board and causing inspection to be made by a team or by any individual;

(h) inspection of the use of electric power and causing inspection to be made by any individual;

8. The Board has the powers to carry out the following in the area of Yangon City Electric Power Supply:

- (b) purchasing necessary electric power at the rate prescribed by the Ministry of Electric Power;
- (c) determining and altering the rates of electric power fee with the approval of the Ministry of Electric Power;
- (d) cutting off the electric power supply if there is failure to pay electric power fees during the prescribed period;
- (f) granting permission, if necessary to any organization or any individual to operate any electric power works as a business taking charges with the approval of the Ministry of Electric Power in the locality where electric power cannot be supplied fully as yet by the Board;
- (g) arranging for development of electric power works and safety from electrical danger by making use of modern and advanced technology;
- (h) scrutinizing and permitting the application for the use of electric power;
- (i) cutting off electric power, if necessary, after investigation on the loss of electric power and the use of electric power by illegal means, and passing decision on the prescribed compensation;

11. The Board shall form offices at different levels to carry out the electric power works within the area of Yangon City Electric Power Supply as follows: (a) The Board of Yangon City Electric Power Supply Office; (b) The District Electric Power Supply Offices; (c) The Township Electric Power Supply Offices.

17. The Board or the inspection team and person assigned duty of inspection under section 16 have the right to enter into the relevant land and building to inspect the electric power works and the use of electric power.

19. The Board shall subsist on its own funds. In addition, it shall take responsibility for all its financial matters. It may take loans with the approval of the Ministry of Electric Power from the Government, or local and foreign organization or person, if its own funds are insufficient.

27. The Board shall pass an order on any person who commits any of the following acts in respect of electric power owned by the Board, which is in the process of execution by the Board, to pay the prescribed amount of money as compensation to the Board:

- (a) transferring without the permission of the Board any electrical equipment to any other person;
- (b) allowing the use of electric power by way of distributing to any other person, without the permission of the Board;
- (c) using the electric power not allowed to be used for commercial purpose from general purpose meter or domestic power meter;
- (d) consumption of electric power exceeding the power load limit of the industrial power meter;
- (e) diverting of electric current without the permission of the Board.
- (f) cutting off electric power line without the permission of the Board.

Additional references

See above: 'Yangon electricity supplies get boost from [YESB plan](#)' (MT: 24/07/06)
'Ministry of Electric Power [re-organized](#)' (NLM: 16/05/06)

World Bank, 18/08/99. [not available on-line] See below: '[Electricity in Myanmar](#)'
Faced with a difficult financial situation, MEPE has begun to restructure the Myanmar electric power sector. Electricity distribution in the townships that make up downtown Yangon is now being run by the Cho Cho group, under a medium-term management contract which has been running since 1996 and extended once. Cho Cho, for its efforts, receives 0.15 Kyat per kilowatt/hour on collections, but does not have capital investment obligations.

VILLAGE [ELECTRIFICATION TECHNOLOGY](#) ON DISPLAY

Myanmar Times, 14/11/05.

(Compiler's note: Issue 292 of the Myanmar Times is no longer available on-line.)

Equipment and technology for village electrification projects was showcased at an exhibition held at Sayar San Plaza in Bahan township early this month. The three-day exhibition was organised by the Ministry of Co-operatives to promote the use of electrification systems in rural areas. Nearly 20 booths sponsored by government and private sectors, co-operative associations and NGOs displayed technology suitable for use at the village level. Participating government ministries included those of Co-operatives, Science and Technology and Energy.

Most of the exhibits involved the use of renewable energy sources, such as solar, wind, biogas and gasifier technology. The Myanmar Engineering Society's display featured all of the renewable energy technology used in Myanmar, including tidal power and dual fuel systems it has developed. A central executive committee member of the society, U Myint Pe, said its display was aimed at making rural communities far from the national power grid aware of the systems available to provide electricity. He said the exhibition had made an important contribution to promoting the development and use of renewable energy technology for providing electricity in rural areas. "It is more comprehensive than I expected," U Myint Pe said.

An advisor to the society, U Soe Myint, said the exhibition had enabled members of the public to learn about the technology while professionals and experts had been able to share their knowledge and experiences. "Their opportunities to make contact with one another were the main advantage of the exhibition," he said. The increased contacts would contribute to improvements in the technologies, U Soe Myint said. An assistant director of the Co-operative Department in Shan State, U Wai Lin, agreed that the exhibition had benefited researchers and developers of village electrification systems by making them more aware of technological advances. [A photo of a solar cooker in operation accompanies the article.]

Additional references

See the entries listed in the Section '**Renewable Sources and Small Generating Facilities**' [SF](#) See especially the entries for biogas and paddy husk generation, tidal power, wind power, solar power and mini hydropower plants. A study carried out under the sponsorship of Japan's International Co-operation Agency published under the title '**The Study on Introduction of Renewable Energies in Rural Areas in Myanmar**' is particularly useful for the detailed technical information it provides on mini-hydro and rice husk generation in Myanmar. For access information to the several volumes and booklets available on-line in this series, see Appendix 9: '[Introduction of Renewable Energies in Rural Areas of Myanmar](#)'.

See below: '[Village electrification committees](#)' (Renewable Energies in Rural Areas: 09/03)

[IVANHOE LOOKING TO YEYWA PROJECT FOR POWER SUPPLY](#)

Kyaw Thu, Myanmar Times, 24/10/05.

(Compiler's note: Issue 289 of the Myanmar Times is no longer available on-line.)

A senior official from Canada-based Ivanhoe Mines' Monywa copper project said the company expects to increase production by more than five times if there is a good enough power supply. Mark Whitehead, a director at Myanmar Ivanhoe Copper Co Ltd (MICCL), said that by 2007 the company could increase its annual production to 200,000 tonnes from the current 39,000 tonnes. MICCL is 50-50 joint venture between Ivanhoe Mines and the No 1 Mining Enterprise under the Ministry of Mines, and since 1998 has been producing London Metal Exchange Grade A copper from its deposits near Monywa in central Myanmar.

"The key issue is power. If there is enough power the copper project will be able to increase production," said Mr Whitehead. "We are also waiting for approval from the Ministry of Mines," Mr Whitehead said in a presentation at the YMCA in Yangon last week.

Mr Whitehead said the power problem would be solved when the Yeywa hydropower project is completed in 2007. Yeywa project lies 31 miles southeast of Mandalay and is expected to generate 3550 million kilowatt hours a year in 2007-2008. "Hopefully we will get the approval from the government by 2007 when the Yeywa project becomes operational," he told Myanmar Times.

He said the plan to increase production follows a growing demand for copper and its higher prices in the world market. The joint venture currently produces about 100 tonnes of copper cathode a day, but the lack of power is one of the factors limiting expansion of the mines. The company's factory currently consumes more power than any other in the country.

"We need about 50 MW to support the production of 200,000 tonnes," said Mr Whitehead, adding that the Monywa project has firm global markets, including Japan and Thailand. He said the main beneficiary of the project is the Myanmar economy, and that the government has earned US\$ 1.25 billion since the project started production in 1998.

Monywa copper mines have three deposits and MICCL is currently operating at two deposits called Sabetaung and Kysisintaung. The Monywa project employs more than 1000 people, which includes a few foreign expatriates. "Myanmar runs the mine site, and we train everyone from truck drivers to technicians," he said.

Additional references

Ivanhoe Mines, *Special Meeting of Shareholders regarding the Proposed Acquisition of the Common Shares of ABM Mining Limited, 10/11/00*. pp G-6, G-7. [not available on-line]

The proposed Letpadaung Development Plan envisages a heap leach facility with capacity to stack up to 17.5 million tonnes per annum of higher grade crushed ore and a parallel lower grade run-of-mine ore dump leach being placed under leach at rates of up to 34 million tonnes per annum. Pregnant solution from the heaps will be concentrated by solvent extraction (SX) and the copper will be plates by electrowinning (EW). The SX plant will treat solution at a rate of 6,800 cubic metres per hour and will incorporate an organic scrub circuit to control iron transfer to the EW circuit. To further control iron build up in the EW circuit, an ion exchange-based iron removal process unit has been included in the design. MEPE is responsible for supplying power to the project. The total average power requirement for the project is estimated to be 70 MVA. The Letpadaung Development Plan allows for the installation of a 215-km, 230-kV 90 MVA overhead transmission line from Thazi to Letpadaung. Thazi is located south of Mandalay on the main national electricity distribution grid. The connection was chosen after extensive study of power supply options by Ivanhoe Mines consultants in conjunction with MEPE. As an alternate source of power, the joint-venture company [MICCL] has encouraged several interested parties to study the possibility of building a coal-fired power plant in the Monywa area. A Japanese group is funding a study using local coal from the Kalewa deposits north of Monywa.

See below: 'Proposal for [barge-operated power plant](#) at Monywa copper mine' (ECFA: late 2004)

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IMPACT OF [UNRELIABLE POWER SUPPLY](#) ON INDUSTRIALIZATION IN MYANMAR

Excerpted from Toshihiro Kudo, *'Stunted and Distorted Industrialization in Myanmar'*, Institute of Developing Economies, October 2005, pp. 22, 26-27, iii and iv.

<http://www.ide.go.jp/English/Publish/Download/Dp/pdf/038.pdf>

While many developing countries including those undergoing a transition from a planned to a market-oriented economy, have liberalized the manufacturing sector, they often impose greater restrictions on the development of infrastructure. This is because the market power associated with scale economies and demand externalities makes proper market functions difficult. Even though it has recently become fashionable for the private sector to be involved in the provision of infrastructure, public provision remains dominant in many developing economies. However, in reality, publicly provided infrastructure services have often delivered poor quality and inadequate coverage. Myanmar provides a striking example.

Electric power supply in Myanmar is monopolized by MEPE, a state-owned economic enterprise (SEE) that comes under the jurisdiction of the Ministry of Electric Power. The SEE Law of 1989 stipulated that electric

power generation was to be exclusively carried out by public enterprises. MEPE is the sole provider of electricity generation and transmission nationwide.

The total installed capacity of electric power was 1335 MW as of September, 2004,³⁴ increases in capacity having lagged behind overall GDP growth. The per capita consumption of electric power is 108 kw, which is one of the lowest in the world. Only 5% of the people of Myanmar have access to electricity, a much lower percentage than in Cambodia (17%) and the Lao PDR (41%). Demand for electric power tends to increase more rapidly than GDP in any economy during the early stages of economic development and this is true of Myanmar. To make matters worse, it is said that in FY 2001, about 15% of electricity was lost during generation, transmission and distribution, making the demand-supply gap even wider. The Economist Intelligence Unit has estimated a 220 MW shortfall in electricity supply in Myanmar in recent years.³⁵

Because the supply of electricity is unreliable and insufficient, industrial firms depend on their own or shared generators, which are run on diesel. The market price of diesel is expensive and the technical efficiency of electricity generation by small-scale generators is low. As a result, independently generated electricity is costly compared to power supplied through the grid. Moreover, the tariff rates are multi-tiered and foreigners, whether residents or organizations, must pay in US dollars or FEC, which makes real charges for electricity much more expensive for foreigner than for locals. A foreign garment factory located in Mingaladon Industrial Estate, one of the best industrial parks in Myanmar, experienced frequent and lengthy electricity outages and had no alternative but to use its own generator. In 2004, the firm's energy costs, including electricity from the grid and diesel oil, was 1.4 times greater than its labor costs.³⁶ Even in the highly labor-intensive garment industry, energy costs more than labor. Thus it is that cheap labor costs have been offset by expensive infrastructure services.

Notes for references cited:

³⁴ Selected Monthly Economic Indicators, CSO, September 2004.

³⁵ EIU, Country Profile 2004 Myanmar (Burma), 2004, p. 20.

³⁶ Personal communication from the factory manager in June, 2005

Table 4-3: SEEs' Capital Investment in Main Infrastructure Sectors, as % of GDP

	FY 1985	FY 1990	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
ENERGY	25.1	5.4	2.3	3.5	4.1	2.4	2.5
Myanma Oil and Gas Enterprise	1.1	0.5	0.0	0.3	0.2	0.3	0.5
Myanma Electric Power Enterprise	11.8	4.7	2.2	3.0	3.7	1.9	1.9

Table 4-4: Performance Indexes for Infrastructure Development

	FY 1985	FY 1990	FY 1995	FY 2000	FY 2002	FY1985-> FY 2002	FY1990-> FY 2002
Electric Power, Installed Capacity (MW)	684	804	982	1,171	1,190	1.7	1.5
Electric Power, Generation (millions kWh)	2,119	2,643	3,762	5,118	5,864	2.8	2.2
Electric Power, Consumption (millions kWh)	1,460	1,675	2,262	3,268	4,691	3.2	2.8

Table 4-5: SEEs' Current Cash Budget (Kyat Million)

MEPE	FY 1980	FY 1985	FY 1990	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999
Recipients	209.2	430.6	795.6	2,771.1	3,227.5	3,450.8	3,599.6	19,680.8
Expenditures	201.9	412.3	658.5	2,599.8	2,721.6	3,120.7	4,976.9	20,614.1
Surplus/Deficit	7.3	18.3	137.1	171.3	505.9	330.1	-1,377.3	- 933.3
% of Receipts	3.5%	4.2%	17.2%	6.2%	15.7%	9.6%	- 38.3%	- 4.7%

Additional references

Toshihiro Kudo, '*Border Industry in Myanmar: Turning the Periphery into the Center of Growth*', Institute of Developing Economies, October 2007, pp 13-14.

<http://www.ide.go.jp/English/Publish/Download/Dp/pdf/122.pdf>

Myanmar has experienced a long-standing national power shortage since the late 1990s. A shortage of electricity is one of the most serious problems in the garment industry as well as in other manufacturing sectors in Myanmar. In the garment industry survey in Yangon in 2005, we asked garment firms to rate how severely poor infrastructure services obstructed their operations regarding telecommunications, electricity and transportation. Table 6 shows that electricity is regarded a severe problem in garment production. In the same survey, 69 firms among the 139 respondents answered that they had experienced power interruptions more than three times a day and that these had often lasted for more than three hours. Therefore, most manufacturers had to use their own and/or share generators. Out of 141 garment factories, 134 factories had used their own or shared generators.

The State-owned Economic Enterprises (SEEs) Law, promulgated in 1989, stipulates 12 economic enterprises that SEEs continue to monopolize, including many infrastructure services such as post and telecommunications, air and rail transport, banking and insurance, broadcasting and television and electricity. Myanmar Electric and Power Enterprise (MEPE), a SEE that falls under the jurisdiction of the Ministry of Electric Power, is the sole legal provider of electricity in Myanmar.

In reality, some of the 12 sectors are open to private enterprises, provided the Myanmar government so permits. In Myawaddy, [for example,] many households are provided with power by a Thai company located in Mae Sot, which is deemed illegal according to SEE law. The Myanmar consumers pay electricity charges in baht, the use of which is also illegal, as possession of foreign currency by Myanmar citizens is prohibited by law. The provision of electricity to households in Myawaddy through the power grid from Mae Sot seems to be based on an understanding between the regional authorities in both countries, although the precise arrangements remain unclear. This example shows that cross-border transmission of electricity is possible between the two border towns. Once legal and institutional arrangements have been finalized between the two governments, factories located in Myawaddy could be officially and regularly provided with electricity from the Thai side of the border.

Compiler's note:

For other instances of cross-border transmission, see the key article on electric power supply in areas of Burma/Myanmar controlled by [cease-fire armies](#). Note especially the sections on the Kokang, Mongla and KIO regions. For information on private sector producers of electric power in Burma/Myanmar, see the section, 'Independent producers and projects' ([IP](#)) in the topical index.

Table 6: Garment Factories' Ratings on Infrastructure Services in Yangon, 2005

	Very Severe Obstacle	Major Obstacle	Moderate Obstacle	Minor Obstacle	No Problem
Telecommunications	3	18	30	34	56
Electricity	53	55	17	8	8
Transportations	0	2	20	35	84

(Source) Kudo [2006: 113].

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AGREEMENT SIGNED ON UPPER PAUNGLAUNG HYDROPOWER PROJECT

NLM, 04/09/05. www.myanmar-information.net/infosheet/2005/050904.htm

Director-General Win Kyaw of the Hydropower Department and Yunnan Machinery & Equipment Import & Export Co Ltd (YMEC) Chairman Feng Ke inked notes of agreement on the implementation of Upper Paunglaung hydel power project, at the hall of the Ministry of Electric Power on 1 September. In attendance were Minister for Electric Power Tin Htut and officials. YMEC plans to supply machinery worth US\$ 80 million for the project and to implement Upper Paunglaung Hydel Power Project together with the Hydropower Department.

The project site is situated on Paunglaung Creek, 15 miles above the already completed Paunglaung hydel power project, 26 miles east of Pyinmana in Mandalay division. Two 70-MW turbines will be installed at the Upper Paunglaung power plant which is expected to generate 411 million kwh annually.

Due to the storage of water at Upper Paunglaung Dam, it will be possible to increase the production of power at the [Lower] Paunglaung hydel power station from 911 million kwh to 969 million kwh yearly. .

Compiler's Note: A good aerial photo of the Upper Paunglaung dam site is available on page 5 of the print edition of the New Light of Myanmar of 21/01/06. <http://www.ibiblio.org/obl/docs2/NLM2006-01-21.pdf>

Topographic map references: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-01: Pyinmana Upper Paunglaung river dam, 26 mi north-east of Pyinmana [19° 46' N, 96° 19' E], grid sq ref: 10\9, 26\1, Nanchu creek dam, 16 miles east of Pyinmana [19° 46' N, 96° 19' E], grid square reference: 10\9, 25\9, <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-1.jpg>

See *Drowning the Green Ghosts of Kayanland: Impacts of the Upper Paunglaung Dam in Burma* (pp 4,10) <http://www.salweenwatch.org/images/stories/downloads/publications/drowningthegreenghostsenglish.pdf> for inset maps showing the location of Upper Paunglaung dam in the wider regional context.

Website reference

<http://www.urec.com.cn/en/project/power.htm>

Union Resources and Engineering Co Ltd (UREC) has been active in engineering contracting since the 1980s. It provides project management including preliminary study, financing, design, construction, manufacture, purchase, installation, commissioning and operation management, etc. It has good contacts with domestic and foreign financial institutes, consultation institutes, construction enterprises and equipment manufacturers. In Myanmar it has been involved with work on 22 hydropower facilities, including the Paunglaung and Shweli-1 projects. [Compiler's note: UREC was previously known as the Yunnan Machinery and Equipment Import & Export Corp (YMEC). The old name still appears as one of the PRC partners involved in the Shweli hydropower contracts. The YMEC website is still maintained on-line. <http://www.ymec.com.cn/en/>]

Additional References

Data summary: [Upper Paunglaung](#)

See above: 'Diversion phase of [Nancho hydropower project](#) nears completion' (NLM, 25/02/09)
'[Paunglaung](#) power plant Myanmar's first underground station' (MT: 14/03/05)

NLM, 28/01/11. <http://www.burmalibrary.org/docs11/NLM2011-01-28.pdf>

Roller concreting (RC) of main embankment started. Work on bottom outlet RC and CV concreting work, earthwork on left embankment and construction of power station switch yard continuing. The embankment is of RCC type and it will be 322 feet high and 1690 feet long. The concreting work will consist of 27 blocks in 29 stages. [A photo of the concreting work on the embankment is included in the print edition of NLM.]

NLM, 17/11/10. <http://www.burmalibrary.org/docs09/NLM2010-11-17.pdf>

EPM-1 Zaw Min visits the upper Paunglaung hydropower project site, 26 miles from Pinyinmana, where he is briefed on stockpiling and of construction materials. The project is expected to generate 454 million kilowatt hours of electricity per year. [A photo of the main gate of the dam is included in the print edition of NLM.]

NLM, 13/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-13.pdf>

EPM-2 Khin Maung Myint inspects the foundation of No 1 tower and the installation of tower No 19 of the Ahtet Paunglaung – Nancho - Paunglaung 230-kV power grid.

NLM, 06/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-06.pdf>

At the Upper Paunglaung hydropower project, 15 miles upstream from the Paunglaung hydropower plant, work is proceeding on the temporary dyke [for diversion of the river] and the site of the main embankment. EPM-1 Zaw Min views drilling operations at the site for construction of the separation wall, and the extraction of soils and stones there, as well as land preparations for building the power house. Foundation work is underway for the RCC batching and mixing plant of the High-Tech Concrete Co and work continues on the diversion tunnel. Two 70-megawatt Francis vertical shaft type turbines will be installed in the plant which will generate 454 million kilowatt hours yearly. So far, the project as a whole is 31.58pc complete.

NLM, 08/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-08.pdf>

EPM-1 Zaw Min attends a ceremony to divert the river past the construction site of the Upper Paunglaung hydropower project. Work is continuing on the diversion weir, the main embankment, the intake structure, the hydropower plant and the switch yard. The minister inspects the site for the construction of the cement batching plant of High-Tech Concrete Co. Roller compacted type concrete (RCC) will be used to construct the dam. The project is now 28pc complete. [A photo of the diversion channel is included in the print edition of NLM.]

NLM, 07/07/08. <http://www.burmalibrary.org/docs5/NLM2008-07-07.pdf>

The Minister and Deputy Minister of EPM-1 visits the Upper Paunglaung project. According to D-G Thaung Han of Construction Group No 1 of the ministry, the diversion canal is 75.66pc complete and the main embankment is 10.69% complete. D-G Aung Than of the Geology Dept explains matters relating to the geology of the area. The ministers look into the construction of a cement batching plant that will produce 120 cubic metres per hour. The Upper Paunglaung project is on a maintenance schedule during the monsoon season. The hydropower station will be able to generate 454 million kWh of electricity per year.

Kayan Women's Union, *Drowning the Green Ghosts of Kayanland: Impacts of the Upper Paunglaung Dam in Burma*, June, 2008. <http://www.salweenwatch.org/downloads/DrowningtheGreenGhostsEnglish.pdf>

The site of the Upper Paunglaung Dam, 26 miles east of Pinyinmana, is just a few miles below the southern end of the Paunglaung Valley, the only fertile plain along the entire river. The reservoir behind the 99-metre-high dam will entirely submerge the valley, once the dam is finished. Over 3500 people in 12 villages in the valley, including Shan, Burman, Pa-O and the indigenous Kayan Lahta people who have inhabited the area for over a thousand years, will be forced to move. The villagers are all subsistence farmers who cultivate their crops, mainly wet paddy, by irrigating the land from streams that run into the Paunglaung. Farms get a high yield of 80 to 100 baskets of paddy per acre. Locals also cultivate cash crops such as potatoes, peas, garlic and onion in the dry season. There are also many fruit trees such as mango, jack fruit, coconut and

djenkol. Turmeric is also widely grown on the hillsides as a cash crop in Pinlaung, a day's journey away by motorized tractor.

Many species of fish used to migrate up the Sttang into the tributary Paunglaung and breed in its feeder streams and creeks. Since the completion of the Lower Paunglaung dam three years ago, villagers have noticed that various species have decreased, including catfish and eels which they catch for their own consumption. Once the Upper Paunglaung dam is built, they expect the fish population will decrease even further. People in the area also have a close dependence on the forest which provides timber for buildings, mushrooms and wild djenkol beans for food, and resin and honey which are key ingredients for traditional medicines. Once the dam is built the remaining forests along the Paunglaung will be submerged, and villagers displaced by the reservoir will be forced to clear further areas of forest to establish new homes on higher ground. Increased military deployment in the area to provide for security for the dam is also likely to lead to further destruction of the forest as the troops clear land and cut down trees to build new military bases.

The villagers in the Paunglaung valley were not consulted about the building of the Upper Paunglaung dam and only learned of the construction when the dam-site was declared off-limits and the Myanmar army sent troops in to guard the area in 2004. Early in 2007, however, village heads from the Thabyegon village tract were taken by Pinlaung township officials to Hopong township (40 miles from their current location) and shown a place with bald hills and stretches of grassland where they would have to move when their villages were flooded by the dam. No mention was made about compensation for their farms which would be flooded. Villagers interviewed in April 2007 mentioned that they dreaded having to move from their homes and set up new lives elsewhere. Usually during April, they take advantage of the dry season to repair and re-thatch their houses. However no one could be seen doing so during the 2007 dry season. By early 2008 some villagers in the valley had begun moving out of their homes and relocating to other areas in Shan and Karenni states.

NLM, 04/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080204.html>

Work on the 968-foot-long diversion tunnel is proceeding at the Upper Paunglaung hydropower project. Sites have been chosen for the construction of the RCC embankment, the RCC and CVC batching plants, two crushing plants and the aggregate stock piles. Preparations are underway to set up a quarry.

NLM, 23/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071223.htm>

Nay Pyi Taw Commander Wai Lwin visits the [Upper] Paung Laung dam site where he is briefed on the project which will be able to generate 454 million kWh per year.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf

The Upper Paunglaung dam and power station with a planned capacity of 140 MW is under implementation by the HPID. It will generate 434 million kWh annually when it comes on-line in Dec 2009.

DVB, 16/07/07. www.burmanet.org/news/2007/07/16/

Residents of 18 villages fear they will have to move from their homes in the south part of Aungban [Kalaw] township in Shan state. Their villages on Paunglaung creek are likely to be flooded as a result of a new dam project. The villagers had planned to expand their villages and build more permanent structures, but now they are waiting to be told where they will have to go and don't know what to do. Surveying for the dam started in April 2007.

NLM, 23/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070623.htm>

Acting Project Director U Tin Aye and Assistant Director U Nyein Chan report to EPM-1 Zaw Min that 768 feet of the 968-foot long diversion tunnel for the Upper Paunglaung dam project have been completed. The tunnel is 33 feet in diameter.

NLM, 25/02/07. <http://burmalibrary.org/docs2/NLM2007-02-25.pdf>

General Than Shwe and party inspect the Upper Paunglaung hydropower project, 26 miles east of Pyinmana. EPM No 1 Zaw Min reports that the dam will be of the RCC-type, 1,640 feet long and 325 feet high. Work continues on the approach roads and on the Nancho and Lainli bridges on the Pyinmana - Pinlaung road. Deputy Minister U Myo Myint comments on the significant geological position of the project and benefits. Gen Than Shwe speaks of need to complete the projects as soon as possible after finding "better technology". A fruit basket is given to the project director of Colenco Power Engineering Ltd. The visitors are taken by helicopter to the site of the Nancho hydropower project on Nancho Creek, 16 miles east of Pyinmana, where EPM-2 Khin Maung Myint reports on the water storage capacity of the dam and how electricity produced will be distributed from the various projects in the region to the national grid. Gen Than Shwe says that the projects are being carried out to provide power for Nay Pyi Taw and environs and the whole country. To preserve the flow of water into the dams he warns against cutting timber and use of burning to clear land for agricultural purposes in the watershed areas of the dams. [See the print edition of NLM for photos of the visit. Video footage with some good shots of the dam site is also available at <http://video.google.com/videoplay?docid=-7694807271238560047>. Commentary is in English.]

Kayan Women's Union, *Drowning the Green Ghosts of Kayanland: Impacts of the Upper Paunglaung Dam in Burma*, June, 2008. <http://www.salweenwatch.org/downloads/DrowningtheGreenGhostsEnglish.pdf>

In October 2005, the Myanmar military junta informed the KNLP that the mountains east of Pyinmana were to come under its direct control and that the KNLP should withdraw its troops from village wouth and southwest of Paunglaung valley. This order was in direct contravention of the 1994 ceasefire agreement between the KNLP and Myanmar military, and the KNLP did not immediately withdraw its troops. Shortly afterwards, in November 2005, troops of LIB 141 opened fire on the the Kayan village of Bawgahta [in the valley of the Nancho], killing a KNLP policeman and injuring a woman and a child. The incident co-incided with the move of the SPDC to the new capital of Nay Pyi Taw near Pyinmana, [15 miles to the east]. Unwilling to provoke further bloodshed, the KNLP then withdrew its troops from most of the villages to the southwest of the Paunglaung valley. After August 2006, the Myanmar Army began patrolling even more frequently these villages from the KNLP had withdrawn and established peremanent bases in the villages of Ledukaung, Bawgahta and Bawlake, south of the dam-site. [**Compiler's note:** In fact, the villages mentioned in this part of the KWU report are in the upper reaches of Nancho valley closer to where the Nancho hydropower dam is under construction. For reasons not explained, this dam is not mentioned in the Green Ghosts report and the Nancho is not shown on the map on p 6 of the report.

NLM, 09/05/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060509.htm>

EPM Tin Htut and D-G Win Kyaw of the Hydropower Dept inspect the Upper Paunglong hydel power project. Site clearing is underway, also the digging of the diversion tunnel and construction of an approach road.

UREC website. http://www.urec.com.cn/en/Introduction/about_yj.htm

Paunglaung II hydropower project (aka Upper Paunglaung hydropower project) is located at 19°45'N, and 96°40' E, in the boundary area between Mandalay division and Shan state. On 03/06/05, the Dept of Hydroelectric Power (DHP) under EPM of Myanmar issued a letter of intent to UREC clearly expressing its willingness to award the contract for building Paunglaung-II hydropower station to UREC. On 02/09/05, UREC submitted a draft contract for the construction of Paunglaung-II hydropower station to the DHP. On 14/02/06, UREC and DHP formally signed a contract for the Upper Paunglaung hydropower project at the Great Hall of the People [in Beijing in the PRC] in the presence of the Chinese and Myanmar premiers.

NLM, 19/02/06. <http://burmalibrary.org/docs2/NLM2006-02-19.pdf>

A ceremony to sign MoUs, agreements and contract notes between the Myanmar and the PRC and talks between the prime ministers of the two countries took place at Hebei Hall of the Great Hall of the People [in Beijing on 14/02/06]. Present on the occasion were PM Soe Win and ministers, the Myanmar ambassador to China and departmental heads, Premier Wen Jiabao of the PRC, ministers, vice ministers, the Chinese ambassador to Myanmar and senior officials. . . . D-G Win Kyaw of Hydro Electric Power Dept of the Ministry of Electric Power and Chairman Feng Ke of Yunnan Machinery and Equipment Import and Export Co Ltd signed a contract for the supply of mechanical and electrical equipment and services for Paunglaung Hydropower Project Phase II.

NLM, 26/03/05. <http://www.ibiblio.org/obl/docs2/NLM2005-03-26.pdf>

At the inauguration of the Paunglaung hydel power project it is reported that the new facility will not be able to generate at full capacity of 280 megawatts even in the rainy season. So, the Ahtet [Upper] Paunglaung hydel project will be implemented above it on the Paunglaung River.

Kayan Women's Union, *Drowning the Green Ghosts of Kayanland: Impacts of the Upper Paunglaung Dam in Burma*, June, 2008. <http://www.salweenwatch.org/downloads/DrowningtheGreenGhostsEnglish.pdf>

Until 2004, there had been no Myanmar Army (MA) troops permanently stationed in the Upper Paunglaung area. Occasionally MA troops stationed at temporary camps south of the Upper Paunglaung valley would patrol along the valley. This was in accordance with the ceasefire signed between the Kayan New Land Party (KNLP) and the Myanmar military regime in 1994 which granted the KNLP control over the valley and surrounding territories in southwest Shan State. However, in February 2004, troops from LIB 606, which had been stationed at Sinkwin, four miles east of the Upper Paunglaung dam site, set up a new camp called Kywe Yoe ("Buffalo Bone") on a mountain at the southern end of the Paunglaung valley, six miles north of the dam site. Under threat of a cash fine or detention, these troops ordered civilians from the villages of Sinkwin, Ywagyi, Gwelon and Thinbawgon to clear land around their new camp from top to bottom of the mountain on which it was set up. Following the establishment of the base, the battalion required the villages in the Thabyegon tract to form a local militia units which had to post sentries around their villages at night and to monitor the movements of anyone traveling through the area.

NLM, 04/04/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040404.htm>

SPDC Secretary-1 Soe Win and party visit the site of the future [Upper] Paunglaung dam project on Paunglaung River, 26 miles east of Pyinmana. Deputy Minister for Electric Power U Myo Myint and D-G Kyaw San Win of Irrig Dept report on arrangements for the the project. It will be located on the Paunglaung river above the Paunglaung project and will add to the productive capacity of that facility. It will also generate 85 MW of electricity.

MINI HYDROPOWER PLANTS PLANNED FOR RURAL AREAS

Nyi Nyi Aung, Myanmar Times, 08/08/05

(Compiler's note: Issue 278 of the Myanmar Times is no longer available on-line.)

The Irrigation Dept of the A&IM is planning to build mini hydropower plants at its dam projects to help support the electricity requirements of the country. "Our plan to build mini hydropower plants near irrigation projects, especially in the rural areas, will help supply more electricity to our power plants," said U Win Maung, the director of the department's Planning and Works Division. As the first step in the plan, he said the department would build four mini hydropower plants: one at a completed irrigation project in Yangon division, and three more at ongoing projects – two in Ayeyarwady division and one in Bago division. He said the department was conducting surveys and plans to start building at least one mini hydropower plant in November.

The electricity from the mini power plants will not be delivered to the national power grid, but will be administered by local electricity providers and sent through separate power lines in each region. Though the department originally began the irrigation projects only to supply adequate water for cultivation areas, it began to introduce a mini hydropower projects five years ago to help support Myanmar's electricity requirements. "Since 2000 the department has been building small-scale power plants that produce 5 to 15 kilowatts at some of our irrigation projects to supply electricity to nearby villages," U Win Maung said.

Website information:

<http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>

Information presented by the Energy Planning Dept of the Myanmar Ministry of Energy at the Second subregional energy forum in Ho Chi Minh city on 22/11/08 indicates that the installed electrification capacity of renewable energy sources at the end of 2008 was as follows: Solar power: 0.1157 MW, Wind power: 0.5194 MW, Mini hydro power: 8.3530 MW, Bio-mass power: 18.1942 MW; Biogas power 1.5993 MW.

Construction Circle 9 website

http://www.construction9.com//index.php?option=com_frontpage&Itemid=1

Circle 9, one of nine construction groups of the Dept of Irrigation of A&IM, is currently responsible for the development and maintenance of five dam and irrigation projects at various stages of completion in the lower Irrawaddy valley. The website provides basic information and technical data related to the construction and operation of the dams and irrigation systems in each of these projects. A separate section on the website deals with a program to install micro-generators at these projects similar in scope to that described in the Myanmar Times article above. (Compiler's note: It is not possible to access the website of Construction Circle 9 in March 2011. The URLs have been retained for reference purposes.]

Information on the micro-generator program

A sectional profile of the low head micro-turbine generators used on canals at the Ma Mya dam along with design data and other specifications can be found on the website of Construction Circle 9 of the Irrigation Dept. Design data and pictures of the single-phase axial turbine generators are also provided. The two-, three- and five- kilowatt generators and turbines are manufactured in China, while the turbine casings, draft tubes and other parts are produced by the Myanmar Irrigation Dept.

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=36&Itemid=57

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=37&Itemid=53

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=38&Itemid=54

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=39&Itemid=55

Project submission (pi)

Rural Electrification with Mini Hydro Power (Ma Mya Dam) Project, Application Form, ASEAN Renewable Energy Project Competition, 06/05/09. 20 pp.

http://www.aseanenergy.org/download/aea/renewable_energy/2009/awardees/mm_Rural%20Electrification%20with%20Mini%20Hydro%20Power%20%28Ma%20Mya%20Dam%29%20Project.pdf

The project was submitted to the 2009 ASEAN renewable energy competition with the aim of showing how to take advantage of drop structures along the canal irrigation system of a rural dam to produce electricity and the ease with which a micro hydropower plant could be installed without disturbing the irrigation system. An analysis of the savings in carbon emissions compared with that required to generate a similar amount of energy using an engine using a fossil fuel is included. The presentation focuses on the installation of micro hydropower turbine-generators along one of the main canals of the government's Ma Mya dam in Myanaung township in the Irrawaddy delta area of Myanmar. It includes details about the design of the project, technical, financial and market considerations, manufacture of the turbines used, the operational and maintenance program and the sustainability and replicability of the project. Information about the changes brought about in the village of Myinwartung which received electricity for the first time as a result of the project is also featured. Numerous photos, charts, tables, diagrams and two maps accompany the text. A map showing the project layout and a sectional profile of the installations at one of the drop sites are especially useful. This document provides the best information available on the micro hydropower program of the Irrigation Dept. The project submission appears to have been prepared by U Htun Naing Aung of Kaung Kyaw Say Engineering, consultant to the project.

Thegaw dam and irrigation system:

Burma 1:250,000: Series U542, U.S. Army Map: NF 46-12: Henzada. Thegaw dam, 0.2 miles S of Hmyagyaung [17° 49' N, 95° 53' E], grid square reference: 8/6, 25/2.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne46-12.jpg>

Myanmar Times, 19/06/00. <http://www.myanmar.gov.mm/myanmartimes/no16/b1.htm>

(Compiler's note: Issue 16 of the Myanmar Times is no longer available on-line.)

Thekaw dam in Letpadan township, Bago division, was commissioned into service at a ceremony on 14 June. The dam is 8320 feet long and 76 feet high and it will provide water to over 12,000 acres through its 8-mile-long main feeder and distribution canals with a total length of 33 miles. It was built at a cost of K 810 million.

According to information on the Construction Circle 9 website, construction work on the irrigation canal system was completed in March 2002. No information is available about micro-hydropower generation at the Thegaw dam or along the canal system either on Circle 9 website or in news reports.

http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=15&Itemid=28

Kantin Bilin dam and irrigation system

Burma 1:250,000: Series U542, U.S. Army Map: NF 46-12: Henzada. Kantin Bilin dam, 20 miles north of the Thegaw dam near Kywemagaing [17° 58' N, 95° 53' E], grid square reference: 8/8, 25/2.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne46-12.jpg>

NLM, 22/04/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020422.htm>

Lt-Gen Khin Nyunt of the SPDC addressed the opening ceremony of Kantin Bilin dam built by Construction Circle 9 of the Irrigation Dept in Minhla Township, Bago Division on 21 April. Kantin Bilin dam is located near Kywemagaing village on the upper reaches of the Kantin Bilinchaung about 20 miles above Thekaw dam. It is an earthen dam, 1,110 feet long and 123 feet high. It will irrigate 25,000 acres of land.

NLM, 18/01/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n050118.htm>

The A&IM minister inspected cultivation of summer paddy, thriving gram plantations and irrigation facilities under construction in the irrigated area at the diversion weir of the main canal and canal 3 of Kantin Bilin Dam in Minhla township. When the irrigation facilities are completed, local farmers will be able to put more lands in Minhla and Letpadan Townships under summer paddy and gram.

Rural Electrification with Mini Hydro Power (Ma Mya Dam) Project, Application Form, ASEAN Renewable Energy Project Competition, 06/05/09. 20 pp. See [pj](#) above for details.

According to Table 1 of the project submission, 200 households in the villages of Mayikwin and Gayansanpya are benefitting from four 3kW turbine-generators installed at near drop structure 7 and the check gate of the Kantin dam

Thonze dam and irrigation system

Burma 1:250,000: Series U542, U.S. Army Map: NF 46-12: Henzada. Thonze dam, about 4½ miles NE of the village of Hlelangu [17° 42' N, 95° 55' E], grid square reference: 8/4, 25/2.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne46-12.jpg>

A topographical map pinpointing the location of the dam, the canals and irrigation coverage can be found at http://www.construction9.com//index.php?option=com_content&task=blogcategory&id=30&Itemid=45

The dam and reservoir are shown in the upper right hand corner of the map. Two main canal systems, one north and the other south of Thonze creek are indicated.

NLM, 27/01/01. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020127.htm>

A ceremony to open Thonze Dam built by the A&IM was held near the dam with an address by Lt-Gen Khin Nyunt of the SPDC. Thonze Dam is built on Thonze Creek in Thayawady township at the foot of historic Alan Hill where revolutionary leader Saya San stationed his troops during the anti-colonialist period. The earth embankment of the dam is 150 feet high and 1,320 feet long and the government used K 1,308 million to build the facility which will irrigate over 50,000 acres of land. Plans are under way for storage of spilled water to carry out agriculture works in the late monsoon season on 20,000 acres of land which are prone to be inundated in the rainy season.

Rural Electrification with Mini Hydro Power (Ma Mya Dam) Project, Application Form, ASEAN Renewable Energy Project Competition, 06/05/09. 20 pp. See [pj](#) above for details.

According to Table 1 of the project submission, 100 households in the village Bogyigone near the check gate of the dam are benefitting from two 3kW turbine generators installed there.

NLM, 15/09/09. <http://www.burmalibrary.org/docs07/NLM2009-09-15.pdf>

While visiting Thonze dam, PM Thein Sein is shown a micro hydro turbine-generator near Bogyigon Village in Thayawady township. He is briefed on operation of the mini-hydro plant on one of the canals of the Thonze dam irrigation system. The plant was constructed by Construction Group-9 of the ID and is equipped with two 3-kilowatt-turbines which are supplying power to 99 households. [A photo of one of the turbo-generators is included on the front page of the print edition of NLM.]

Other news reports about the Thonze dam can be found in the NLM (10/12/01; 24/11/04; 05/03/05; 11/05/05). http://www.construction9.com/index.php?option=com_content&task=blogcategory&id=25&Itemid=39

Kanyin dam and irrigation system

Burma 1:250,000: Series U542, U.S. Army Map: NF 46-08: Prome. Kanyin dam, 2½ miles NW of Tatkon [17° 59 N, 95° 06 E], grid square reference: 9/2, 24/2. <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne46-8.jpg>

A sketch map pinpointing the location of the dam, reservoir and irrigation coverage can be found at http://www.construction9.com/index.php?option=com_content&task=blogcategory&id=34&Itemid=50

NLM, 24/11/10. <http://www.burmalibrary.org/docs09/NLM2010-11-24.pdf>

Nearly 80pc of the embankment, 65pc of the conduit pipe and control tower and 100pc of the spillway and eleven canal structures have been completed.

NLM, 29/07/10. <http://www.burmalibrary.org/docs09/NLM2010-08-29.pdf>

A&IM Htay Oo visits the Kanyin dam project and is briefed on construction of the main dam, conduit, spillway and irrigation facilities. The main dam will be 194 feet high and 2,850 feet long. Earthwork on the main embankment is now 73pc complete. The high-pressure steel pipe for the conduit will be 938 feet long. Earthwork for the conduit is 56pc complete and laying of concrete 14pc. The spillway will be 250 feet wide and 991 feet long. Earthwork for the spillway is 61pc complete and concreting of the spillway is finished. Altogether the whole project is 61pc complete.

NLM, 02/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-02.pdf>

PM Thein Sein visits the site of the Kanyin dam project and is briefed on construction of the spillway, the main dam and other structures. Up to now construction tasks are 59pc complete. Kanyin dam will irrigate about 25,000 acres of farmland in Ingapu township and supply five megawatts of electricity to the surrounding areas. A&IM Htay Oo also informs the PM about production of low-cost cement for rural areas, supply of electricity with 40-watt solar power cells to ten villages of the Hinthada district.

Xinhua, 04/12/09. <http://english.sina.com/world/2009/1204/290596.html>

The Saudi Development Fund (SDF) will provide an interest-free loan of US\$ 8 million to Myanmar to help develop Myanmar's irrigation sector, the local weekly Yangon Times reported on 03/12/09. The loan will be used in a dam construction project at Ka Nya [sic] in Ingapu township, scheduled to start early next year. On completion the dam will irrigate over 10,000 hectares of farmland.

NLM, 06/11/09. <http://www.burmalibrary.org/docs07/NLM2009-11-06.pdf>

Gen Than Shwe visits Kanyin Dam project in Ingapu tsp and is briefed by A&IMin Htay Oo on irrigation facilities and arrangements for generating small-scale hydropower through the canals. Planning has taken into consideration the need to use modern land reclamation methods and the installation of two 2.5-megawatt-capacity-generators at the dam. The project which is scheduled for completion in 2010-2011 is 31pc complete up to the present.

NLM, 16/08/09. <http://www.burmalibrary.org/docs07/NLM2009-08-16.pdf>

Director U Kyaw Myint Hlaing of Construction Group 9 of the ID briefs A&IMin Htay Oo on work being carried at the Kanyin dam site. The dam will supply irrigation water to 25,000 acres of farmland in Ingapu Township. The whole project is now 31pc complete.

Kyaw Sein, NLM, 23/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-23.pdf>

Hydrological and other studies of the dam site began in 1979 with funding by JICA. Pre-engineering work began in 2002-03. Soil has had to be removed up to a depth of 40 ft in some areas to provide a solid footing for the dam. The region has an average annual rainfall of 79 inches and the inflow water into the dam is 273,000 acre feet a year. 100 workers and 46 pieces of heavy equipment are currently working on the

project. Work on the dike (separation wall) has been completed. Clearing of the ground for the spillway is currently underway. The project is targeted for completion in 2010-11. [This is a feature article in the print edition of NLM and includes several photos of the dam site. No mention is made of the generating facilities planned at the dam.]

NLM, 24/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-24.pdf>

Gen Shwe Mann of the MoD visits Kanyin dam which will irrigate about 25,000 acres of farmland and prevent flooding in the area. Small hydro turbines will be installed at the project to supply power to nearby villages.

NLM, 09/07/04 <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040709.htm>

Lt-Gen Khin Maung Than of the MoD visited the Kanyin dam project site. The earth dam is being built to irrigate 25,000 acres of farmland in Ingapu township. It will be 194 feet high and 6,600 feet long. The conduit and the spillway are of reinforced concrete. It will have a storage capacity of 148,800 acre-feet of water at its highest level and generate five megawatts of electricity.

[Other news reports about the Kanyin dam can be found in the NLM on the following dates: 22/02/03; 06/07/04; 04/10/04; 11/07/08]. Note that the Circle 9 website does not mention hydropower generation in the information it provides about the project.]

http://www.construction9.com/index.php?option=com_content&task=blogcategory&id=33&Itemid=49

Additional references

See below: 'Private sector promoting interest in renewable energy' (MT: 12/07/04)
'Manufacture of small hydro turbines in Myanmar' (JICA: Sept 2003)
'Co-op department assisting villages with power supply' (MT: 04/08/03).
'Rural power services in Chin state' (Appendix 10)

*The following key articles focus on clusters of small, mini- and micro- hydropower facilities:
'Mini-hydro facilities slated for [dams in Kyauktaw township](#)' (NLM: 26/11/08)
'Additional hydropower generation planned for [Putao](#)' (NLM, 25/01/08)
'[Pyin-U-Lwin hydropower projects](#) speeded up' (NLM: 30/11/07)
'Hydropower station commissioned in [Kaungkha](#)' (NLM: 26/07/05)
'[Namwok hydropower plant](#) re-opened' (SHAN: 09/04)

*The following key articles focus on individual small, mini- and micro- hydropower facilities:
'[Maday dam serving farmers](#) of Kanma township' (NLM: 14/01/11)
'Electricity flowing from [monk-driven projects](#) in Mon state' (IMNA: 05/02/09)
'[Self reliant hydropower plant](#) serving 600 homes Kanan' (NLM: 30/01/09)
'[Bontalar hydropower station](#) in Matupi visited' (NLM: 23/11/08)
'[Natchaung model village](#) well supplied with electric power' (NLM: 15/09/08)
'[Pathi hydropower plant](#) inaugurated in Toungoo township' (NLM: 03/01/08)
'[North Yama](#) support dam to generate 250 kilowatts' (NLM, 29/11/07)
'[Ma Mya dam](#) put into service in Myanaung township' (NLM: 08/06/07)
'Hydropower plants in Myanmar with [capacities up to 10 MW](#)' (JICA: Sept 2003)
'[Meipan creek](#) hydropower plant inaugurated' (NLM: 16/05/02)

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Appendix A*: pp 27-31 (September 2003).

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5)

During 2001-02, a Japanese study team from Nippon Koei and the Institute of Energy Economics Japan carried out research related to the rehabilitation of small and mini-hydropower stations in rural areas of Myanmar. To summarize their research they prepared a chart giving essential information related to the location, generating capacity, commissioning date, hydrological data, and condition of each of the facilities

they visited and/or were informed about. Fourteen of the stations named could be considered 'small' facilities, i.e. between 1000 kW and 10000 kW. Information about these and a few other 'small' hydropower plants in Myanmar can be found in the article 'Hydropower plants in Myanmar with [capacities up to 10 MW](#)' (JICA: Sept 2003). The other 29 plants named in the chart could be considered mini-hydropower stations, i.e. under 1000 kW.

They include the stations in Kachin State at Putao [Nam Htun] (160 kW), Kampaiti (150 kW), Panwa (150 kW); in Kayah [Karenni] State at Pasaung [Hwe Kabu Chaung] (108 kW); in Kayin [Karen] State at Papun [Lekapaw Chaung] 37 kW; in Chin State at Dhobi Chaung (60 kW), at Zalui (400 kW), at Daung Va (400 kW), at Paletwa (50 kW), at Matupi [Namlaung Chaung] (200 kW); at Laiva (600 kW), at Tui Saung Chaung (200 kW), at Mindat [Che Chaung], (200 kW); in Sagaing Region at Lahe [Hwe Hngwin Chaung] (50 kW); in Tanintharyi Region at Kattalu Chaung (150 kW), on Malikyun (192 kW); in Mandalay Region at Wetwun (450 kW); in Mon State at Zingyaik (198 kW); in Shan State at Namhsan (30 kW), at Muse [Namkhun Chaung] (192 kW), at NamKham [Nammahla Chaung] (300 kW), at Kunhing [Namsham Chaung] (150 kW), at Kyaington = Kengtung [Nam Lat Chaung] (480 kW); Chinshwehaw [Pachethaw Chaung] (300 kW); at Maing Lar = Mongla (60 kW), at Selu [Nam Lat Chaung] (24 kW), at Kunlong [Nam Hsawn Chaung] (500 kW), at Pon Hsan southwest of Panghsang [Namnga Chaung] (80 kW), at Kyukok [Nam Hkan Chaung] (320 kW).

For further information on these minihydro stations see the URL listed above; also the UREC (YMEC) website at http://www.ymec.com.cn/en/about_yj_2.htm Some of these mini-hydropower stations are also dealt with separately in the Compendium. Consult the topical index 'Renewable Sources and Small Generating Facilities ([SF](#))' for further information.

Min Khaing, "Development of Hydropower in Myanmar" in *SHP News*, Volume 23, Issue Winter, 2006, pp 21-24. <http://www.hrcshp.org/shp/en/pdf/2006/winterdetail.pdf>

According to the author, an employee the Design and Technology Branch of the Dept of Hydropower Implementation of EPM No 1, the main source of electricity outside the grid system in Myanmar is "mostly small hydropower stations". "The majority of these are operated as isolated rural electrification stations and only a few operate as a central station distributing to neighboring towns and villages. The potential of small hydropower represents 2.05% of the total electricity supply in Myanmar. At present, 32 small hydropower stations are in operation to fulfill local and regional electricity requirement." A chart naming the 32 stations and their generating capacity indicates that all of them came into operation between 1984 and 1996. It seems to be limited to projects in which government's electric power department and/or ministry were involved. No explanation is provided as to why the list was not extended beyond 1996, since the article other references show that it was written shortly after the formation of the two separate electric power ministries in 2006.

*Several of the hydropower facilities included in the items below are more properly referred to as "small" rather than as "mini" or "micro" hydropower stations. They are included here to facilitate quick reference to "off-grid" hydropower facilities throughout Burma/Myanmar. For information on the distinction between the various sizes of power plants in the country, see the section [ME](#) on "definitions" below. Responsibility for the operation and maintenance of hydropower plants under the size of one megawatt comes under a number of ministries, village councils, companies and even private owners.

NLM, 09/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-08.pdf>

A box in an article entitled 'Colourful Chin state' notes that there are 10 [small-scale] hydropower plants in the state. A hydropower sub-station with a generating capacity of 0.7 MW is under construction at Laingvar in Falam township.

NLM, 08/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-08.pdf>

A box in an article entitled 'Kayin state gaining development momentum' notes that there are 89 small-scale hydropower plants in the state.

NLM, 31/01/11. <http://www.burmalibrary.org/docs11/NLM2011-01-31.pdf>

Social Welfare Minister Maung Maung Swe checks on self-reliant generation of hydropower by damming Namhsin and Hekham waterfall creeks for supply of electricity to villages in Mongngaw village tract in Kyaukme township.

NLM, 12/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-12.pdf>

The hydropower station at 6th-mile waterfall in Momeik township is inspected during a tour of northern townships by Gen Tha Aye of the Defence Ministry. [Apparently, it is operation. See NLM 26/08/07 below.]

NLM, 17/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-17.pdf>

Lt-Gen Tha Aye of the MoD inspects construction of a small hydel plant that will provide power to the Homalin military station. At Neintalon village in Homalin township he checks on the site chosen for implementation of a small hydropower project.

NLM, 21/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-21.pdf>

Triangle Region Commander Kyaw Phyto attends the launch of a self-reliant hydropower generator in Mongtwam-Punako village in Shan State East. After inspecting the supply of electricity he gives instructions on the development of the village tract and presents medicines and sports gear to the village through officials.

NLM, 03/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-03.pdf>

Yekyaw village in Hlegu township is the site of a river pump station that is maintained by the Yangon division WRUD. Power is supplied to the village with the use of a hydro-turbine generator.

NLM, 28/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-28.pdf>

On a tour of villages in Kyunsu township in Taninthayi division, Industry-2 Minister Soe Thein visits Mayanchaung, Kapa, Kade Katud, Katan, Tayapine, Wachaung, Migyaung-aw, Lewahbyin, Done-paleaw and Kangyi [on Katan island] where he consults with officials, teachers, health staff, local people and members of NGOs on matters related to the supply of electricity, including the use of hydropower, solar energy and bio-fuel and the building of village-to-village roads. The minister presents 20 sets of solar generators and 20 sets of hydro power turbines for village dispensaries, monasteries and computer rooms. [Note also the following references: The (15-kW) Kattalu hydel power plant supplies electricity to Kyunsu all day in the rainy season (NLM, 19/03/02. <http://missions.itu.int/~myanmar/02nlm/n020319.htm>); Electricity is being generated at the Kattu hydropower project in Kyunsu township. A total of 10 island villages were installed with hydropower generators in 2009. (NLM, 13/1010. <http://www.burmalibrary.org/docs09/NLM2010-10-13.pdf>);

NLM, 17/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-17.pdf>

Minister for Industry-1 Aung Thaung meets with people of Thabutpinte [21° 04' N, 95° 29' E], Yonetaw, Ohtaung, Kywetut, Myinchangon, Thepingon, Thangon and Sonlon villages of Thabutpinte village-tract in Taungtha township and inspects the completed [mini-] hydro power station there and the generation of hydro electric power and irrigation. [Yayku dam, with a storage capacity of 10,700 acre-feet, serves as a support dam for the larger Kyauktalon dam which is located below it on Kyauktalon creek. During construction of Yayku dam [NLM, 29/08/01 <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010829.htm>], it was announced that the outflow canal of Yayku dam is directly linked with underground conduits and would be used to generate power for nearby villages. Eight years later, It would appear that the promised generating plant has been completed. No further information is provided about the capacity of the turbine /generator set or the arrangements for distribution of the power to the villages named.]

Nu Nu Yi & Aye Thanda Thein, NLM, 31/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-31.pdf>

Chaungmange dam was inaugurated on 12 July 2006 near Pannyosein village [19° 40' N, 95° 59' E] in Lewe township in the Nay Pyi Taw district. The main earthen embankment is 96 feet high and 2,150 feet long and there are two additional 450-foot-long dikes. It can store up to 91,770 acre feet. A 50-kw generator installed at the dam is producing 0.16 million kwh yearly. A total of 8,000 acres of farmland will be irrigated [when the

canal system is finished], making it possible for farmers in the Pyinmana area to harvest up to three crops a year.

NLM, 12/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-12.pdf>

Nay Pyi Taw Commander Wai Lwin visits Mepauk and Gamontaung villages in the hilly region of eastern Pyinmana township between the sites of the Nancho and Upper Psunglaung dams. Tea plantations are to be established in the area on guidance from Gen Than Shwe. At Gamontaung village electricity is being generated on a small scale using hydropower.

NLM, 28/09/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080928.htm>

A&IM Htay Oo looks into the generation of hydropower on the Luntaung tributary canal [north of Mandalay]. 3,582 acres of paddy in Patheingyi and Madaya townships are irrigated through Luntaung tributary canal.

NLM, 07/09/08. <http://www.burmalibrary.org/docs5/NLM2008-09-07.pdf>

A bomb explosion near the hydropower station on the Hpa-an-Hlinebwe road in Mebaung village, Hpa-an township, caused minor damage to a 50-KVA generator at the station.

Win Khaing, *Renewable Energy and Rural Development in Myanmar*, pp 27-32. Presentation made at TCDPAP & FIDIC/ASPAC) Conference (22-25/04/08) in Seoul. Edited.

www.mes.org.mm/.../RE%20&%20Rural%20%20Development23April%2008,%20Seoul.pdf

Myanmar has abundant renewable energy resources and the geography and topography of the country are suited to an isolated power supply system. Myanmar has potential for abundant small hydro production and turbine manufacturing and installation technology. Appropriate renewable energy technologies exist, and the skills to design and build such systems are available. In terms of the small hydro potential, there are nearly 60 sites suitable for small hydro with a total output potential of 170MW. Up to 2008, 33 small hydro-power projects were generating [approximately] 36 megawatts. Also, there are numerous village hydros with a capacity of less than 50kW and turbine generator installations of 1kW or less in hilly regions.

In the town of Paletwa in the township of the same name [in southern Chin state], there is an existing diesel generating station with an output of 75kW. But the generator operates only 3 hours a day. [In the town there has been a project to set up another power station installed with two 25 kW microhydropower turbine-generators.] The people are involved with this project and have been very helpful during the construction period, as they want to have electricity 24 hours a day. There are about a thousand households in the town which has a population of about 7,000. Fishing and agriculture are main sources of livelihood for the people. [Several photos are included.]

NLM, 01/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080201.htm>

Madan Dam is being built by the ID across Madan Creek near Na Nwin Kyin and Chaungkhwa villages about 42 miles south-west of Lewe. On completion, it will benefit 8,000 acres of arable lands and generate 25 kilowatts. There are thriving groundnut plantations along the road to Chaunggwa. See also: NLM: 30/01/04; NLM: 28/12/04; NLM: 15/08/05; NLM: 30/03/08.

NLM, 22/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071222.htm>

During a tour of the Pyin Oo Lwin area A&IM Htay Oo and CPTM Thein Zaw visited the Dokwin Agriculture Farm of the Myanma Agriculture Service where herbal orchids are grown in accordance with the guidance of the Head of State. Afterwards, the ministers inspected a small hydel power project on an irrigation canal of Dokwin dam that can produce 5 kW. Generators are also equipped on irrigation canals to produce hydro power on a small scale.

NLM, 11/10/07. <http://myanmargeneva.org/NLM2007/eng/10oct/n071011.pdf>

A small-scale hydel power station capable of generating 20 kilowatts was opened 18 May 2007 in Konbaung village, Kengtung township, Shan state north, and another capable of generating 50 kilowatts in Namma (Wanlon) village, Kengtung township, on the same day.

NLM, 01/10/07. <http://burmalibrary.org/docs4/NLM2007-10-01.pdf>

Shanmange dam built by Irrigation Dept was put into operation on 29/09/07. It is located on Shanmange creek near Aungtha village in Meiktila township close to the Kyaukpadaung - Meiktila road. The new dam which can irrigate 733 acres of farmland will serve a support facility to keep the reservoir at Mondaing dam from silting up. The Shanmange dam is 89 feet high and 6800 feet long and has a water storage capacity of 21,638 acre feet. It was built at a cost of K 1724.02 million. Plans are under way to generate 80 kilowatts of electricity at the dam and a survey is being conducted in villages in the area.

NLM, 27/09/07,. <http://myanmargeneva.org/NLM2007/eng/9Sep/n070927.pdf>

In Thayetchaung township Coastal Commander Khin Zaw Oo views the construction of the lake and the hydropower station which can produce 90 kilowatts.

NLM, 26/08/07. <http://myanmargeneva.org/NLM2007/eng/8Aug/n070826.pdf>

A hydropower project is underway at the 6th-mile waterfall in Momeik township in northwestern Shan state. It will have an installed capacity of 140 kilowatts that will be supplied to the town of Momeik.

NLM, 05/10/06. [excerpted] <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061005.htm>

At meeting no 1/2006 of the Central Cte for Development of Border Areas and National Races . . . General Soe Win said that [since 1988] small-scale hydel power plants had been set up in 14 towns in border areas and . . . the Ministry of Industry No 2 is constructing a factory to produce turbines and generators. . . . EPM No 1 Zaw Min submitted reports on small scale hydel power projects being implemented by the ministry. . . . [He said that the] Ministry of Electric Power No 1 has made arrangements to establish a total of 185 small-scale hydel power plants in Kachin, Kayah, Kayin, Mon, Rakhine and Shan states and Sagaing, Bago, Magway and Mandalay divisions. When completed, these plants could be expected to generate a total of 187 MW.

NLM, 17/11/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051117.htm>

Dahseik model village and Namgtok and Namgtum villages in Langkho township have been facilitated with power generated by hydel power on a self-reliant basis. All the houses in Dahseik enjoy TV programmes available through a satellite receiver.

NLM, 12/11/05. <http://burmalibrary.org/docs2/NLM2005-11-12.pdf>

At the national AGM of the USDA in Hmawby township U Myint Oo of the Mon state delegation reports that a 20-kilowatt hydel power station was opened in Saungnaingyi village in Kyaikto township on 17/10/05. Plans are underway for five other rural hydel power station projects in Mon state, including Mekkhamu and Gadaingtook villages in Kyaikto township and Kyakwin and Paingdawei villages in Bilin township. At Mansaung [Manaung? (15° 08' N, 97° 55' E)] village of Ye township, a 30-KVA hydel power project is under implementation and so far 40pc of the project has been completed.

NLM, 01/02/05. <http://burmalibrary.org/docs2/NLM2005-02-01.pdf>

Information Minister Kyaw Hsan attends a ceremony to launch a hydel power turbine in Htanbingon village of Htilin Township. The 7.5-kW turbine was built on Maw creek at a cost of over K 6 million on a self-reliant basis by the USDA and local people. It will also power a small rice mill.

NLM, 28/01/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n050128.htm>

In a speech at a state-wide rally in support of the National Convention at Eindu, Papun township USDA Executive Khaing Khaing Win reports that the association has erected 25 mini-hydel power plants in rural areas of Hpa-an, Thandaung, Hlaingbwe, Kawkareik, Kya-in Seik-kyi, Papun and Myawady townships in Karen state expending K 6.7 million [approx US\$7,600] in the operation. Water from mountain springs is being supplied to villages. [This may be a reference to a microgenerator program to assist with potable water supply. The budget for the project defies imagination. Note the cost of the 7.4-kW turbine/generator set mentioned in the previous entry.]

NLM, 20/01/05. <http://burmalibrary.org/docs2/NLM2005-01-20.pdf>

A&IM Htay Oo inspected Khawa dam in Padaung township, Bago Division (West). It was opened on 25 June 2004 and is currently providing water to a thousand acres of farmland for the cultivation of summer paddy. It also supplies drinking water through a pipeline and electricity supply to the villages [of Chinywagyi and Tonkin] through a locally made 3,000-watt dynamo. At the briefing hall, the director of Construction Group 2 of the ID reported on the maintenance of Khawa dam and water supply for cultivation of summer paddy and the generation of electricity through irrigated water. [**Compiler's note:** 'Dyanmo' is generally used to refer to a motor that produces direct current. Its use here may simply have been the translator's way of referring to a 3-kilowatt alternating current generator used in conjunction with a turbine put together at the electrical workshop in the machine and tool factory in Nyaungchedauk or, possibly, at the AgMin's workshop in Hmawbi. The reference to the generation of electricity through 'irrigated water' may simply mean that the generating set is located at a junction point along the main irrigation canal rather than at the dam itself.]

NLM, 15/12/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n041215.htm>

Hydro electric power is generated in Santaik village in Paung township, Gawt (Gaw, Got) village in Thaton township and Shwehlay village in Bilin township in Mon state.

HYDRO POWER STATION COMMISSIONED IN KAUNGKHA

NLM, 26/07/05. <http://burmalibrary.org/docs2/NLM2005-07-26.pdf>

Kaungkha Hydel power plant was commissioned into service in Kaungkha town, Kutkai township, Shan State (North) yesterday (25/0705) with an address by Chairman of the Work Committee for Development of Border Areas and National Races Lt-Gen Thein Sein. He said the Tatmadaw government has been building infrastructures in all sectors to develop the national economy. It is boosting agricultural production region-wide and nation-wide for ensuring food sufficiency for all the nationalities. In addition, it is trying to acquire capital for Myanmar to become an industrial nation.

A 66-foot long and eight-foot high diversion weir was built on Nanhumon creek near Loikham village in Kaungkha town to run two 75-kilowatt turbines that will generate 0.6 million kilowatt hours of electricity annually. As the power generation of the facility exceeds local consumption, the surplus power can be used by cottage industries in the region. The EPM erected the station to provide the power needed to develop the Kaungkha region of Special Region 5 of Shan State (North). The project was initiated by the Work Committee of the Development of the Border Areas and National Races of the SPDC.

U Mahtu Naw, chairman of the Kachin Defence Army of Special Region No 5, thanked the government for the facility, pledging to always serve the national and regional interests together with the government. Lt-Gen Thein Sein and U Mahtu Naw exchanged gifts. The Secretary-1 also presented gifts to the headmasters of Kaungkha Basic Education Middle School and Loikham BEMS and the medical superintendent of Kaungkha Station Hospital.

Border Areas Minister Thein Nyunt, MD San Oo of MEPE and U Mahtu Naw formally opened the station that will supply power to Kaungkha and Loikham regions. A crowd of over 2,500 attended the opening. [Several photos of the occasion are to be found in the print edition of NLM.]

Additional reference:

NLM, 21-03-04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040321.htm>

General Khin Nyunt visits Nanhumon (Kaungkha) hydro-electric power plant near Lwekhan Village in Kaungkha Myothit of Kutkai township where he is briefed by Director Win Kyi of Construction Group 2 of the HPD on construction of irrigation facilities for the project. National race leader Mahtu Naw reports on regional development tasks. After an exchange of gifts, they view construction of the diversion weir, sluice gate, conduit and canal. Two 150-kilowatt generators will be installed to produce 1.475 million kilowatt hours a year to Kaungkha.

Compiler's note:

One of the “carrots” held out by Myanmar’s military government in persuading armed ethnic insurgent armies and local militia groups to reach non-aggression pacts has been the promise of assistance with local development projects. The construction of small dams for purposes of irrigation and the generation of hydro-electric power has been a prominent feature of such agreements. The Kaungkha project above and the Tamoenye and Mong Yin projects referred to below are typical examples of the deals struck with smaller groups. In the case of the older pacts made with the Kokang, Wa and Eastern Shan State “armies” in 1989, the agreements appear to have involved the construction of several dams and hydropower plants in each area. Government publications generally mention only the “official” monetary contributions to such projects, but other sources refer to conscripted labour and other contributions “donated” by the partners to the pacts.

Several of the cease-fire groups located on the long border with Yunnan in northeastern Burma have also found it convenient to arrange for electricity to be supplied from across the border to the enclaves they control. Chinese business interests operating casinos and other cross-border trading and commercial enterprises in these areas are reported to have been closely involved in making these arrangements. See especially the sections dealing with the Kokang, Mongla and KIO regions below.

Mong Yin region

Htein Lin, NLM, 12/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-12.pdf>

A feature article reports that the construction of the Moneyin dam has led to the reclamation of 2000 acres of land for farming in the three village tracts along Namhsuan creek where the dam was built. Summer paddy was cultivated on 800 acres last year. The 20-mile road leading to Lashio has been improved as a result of the dam construction and there are plans to grow rubber trees on the hillsides in the area. The article notes that the “dam also can generate 2.2 million kilowatt hours a year”, but does not say whether the facilities for producing and distributing the power have been installed.

NLM, 05/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-05-text.pdf>

Moneyin dam on Namsum creek near the village of Moneyin in Namtu township was commissioned on 31/05/08. The earthen embankment of the dam is 1700 feet long and 100 feet high, and its storage capacity is 28,420 acre-feet. It will supply drinking water, generate hydro power and irrigate 2600 [acres] of farmland. The government spent K 1690 million on construction of the dam.

See also: NLM, 23/08/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070822.htm>

In Lashio, Lt-Gen Kyaw Win of the MoD is briefed on the construction of Monyin dam that was started in 2006-07 fiscal year. Presently, it is 40pc complete. It will be able to generate 2.5 kW for the region.

See also: NLM, 10/12/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n051210.htm>

U Kyaw Win of Shan State ID reports to Lt-Gen Kyaw Win of MoD on the Namswum creek dam project to be built near Monyin village in Namtu township. Instructions are given.

See also: NLM, 25/07/05. <http://www.ibiblio.org/obl/docs2/NLM2005-07-25.pdf>

A ceremony to unconditionally exchange arms for peace by SSNA Brigade-6 and SSA (Breakaway Group) from Ei-nainglon village in Lashio township, Monpa village in Hsenwi township, Mongyin village in Namtu township and Muse and Namhkam townships was held at the Pyidaungsu Sports Grounds in Lashio, Shan State (North). It was attended by Lt-Gen Thein Sein of the SPDC and . . . 119 members of SSNA Brigade-6 led by U Sai Ku and the SSA (Breakaway Group) led by U Sai Yee who had decided to return to the legal fold. Speaking on the occasion, NE Commander Myint Hlaing said he would fulfil the requirements of the members of SSNA Brigade-6 and the SSA (breakaway group), including security, by providing assistance in the transport, education, health, social and economic sectors for regional development. . . . [Afterwards,] Deputy Brigade Commander Sai Ku of Shan State National Army Brigade No 6 explained the purpose of the unconditional exchange of arms for peace in the Shan language. He said [the members of his group] had made their living by extorting money from the local people, but when they found [out] that the Government was carrying out regional development tasks they felt ashamed of their acts and decided to exchange arms for peace in the interests of the people. Nowadays, was not the time to threaten and oppress the people by holding arms and collecting extortion money. It was time abandon their arms and restore peace when the Government was striving for equitable development of the national races, hilly regions and plains.

Tamoenye region

NLM, 29/04/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030429.htm>

Lt-Gen Aung Htwe of the Ministry of Defence went to Tamoenye, 17 miles from Kutkai in Shan State North. At Manjel Village 10 miles from Tamoenye, he attended the opening ceremony of Namhsa Hydel Power Plant Station. At the ceremony, Muse DPDC Chairman Lt-Col Soe Win and Tamoenye Region national race leader U Myint Lwin [leader of the Tamoenye mobile militia unit] formally opened the power station. U Myint Lwin reported on the self-reliance power plant built with the help of the Ministry of the Progress of Border Areas and National Races and Development Affairs. Then, U Myint Lwin presented commemorative pennants of the opening ceremony to Lt-Gen Aung Htwe, Brig-Gen Maung Maung Thein, Maj-Gen Myint Hlaing, Kachin national race leader U Ma Htu Naw of Shan State (North) Special Region-5 and officials. Namhsa Hydel Power Plant is located near Manjel Village in Tamoenye and it is generating 800 kilowatts of electricity at Namhsa Creek with the use of two 400 kilowatt generators. The embankment is 18.22 metres long, 5.9 metres wide and 5.1 metres high. The canal is 1,833 metres long, 1.5 metres wide (upper) and 1.3 metres (lower) and 1.5 metres deep. The pre-stressed pile is 120 metres long and 0.8 metre diameter. The construction tasks started on 1 March 1998 and were completed on 1 July 2000. Spending on the construction amounted to K 4.8 million.

Mongla (NDAA) region

Shan Herald, 29/11/99. http://www.shanland.org/drugs/1999/a_slap_in_the_face_for_undcp.htm/

The area northeast of Kengtung, from Saleu to Mongla near the Chinese border, is known as Shan State (East) Special Region No 4. It is under the sway of the New Democratic Alliance Army of Sai Leun (aka Lin Mingxian). According to official bulletins, three hydro power plants have been built in Mongla, Saleu and Mongyawng, (400 KW, 380 KW and 300 KW respectively) under the SPDC's Border Area Development Program with aid from the UN Development Program (UNDP) and the UN Drug Control Program at an estimated cost of K.150 - 200 millions. But the villagers had to pay 50 old coins per household, (1 old coin = K 1,000 - 1,200) for the electricity poles. Besides, each household has to pay Y 50 (Chinese currency) per month for the electricity bills. See also: WPD, 04/03/92. <http://burmalibrary.org/docs3/BPS92-03.pdf> [doc 32] Hydel power plants were inaugurated 01/03/92 at Mongla in Kengtung tsp and at Hsilu in Mongyawng tsp. The first cost K 2.93 million and the second K 1.43 million.

Shan Herald, 20/07/05. <http://www.shanland.org/general/2005/Chinese-police-invades-Burma/>

Chinese police staged surprise raids on casinos at Mongla in eastern Shan State on 6 July and rounded up more than sixty Chinese clients at the establishments, according to sources arriving at Thai-Burma border. The raiders who came in three trucks swept down upon the three main casinos in Mongla opposite Daluo of Xixuangbanna prefecture in broad daylight. Local and Thai players however were left untouched. Power having been cut off from China, the city's residents are now getting electricity on a rotation basis [from locally operated diesel plants]. A hydropower plant is presently being constructed, they said, but it has yet to be completed. Mongla, the seat of the National Democratic Alliance Army, concluded a ceasefire pact with Rangoon in 1989. [A map accompanying the article shows the location of Mongla on the China-Burma border.]

Wa (UWSA) region

Those Impeding Eradication of Narcotic Drugs, [1999]. [Edited]

<http://www.myanmar-narcotic.net/MTA/ndrug2.html>

On 9th May 1989, the Wa "faction" [United Wa State Army] officially signed a peace agreement with the [Myanmar] government. In those days, Pangsan was a small village inhabited by Wa and Shan nationals. Ten years later, I went on a visit to the now thriving town. [While I was there, I was driven] to the construction site of Nant Pan (Nangpan) hydro-electric power plant on Nant Pan creek about 30km away from the town. Four hundred labourers were working day and night shifts to finish the project in time for its scheduled opening on 17 April. The facility, which will eventually generate 7.5 MW, of electricity is being built at a total cost of K 3,200 million. I was told that three other similar plants are under construction in the Wa region. They include the 2,000-kW Yone Kyet plant and the 800-kW plant at Khway Mar. [A photo of the opening of the Nantpan power station is included with the article.]

NLM, 28/04/99. <http://www.myanmargeneva.org/99nlm/n990428.htm>

On a visit to the Wa region on 25/04/99, Lt-Gen Khin Nyunt of the SPDC and U Pauk Yu Chan, national race leader of Shan State Special Region No 2, went to the Sonphu (Nangpan) hydroelectric power station where a ceremony was held to commission the station into service.

NLM, 14/11/04. <http://www.ibiblio.org/obl/docs/NLM2004-11-14.pdf>

On 11/11/04, Minister for Progress of Border Areas Thein Nyunt went to Nan Pan Creek Sonphu hydro-electric power station, the main power station for the Wa region. It generates 8.5 megawatts and supplies power to Pangsang and Mongpauk.

MIC, 17/08/06. <http://www.myanmar-information.net/infosheet/2006/060817.htm>

For the development of Wa region, the Government has spent K 2,865.66 million and provided cash and material assistance worth K 1,256 million. . . . Regarding energy, altogether 5 towns in Wa region are being supplied with electricity. A village and a town in Wa region is being supplied with hydro-electric [power].

For other hydropower projects on the Namhka and Namlwi rivers in the Wa and Mongla regions, see '[South China power](#) companies target rivers in north-eastern Shan State' (Sohu: 08/02/10)

NLM, 30/03/11. Edited. <http://www.burmalibrary.org/docs11/NLM2011-03-30.pdf>

Replying to a question in the Union Parliament from Representative Sai Pao Nat of Shan State as to plans for the further development of the Wa Self-Administered Division, Border Affairs Minister Thein Nyunt said that . . . a hydropower station with installed capacity of 500 KW had been established on the Namaw [Nam Mao] Creek and that the Panwai [Saopha], Mongmaw [Mongmao], Panlong, Winkin [Vingkao, Weinkaung] and Panghsam [Panghsang] regions were being supplied with electricity.

Kokang (MNDAA) region

Diesel powered generators were set up in the border trading town of Chinshwehaw (23° 28' N, 98° 49') and the Kokang capital of Tashwetang [since renamed Laukkai (23° 41' N, 98° 46' E) almost immediately after a cease-fire was arranged with the Kokang-based forces of the former Communist Party of Burma in 1989. Later a small 100-kw hydropower plant was set up Parkyethaw near Chinshwehaw. After this was completed in Feb 1992, (WPD: 24/0792 <http://www.burmalibrary.org/docs3/92-07.txt>) a 200-kw extension was added and commissioned in Mar 1995. At the 10th anniversary celebration of the secession of the Kokang army from the CPB in March 1999, leader Peng Jiasheng (aka Phon Kya Shin) reported that another hydropower station capable of generating 640 kw was being built at Lonchwin (loc uncertain) in the Kokang area (MIC: 13/03/99 <http://www.burmalibrary.org/reg.burma/archives/199903/msg00265.html>) Ambitious plans were announced on the same occasion to create a reservoir near Laukkai and to set up a hydropower station capable of generating 3000 kw at the lake. While it would appear that the reservoir was built according to plan, there is nothing to indicate that financing for the power plant was obtained. Instead, Laukkai, now a city of some 30,000 inhabitants, is said to obtain most of the electricity it uses from across the nearby border in Yunnan. (*Show Business: Rangoon's "War on Drugs" in Shan State* (SHAN, 2nd edition, April 2005, pp 19-20 <http://www.shanland.org/resources/bookspub/drugs/SBII.pdf>). In Jan 2004 Peng Jiasheng announced reported assistance received from the Japanese government had made it possible to open another power station that was supplying electricity to three villages in the Kokang area (NLM: 28/01/04 <http://www.ibiblio.org/obl/docs/NLM2004-01-28.pdf>). (Compiler's note: Presumably this was accomplished through a Grass Roots Assistance grant of "216 million yen for electrification" announced by the Japanese embassy in Yangon in Dec 2001 (Kyodo: 17/12/01)

www.findarticles.com/p/articles/mi_m0XPQ/is_2001_Dec_17/ai_83313082

KIO (Kachin Independence Organization) region

The KIO, which is headquartered at Laiza on the China-Burma border, exercises control over several enclaves in eastern and northern Kachin state. Through its [Bugu](#) Company it operates one of the few independent hydropower facilities in Burma on Mali creek, and is currently supplying electricity to the state capital of Myitkyina, as well as to Laiza. Power supply in the large border town of Maijyang (see below), also in KIO territory south of Laiza, is supplied from Zhanfeng across the border in Yunnan. For a map showing the locations of the Mali and Dabak hydropower facilities and other places named in this section see Global Witness, *A Choice for China: Ending the Destruction of Burma's Northern Frontier Forests*, p 37, Oct, 2005.. www.globalwitness.org/media_library_detail.php/492/en/

KNG, 06/02/09. <http://www.bnionline.net/news/kng/5804-china-cuts-off-tele-communication-and-electricity-in-kios-area-over-casino-fiasco.html>

In a drastic step, China has cut off the telephone communication system and electricity supply to Maijyang business village on the Sino-Burma border. Residents said Chinese border authorities had cut off telephone communication yesterday and that electricity was shut down this evening. "The whole village is plunged in darkness. I can see many people coming out on the roads and the roads are unusually crowded. People

are using candle light and a few hotels are using power from generators," said one villager. The shut down of essential services followed an incident in which a gambler from Sichuan province, who had lost in the Maijyang casino was kidnapped on Thursday by Chinese casino owners. The abduction was reported to the Sichuan police by a female companion who had been with gambler in the Maijyang casino.

KNG, 23/01/09. http://www.kachinnews.com/index.php?option=com_content&task=view&id=708&Itemid=50
The Kachin Independence Organization has handed over to PRC authorities 14 Chinese nationals caught in KIO-controlled territory on January 21-22, according to border sources. Most of those arrested were said to be from Shanxi province in the PRC. Action was taken following a warning from Chinese authorities who had delivered a list of wanted gamblers in the area five days ago. The warning indicated that the supply of electricity to Maijyang would be cut off and road communication to the town would be closed down on January 23 unless the request was complied with. [A picture of the casino area is included with the article.]

KNG, 22/01/09. <http://www.bnionline.net/news/kng/5731-the-dark-world-of-chinese-casinos-on-sino-burma-border-special.html>
Every day, thousands of people from different areas of China come to gamble at the Maijyang casino, according to residents of Maijyang. The KIO hired out the land for the casino site to Chinese businessmen under a 30-year contract in 2000. Last year, Chinese businessmen took an extra 80 acres of land for the casino from the KIO at the same place. Currently, the Maijyang casino is one of the most crowded along the border. But the number of rich businessmen coming to gamble has dropped in recent months because of a murder and suicides connected to the operation of the casino, said Maijyang sources. Electricity in the casino is provided from China and gamblers and local people use Chinese land-lines and mobile phones. Internet access inside the casino compound as well as in Maijyang is also provided from China. The casino is located near the official road connecting the border trading town of Lweje (Loije) in Burma and Jiang Phong (Jiang Hkong, Zhanfeng) in Chinese territory.

AFP, 05/10/07. <http://brainbetting.com/content/view/971/129/> [condensed]
Betting is illegal in China, so thousands of Chinese flock to the relative safety of Maijyang in the far northeast of Myanmar to try their luck at the mafia-run casinos of this frontier town. Business is roaring at Maijyang, handily located just 20 minutes by motorbike from the border along pot-holed dirt roads that wind through picture-perfect paddy fields. "Whatever you need we can take care of, gambling, drugs, girls -- all of it can be arranged," a former casino employee surnamed Wang said as he escorted an AFP journalist past Myanmar border guards to Maijyang. Inside International Entertainment, one of 11 casinos, slot machines buzz and sing, as Chinese croupiers in maroon vests call for bets at blackjack and baccarat tables crowded by mostly Chinese patrons. Suggesting a professionalism behind the operations, cameras are trained on each of the seven sprawling rooms packed with players, while shifty looking men who do not appear to be betting move around the floor. According to one Chinese man who has worked in three of Maijyang's casinos, operations are headed by a Chinese mafia boss in Ruili, a Chinese border town built on the illicit drug, gemstone and timber trade. The popularity of Maijyang and another frontier casino further north in Laiza exploded after Chinese authorities last year cracked down on the multiple gambling dens in Ruili, about 45 kilometres (30 miles) south of here. Chinese casino owners in Maijyang operate with impunity, as the gambling dens' extra-territorial location means they are beyond the reach of Chinese law. Protection money is paid to Kachin soldiers but Chinese police also turn a blind eye to the hundreds of daily border violations in return for a piece of the action. "Everyone takes a cut," said the Chinese man, who asked that his name not be used.

INVERTERS KEEP LIGHTS AND TV SETS RUNNING

Tin Moe Aung, Myanmar Times, Electronic Supplement, 04/07/05.

(Compiler's note: Issue 272 of the Myanmar Times is no longer available on-line);

Since inverters first appeared in Myanmar in 1997 their use has skyrocketed. Inverters are used to convert direct current (DC) to alternating current (AC), which stores energy to use when electricity is not accessible from its main source. They are used in conjunction with a battery, which is charged when the electricity is

on, and which supplies power when the electricity is off. Many people prefer inverters to generators because they do not make noise and are easy to operate.

The first inverters available in Myanmar were made in China, but in 2001 domestically made models appeared on the market. "We started manufacturing inverters in 2001, and in 2002 and 2003 more people started using them in Myanmar," said Ko Myo Thant Htun from Nibban Electric and Electronics, which produces Baho inverters. Baho inverters are available in three capacities: 300 voltage amperes (VA) for K 16,500; 500 VA for K 35,000; and 1000 VA for K 42,000, he said.

Generally, a 500 VA inverter with a battery costs about K90,000. It will supply enough energy to power the lights and television. Industry sources hope that sales of inverters will continue to boom in the future but admit that upon the completion of several government hydroelectric projects they are likely to drop.

Compiler's Note: A good picture of an inverter is available with this article.

Additional references

See above: ['Coping with unreliable power supply in Burma's cities'](#) (IRROL: 22/05/10)

See above: 'Rising world lead prices zap Yangon [battery market](#)' (MT: 10/09/07)
'[Nibban Electronics](#) expects 'IP' protection for its products' (ASEAN: 06)

See below: 'Market for power [inverters expected to dwindle](#)' (MT: 29/03/04)

YANGON COMPANY PRODUCING [INDUSTRIAL ENERGY METERS](#)

Ye Lwin, Myanmar Times, Electronic Supplement, 04/07/05.

(Compiler's note: Issue 273 of the Myanmar Times with the accompanying supplement is no longer available on-line)

Electronic products manufactured in Myanmar offer a less expensive alternative to imported goods. U Myint Zaw, the managing director of Trust and Development Co Ltd, said his company began producing utilitarian electronic devices in 2000. "We started by making multigrain moisture meters to measure the percentage of water in grains – such as paddy, beans and pulses – and later started manufacturing digital balances to measure the weight of commodities, as well as energy meters to measure electricity capacity and use," he said.

Moisture meters were produced by order of Myanma Agricultural Produce Trading (MAPT) to replace the use of meters imported from Japan. Since 2000 the company has manufactured more than 400 multigrain moisture meters, most of which have been sold to government departments. However, with the liberalisation of crop trading rules the company has also begun targeting farmers and trading companies for sales, said U Myint Zaw. Under the recommendation of the International Rice Research Institute, which is based in the Philippines, the company also plans to produce portable moisture meters for export to farmers in the Philippines and Indonesia.

The digital balances manufactured by Trust and Development since 2002 can be read in four standards – pounds, kilograms, viss and tonnes – and are available in three designs for different uses: precision (to measure the ratio of ingredients in confections), commercial (to measure the weight of rice, beans and pulses), and floor, or truck scale, which can measure weights up to 60 tonnes.

Last year the company introduced electronic energy meters, primarily produced for the Ministry of Electrical Power to track energy use in households and power plants. The company is currently scheduled to manufacture 2,000 energy meters to be installed in factories in the Hlaingthaya Industrial Zone. "And we are determined to install high-quality domestically made electronic energy meters in hydropower plants within five or 10 years," said U Myint Zaw.

U Myint Zaw, a central executive committee member of the Myanmar Industrial Association (MIA), said raw materials used in the manufacture of Trust and Development's products are imported from Germany and Hong Kong. "The advantage of domestically made electronics is that they are made according to present and future market demands in Myanmar – we are always researching local market demands," he said.

Additional references

See above: ['Padaung factories](#) begin production of generators and meters' (NLM: 17/10/06)

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MYANMAR [EXPORTS FIRST](#) DOMESTIC TRANSFORMER

Tin Moe Aung, Myanmar Times, 30/05/05.

(Compiler's note: Issue 268 of the Myanmar Times is no longer available on-line.)

A Myanmar manufacturer last week made the first overseas sale of a domestically made transformer and has plans to export more, said the managing director of the company. "The transformer was exported to Perth, Australia," said U Tun Lin Thaung of the Yangon Transformer and Electrical Co Ltd, one of the leading transformer manufacturing companies in Myanmar. The company shipped a 750-kilovolt ampere (kVA) transformer with a price tag of US\$ 9,000 last Wednesday, he said.

"When our company started, we imported transformers to sell in Myanmar, but we started manufacturing our own in 2002," said U Tun Lin Thaung. The company has already received orders from Australia for two 3000-kva transformers to be shipped later this year, he said.

He said that last November the company earned ISO 9001:2000 certification for its quality management systems, which ensures the quality of its products and gives foreign companies the confidence to buy them. The parts and accessories used in the transformers are imported from Japan, Switzerland, Singapore and Thailand, U Tun Lin Thaung said. The company manufactures transformers with a capacity ranging from 50 to 20,000 kVA, and with prices ranging from K 2 million to K 200 million.

U Tun Lin Thaung said the demand for transformers in the domestic market has gone up year after year. "Demand has increased by about 30 per cent every year," he said. The company sells about 400 transformers annually on average, most of which have a capacity of less than 500 kVA. Most of the company's customers are from the industrial and construction sectors, said U Tun Lin Thaung.

Compiler's Note: A good photo of Botataung Port workers loading a 750-kVA transformer into a shipping container for export to Perth, Australia, accompanies the article.

Website information (circa 2006): <http://www.yangontransformer.com/>

Yangon Transformer and Electrical Co Ltd (YTE) is the first Myanmar ISO 9001-2000 certified manufacturer of power and distribution equipment. The company was established in 1999 and started with the manufacture of 11kV- and 6.6 kV-incoming and 400V-outgoing distribution transformers. Currently we are expanding production to 33kV and 66kV power transformers with a capacity of 50 kVA up to 30,000 kVA (30 MVA) and are planning to make 132kV and 230kV power transformers up to a capacity of 100 MVA. We started exporting transformers at beginning of 2005 and expect to increase our exports in 2006. YTE is a 100pc Myanmar citizen owned. The company factory is in Shwe Pyi Thar IZ No 1.

Additional references

See below: 'Local transformer manufacturers face [tough competition](#)' (MT: 27-01-03)

Tin Htwe, NLM, 29/09/08. <http://myanmargeneva.org/NLM2008/eng/9Sep/n080929.pdf>

[Yangon Transformer & Electrical Co](#) Ltd was established in 1999 and started manufacturing transformers in 2000. Previously, some parts were imported, but nowadays, the factory is capable of producing all the parts needed for the transformers it makes. Finished products include machines with capacities from 50 KVAs to

30,000 KVAs. The factory secured ISO 9001-2000 accreditation in 2004 and commenced exporting products in 2005. At present, transformers are being exported to Australia and Ivory Coast in Africa. The factory is also producing transformers for state sponsored projects in Myanmar and the company is involved in building sub-stations for EPM No 2 and equipment for these stations. It is also manufacturing transformers for river water pump projects of the Ministry of Agriculture and Irrigation, isolation transformers for signal lights to used on airport runways and equipment for the control rooms of airports under the Ministry of Transport. Transformers are also being made for private entrepreneurs and industrial zones. [Several photos accompany the article in the print edition of NLM, including one of a 66/11 kV, 10000 KVA transformer installed at the Lawkananda River pump project near Bagan on the Irrawaddy river.]

NLM, 18/09/08. <http://myanmargeneva.org/NLM2008/eng/9Sep/n080918.pdf>

Yangon Transformer is manufacturing transformers for use in local factories, sub-power stations, runway signal lights in airports and river pump projects. [A photo of a transformer produced at the factory is included in the print edition of NLM.]

Ye Kaung Myint Maung, MT, 10/12/07. <http://www.mmtimes.com/no396/n004.htm>

Yangon Transformer and Electrical Co Ltd has exported the first of 17 transformers it contracted to manufacture for the mining industries in Mali and Ivory Coast. U Thant Zin Thaung, the executive director of the company, said the deal to produce the high-voltage transformers was made with Australia-based Tanis IPS Pty Ltd. He said the production of the transformers, which range in capacity from 20 kilovolt-amperes to 50 megavolt-amperes, has been completed and the first two were shipped to Africa in November, followed by two more last week. "The rest will be shipped by the end of December," he said. "We won the contract agreement through tender bidding only after competing with South Korean and Indian manufacturers. We are proud of earning the contract for Myanmar because no other domestic firm can export such a heavy-industry product," said U Thant Zin Thaung. He said that although exports currently account for fewer than 1 percent of the company's total production, it had ambitious plans to expand into more overseas markets. "Mining firms consume huge amounts of electricity and they need high-quality transformers. This contract will increase our company's reputation and help us reach our goal of exporting more products," he said, adding that the Middle East in particular was a promising market for the company. Yangon Transformer and Electrical Company was founded as a transformer importer in early 1990s. In 2000 it established a factory at Shwe Pyi Thar Industrial Zone to manufacture its own products.

NLM, 08/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nml/n061208.htm>

Under a contract between Yangon Transformer Co and Timestar Holding Pty Ltd in Australia, the Myanmar company delivered its second and latest batch of four transformers to Australia through Botahtaung wharf. In the first batch, it delivered five units to Australia. At the ceremony, Director U Thant Zin Aung said the factory was set up in Shwepyitha IZ in 1999. It is now producing transformers domestically with the use of imported raw materials. At present, it produces two to five units a day. The company received an ISO 9001:2000 certificate in 2003. The first three transformers were delivered to Australia in 2005. It has also signed more contracts for 2007 with Timestar Holding Pty Ltd. It will also distribute its products locally. The company is producing 66 KV, 33 KV, 11 kV transformers, The units range form 50 kVA to 30,000 kVA (30 MVA). It is planning to produce 230-kV and 100-kVA power transformers next year.

MARKET EXPANDS FOR [GENERATOR AND RENTAL SHOPS](#)

May Oo Moe, Myanmar Times, 09/05/05.

(Compiler's note: Issue 265 of the Myanmar Times is no longer available on-line.)

Most businesses that sell and rent electricity generators for home use are enjoying growth, but sales of generators for industrial use have stagnated as more companies are now relying on rentals, said shop owners in Yangon last week. U Thant Zin Shwe, the executive director of Kappa Power International, Ltd said that rentals and sales of generators at his company have been increasing since February. "Rentals and sales since February have been 50 per cent higher than during the same period last year," he said. The increase in sales is limited to generators intended for home use, while industrial-sized generators are mostly

rented, he said. "I think the increase in business has been caused by the electricity situation," U Thant Zin Shwe said.

Kappa Power stocks such brands as Denyo, Airman and Nippon Sharyo from Japan, and F.G. Wilson and Tropic Power from Britain. U Thant Zin Shwe said most of the generators at his company are reconditioned, since new units are more expensive. New generators manufactured by F.G. Wilson and Tropic Power range in price from K8 million (20 kilovolt amperes, or kVA) to K180 million (2200 kVA), while a new 20-kVA Denyo costs K12.5 million, he said. A reconditioned, 20-kVA Japanese-made generator rents for K400, 000 a month, he said. Among the generators enjoying big sales increases are domestically assembled units that use Chinese-made engines and that sell for much less than imports.

Ma Hlaing Hlaing Maw, a spokesperson for the UD Group, said the locally assembled generators sold by her company are more popular than imported brands due to the low price. "I think we have more customers than companies that sell imported brands," she said. UD Group sells 25-kVA generators for K1.95 million and 62.5-kVA units for 3.7 million, and rents 25-kVA units for K10,000 a day. Most of the company's business is based on sales for home use rather than rentals.

Meanwhile, the sales of generators for industrial use are slow as most businesses that need them rely on rentals. U Win Naing, the managing director of Sonnenberg Trading and Engineering Services Co., Ltd said his company's generator sales depend on the health of the industrial sector. "Our products are for industrial use, so if the industrial sector grows our business will grow," he said. "Since the closure of many garment factories our business has not been as good – last year we sold only 10 generators and so far this year we have sold only two," he said. "Around the time we opened, from about 1997 to 1999, business was very good and there were many new industries, companies and garment factories, and we sold 15 generators a year," said U Win Naing. Sonnenberg Trading and Engineering Services sells new and reconditioned generators ranging in size from 27 kVA to 2000 kVA, with new units priced at about K150,000 a kVA.

U Zaw Moe, the owner of Ever Top Trading Co., Ltd, which sells Chinese and Japanese generators for home use, said sales at his shop were not good compared to last year. "Our sales have decreased since last year but they are still good, they just haven't reached the point we expected," he said. "A lot of people assume that generator sales must be increasing because of the electricity situation, but many people have already bought generators," U Zaw Moe said. Ever Top Trading sells Japanese-made Honda generators at K44,000 for a two-kilowatt (kW) unit with a manual starter; K980,000 for a 5-kW unit without a battery starter; and K1.1 million for a 5-kW unit with a battery starter. Chinese-made generators are priced at K220, 000 for 2.2 kVA with a manual starter; K450,000 for 5.5 kVA without a battery starter; and K500,000 for 5.5 kVA with a battery starter.

Ko Myint Kyi, an engineer from Ever Seiko Co Ltd also said that sales have not increased at his shop. "But I think for the shops that both sell and rent, business is going up," he said. Ko Myint Kyi said that the units sold at Ever Seiko are mostly for office and business use.

Additional references

See above: ['Generator sales spike](#) upwards in Yangon' (MT: 15/12/08)
['Padaung factories](#) begin production of generators and meters (NLM: 17/10/06)

Aung Gyi Trading website information, [n.d.]. <http://www.aung-gyi.com/>

Under diesel generators, the company lists 17 different models of Cumming and Stamford diesel generator sets for commercial and industrial use, ranging from 45 kVA to 1000 kVA. For prime power use, all ratings are suitable for continuous electrical power (at a variable load in lieu of main power network). There are no limitations to the annual hours of operation and all models can supply 10% overload power for 1 hour in 12 hours. For standby power, all ratings are for the supply of emergency power at variable load in the event of a main power network failure up to a maximum of 500 hours per year. No overloads permitted.

See also other trading company listings under Generators in the Myanmar Yellow Pages.

STATE'S ELECTRIC POWER PROJECTS

Thiha Aung, NLM, 25-27/04/05. <http://www.ibiblio.org/obl/docs3/NLM2005-04-25.pdf>
<http://www.ibiblio.org/obl/docs3/NLM2005-04-26.pdf>
<http://www.ibiblio.org/obl/docs3/NLM2005-04-27.pdf>

This three-part article provides an inventory of electric power projects and adds some useful information about several projects in particular. References are included under appropriate key articles in the compendium.

COAL-FIRED TIGYIT PLANT NEARS COMPLETION

Kyaw Thu, Myanmar Times, 25/04/05.

(Compiler's Note: Issue 263 of the Myanmar Times is no longer available on-line.)

Myanmar's biggest steam-powered electricity plant was due to go into full operation by the end of April, according to a MEPE official. He said the Tigyt [Hsi hkip or Thigyit: 20° 25' N, 96° 42' E] power plant, at Pinlaung, about 22 miles south of Kalaw in southern Shan State, will generate 120 megawatts, using two 60-megawatt steam turbines, the biggest to be installed in Myanmar.

The coal-fired power plant, on which work began in February 2003, will supply 10pc of the country's total energy demand. "Electricity generated by the Tigyt plant will help to fill the gap in supply shortages which normally occur in summer, as the water inflow at many hydropower projects in the country is at its lowest during the hot season," the official said. He said one turbine was already in operation and the installation of the second was nearing completion. The second turbine would be test run on April 25 and 26. "No 1 turbine has been supplying power to the national grid since it went into operation in January," he said. The power is being fed into the national grid at Kalaw via two 132-kV power lines.

The plant was built by the PRC's China National Heavy Machinery Corporation, under a US\$ 42.93 million contract. Other work, including site preparation and accommodation for the workers and the plant staff, as well as access roads, was carried out by MEPE and the private sector Aden Group. The water supply for the plant is piped from a small reservoir on Lawpita creek, about three miles west of the plant.

The plant is supplied by Myanmar's biggest coal mine, an open-cut pit just over a mile to the south, which is operated by the Shan Yoma Nagar Co Ltd. The company's project director, U Than Lwin, said the mine has enough reserves to supply the plant for up to 30 years. The mine supplies the plant with 1,750 tons of coal a day, he said. The coal is being supplied to the plant by truck but will eventually be delivered along a conveyor built. Another official at the MEPE said equipment had been installed at the plant to reduce toxic emissions from the coal. "The smoke is made as clean as possible," he said.

Compiler's Note: A good picture of the steam power plant accompanies the original article.

Additional references

Data summary: [Tigyt](#)

Pa-Oh Youth Organization, *Poison Clouds: Lessons from Burma's largest coal project at Tigyt*, (Kyoju Action Network, January 2011, 54 pp) <http://www.burmalibrary.org/docs11/PoisonClouds%28en%29.pdf>

This is a first class report by a grass-roots community group on the environmental impacts of the Tigyt coal mine and coal-fired power station. From the introduction: "In the village of Tigyt, located within the watershed of Burma's famous Inle Lake, lies the country's largest open cast coal mine and largest operating coal-fired power plant. Piles of coal for the power plant now tower above village homes, the local pagoda has been destroyed by the force of mine blasts, and local waterways are so polluted that they are no longer usable. Hundreds of acres of farmlands have been seized and two entire nearby villages have been forced to relocate without any assistance. Local populations had no say in the project that has so radically affected

their lives and still have little understanding of its long-term health impacts. . . . As Burma prepares to develop other coal deposits and to build more coal-fired power plants, it is of urgent importance to highlight the Tikyit experience. Communities about to face coal projects can start to understand what the projects entail and prepare to protect themselves. At the same time, companies from neighboring countries that plan to invest in coal projects in Burma will be made aware of the social and environmental costs of such operations.” The report includes many illustrative photos, maps, tables, diagrams, fact boxes, interviews, footnotes, appendices. The report is best appreciated by consulting it in its original form rather than through a summary.

NLM, 25/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-25.pdf>

PM Thein Sein and party visit the coal-fired power station at Tikyit where they are welcomed by Managing Director Kyi Tha of the Hydropower Generating Enterprise and officials. EPM No 1 Zaw Min reports on the production of electricity and shows documentary photos depicting major repairs to the coal mine that supplies the station. An inspection of the main control room, steam turbines, generator room, ball mill and boiler follows. They go on to the Tikyit coal mine of the Shan Yoma Nagar Co Ltd, a branch of Eden Group Co, where Chairman Chit Khaing reports on the mining of coal. They observe the conveyor [belt] that is used to carry the coal from the mine to the station.

NLM, 23/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071223.htm>

EPM No 1 Zaw Min visits the Tikyit coal-fired steam turbine in Pinlaung township and is briefed by the factory manager on power generation through the two turbines. The station has begun test-generation of electricity using coal from Kalewa along with Tikyit coal. MD Kyi Tha of the HPGE and Superintending Engineer Khin Maung Oo also report. The minister inspects the laboratory, water treatment plant, computer-operated control room, turbines and coal stockpile. He goes on to visit the Shan Yoma Nagar coal mine where Chief Engineer Hlaing Win Aung reports on the mining, refining and supply of coal to the power plants. The minister explains about the quality of the coal. 200 [2000?] tons are being produced daily.

Platts Myanmar Country Energy Profile, [mid 2007]. For access information, see [Platt's Profile](#).

In August 2001, MEP signed a US\$ 42.9-million contract with China National Heavy Machinery Corp for a 120-MW minemouth, coal-fired power plant in Pinlaung township. The first of two 60-MW units at the Tikyit plant was completed in April 2005 and the second in 2006. The plant is expected to burn 750,000 T/yr of coal delivered by conveyor from a nearby mine run by Shan Yoma Naga Co Ltd. Electricity is evacuated by two power lines, one on the route Tikyit-Tagundaing-Monywa and a second from Tikyit to Yangon on the route Lawpita-Toungoo-Hlawga.

NLM, 08/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060608.htm>

EPM No 1 Zaw Min checks on exploration for and storage of coal at the Shan Yoma Naga mine and the control room, generators, boilers and water purifying factory at the Tikyit coal-fired power plant. The plant generates 960 million kilowatt hours a year and distributes power through the Kalaw sub-power station.

Thiha Aung, NLM, 25/04/05. <http://www.ibiblio.org/obl/docs3/NLM2005-04-25.pdf>

The EPM constructed a coal-fired power plant, which is able to generate 120 megawatts, with the effective use of coal produced in Tikyit, Pinlaung township. Each of the two turbines of the Tikyit coal-fired power plant can generate 60 MW. The operators underwent thorough training at home and abroad to be able to operate the plant smoothly. For environmental conservation purposes, the EPM installed modern machinery and technologies in use in developed and neighbouring countries. The Government spent a large amount on the project, including US\$ 42.9 million. The first turbine of the plant was put into service in 2004. The other is targeted to start in the last week of April 2005.

NLM, 16/04/05. <http://www.ibiblio.org/obl/docs2/NLM2005-04-16.pdf>

Tikyit power plant was commissioned on 12 April 2005. Construction started on 4 September 2002 and it was completed on 31 March 2005. CHMC of China and Eden Group of Myanmar built the plant under the supervision of the Energy Ministry. Of the two turbines, one was completed in 2004 and is already generating at full capacity. The other will start generating power during the last week of April. **Compiler's note:** Good pictures of the plant and other facilities are available in the print edition of the NLM at the URL listed above.

NLM, 04/10/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nml/n041004.htm>

General Aung Htwe of the SPDC is briefed on construction of the plant and installation of machinery. 1,600 workers are labouring day and night to finish the power plant on time.

MT, 05/04/04. [Issue 211 of the Myanmar Times is no longer available on-line.]

Third and final shipment of equipment for the mine that will supply coal to Myanmar's biggest steam turbine power plant at Tigyt arrived at Yangon Port from China. The shipment is valued at US\$ 5 million. Belt conveyors, crushers and other equipment acquired from the China National Heavy Machinery Corp will be used to supply 1,750 tonnes of coal a day to the power plant. Officials hope to have one of the two 60-megawatt turbines in operation by June. The coal will be extracted from a 20.7-million-tonne deposit about 1.5 km from the power plant. The coal deposit, discovered in 1989, covers 544 acres. Excavation began in September 2002. At the current rate of extraction, the deposit will supply the power plant for 27 years. The total cost of the mining project is estimated at US\$10 million and K 3 billion.

Kayan Soe Myint, NLM, 16/09/03. <http://www.burmalibrary.org/docs6/NLM2003-09-16.pdf>

Tikyit coal-fired power plant is situated east of Myintha village in Pinlaung township, 22 miles from Kalaw. Work on the plant is 55% complete. 10 companies submitted tenders to supply equipment for the plant and to build a sub-power station and install power lines. A contract was signed with China National Heavy Machinery Corp that submitted the lowest tender meeting the set standard. A contract was signed on 27 August 2001. Total value of the contract was US\$ 42,936,000. Survey work started in August 2001 and construction of the plant started in March 2002. The plant will need 750,000 tons of coal a year. Shan Yoma Naga Co Ltd and CNHMC will supply the coal for the plant. Mining operations are already under way in the Tikyt region. Power will be distributed to sub-power stations up to Monywa and to Yangon division.

Kayan Soe Myint, NLM, 21/07/03. <http://burmalibrary.org/docs4/NLM2003-07-21.pdf>

MEPE is constructing a coal-fired power plant east of Pyintha Village in Pinlaung township. The plant will use coal mined in the Tikyt region of the township. Two coal-fired boilers and turbines, each of which can generate 60 MW, will be installed at the plant. There are plans to install another turbine in the future. A contract to purchase the equipment required for the sub-power station and power lines worth US\$ 42,930,000 was signed with China National Heavy Machinery Corporation (CNHMC) on 27 August 2001. Installation of a 1.5-mile-long, 11-KV overhead power line and a two-mile-long 400-V overhead power line, and construction of 11/0.4-KV, 160-KVA, 500-KVA and 33/11-KV 1250 sub-power stations, as well as a briefing hall, staffquarters, a motor vehicle workshop, a plinth for the two boilers, a storage shop a workshop and a laboratory have been carried out. Two transformers of about 60 tons, two turbines, turbine casing generator stator core and other equipment arrived at the construction site between 21/08/01 and 16/04/03. The Mines Ministry calculates that 20.7 million tons of coal with a heating value of 10320 Btu/lb can be produced from the mine at Tikyt. CNHMC and Shan Yoma Naga Co Ltd will produce 750,000 tons of coal per year for the power plant. Arrangements for the coal purchase contract between MEPE and Shan Yoma are under way. Electricity generated by the plant will be supplied to the main power grid system by two power lines, one from Tikyt to Thazi, Kinta, Tagundaing (Mandalay) and Monywa via Kalaw, Chauk and Kyunchaung sub-power stations and another from Tikyt to Yangon Division via the Lawpita power plant and the Toungoo and Hlawga subpower stations.

NLM, 14/07/03. <http://burmalibrary.org/docs4/NLM2003-07-14.pdf>

A photo of the Tikyt plant under construction is included in the print edition of NLM. Caption: The site for Coal-fired Power Station (Tikyt) Project being implemented by Myanma Electric Power Enterprise. The project is expected to be completed before the end of 2003.

NLM, 10/07/03. <http://burmalibrary.org/docs4/NLM2003-07-10.pdf>

Gen Aung Htwe of the SPDC briefed by U Than Lwin of Shan Yoma Dragon Co Ltd on the type of coal, obtainable tonnage, and tasks at the Tikyt coal mine. Coal deposit is two miles in length and 6 to 69 feet in thickness. Upper levels of deposit are lignite coal while deeper levels are subbituminous. 20.7 million tons can be extracted. At the power plant project site, construction of the steel boiler structure, coal storehouse, ash storehouse, control room, 132 kVA sub-power station and chimneys, and the installation of boiler tubes

by Shan Yoma Dragon is underway. [A photo of the power plant at an early stage of construction is included in the print edition of NLM.]

Mineral Industry of Burma, 2002, citing Than Htay, M, Myanmar in Mining Annual Review.

<http://minerals.usgs.gov/minerals/pubs/country/2002/bmmyb02.pdf>

The Tigyit power plant will consume 500,000 T/yr of coal. A drilling test of the coal deposit indicated a resource of 20 million tons, which would be sufficient to feed the plant for 40 years. Shwe Thanlwin Co Ltd will mine the coal for the plant through a joint venture with Mining Enterprise No 3.

NLM, 12/12/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n021212.htm>

Gen Khin Nyunt of the SPDC briefed by Production Manager Xu Yunpeng of CNHMC on arrangements for production of coal and methods for transporting the coal to the power station. Two 60-MW generators will be installed as the first phase of the project. Another 60-MW generator will be added in the second phase.

NLM, 17/07/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020717.htm>

Gen Maung Aye is briefed on pre-engineering work for the Tikyit project, arrival of imported machinery, availability of coal and power distribution plans. Director Chit Khaing of Shan Yoma Nagar Co Ltd reports on the construction of buildings related to the project. Companies of the national races are sub-contractors for the project. The China National Heavy Machinery Corporation (CNHMC) of the PRC will supply machinery including two 60-megawatt generators. The project is located near Pyntha village in the Tikyit region. Efforts are being made to start power generation in September 2003.

Myanmar Times, 24/09/01. [Issue 82 of MT is no longer available on-line.]

MEPE plans to begin work soon on Myanmar's first coal-fired power station. It will be capable of generating 120 MW and will be built in Pinlaung township in southern Shan State, about 200 miles north of Yangon. It is expected that it will start generating electricity in 2003 using machinery imported from China. It will use 500,000 tons of coal a year sourced from a reserve of nearly 21 million tons at Tikyit, about 30 miles from Pinlaung. The coal reserve will last about 40 years. The search for other coal deposits in the area continues. The concession to extract coal has been given to Shwe Thanlwin, the Eastern Development companies and a business group from Special Region-6, in Shan State South. Shwe Thanlwin is already mining sub-bituminous coal at the reserve.

NLM, 20/09/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010920.htm>

Gen Maung Aye and party visit Tikyit power station project site in Pinlaung township where they are briefed on plans to purchase mine equipment for the project, the selection of the site and coal deposits in the area. A 120-MW station will be built using coal mined in the Tikyit region. It will be able to generate power in a short period. Efforts are needed to prevent environmental pollution.

NLM, 02/08/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010802.htm>

EPM Tin Htut visits a coal production project at Teekyit in Pinlaung township and meets with officials of the Electrical Engineering Dept of the Ministry of Mines there. He gives instructions on a site chosen for the plant and inspects current charcoal production.

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CABLE FACTORY AND FOUNDRY OPENED IN INDAGAW INDUSTRIAL ZONE

NLM, 04/05/05. <http://www.ibiblio.org/obl/docs2/NLM2005-05-04.pdf>

The Ministry of Industry-2 opened the Research Department, a foundry and an aluminium cable factory in Indagaw region in Bago township this morning. Lt-Gen Khin Maung Than, cabinet Ministers and senior military officers attended. The foundry can produce 1,500 tons of iron and 500 tons of steel a year. The aluminium factory can produce 1,600 tons of cables for 6.6 kv, 11 kv, 33 kv, 66 kv, 132 kv and 230 kv lines and stay wires. The ministry has built industries manufacturing disc wheels, radiators, metal bearings, inlet and exhaust valves, diesel engines, steel, ball bearings and aluminium cables in the industrial zone. An electric motor factory and an electrical apparatus factory are under construction.

Additional references

See above: 'Motor and [electrical appliance factories](#) opened in Indagaw' (NLM: 21/03/06)

See below: 'Construction fuels [wire and cable market](#)' (MT: 29/03/04)

'[Wire and cable producers](#) find ready market in Myanmar' (MT: 25/08/03)

NLM, 03/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-03.pdf>

Generals Tin Aye and Myint Swe of the MoD and EPM-2 Khin Maung Myint visit the ACSR cable wire and meter factory in Indagaw and inspect samples of ACSR cable and other kinds of cable manufactured there. They are briefed by Manager Kyaw Win and officials on production of the ACSR cable and other power lines. They also check on the assembling, testing and packing of meters at the factory. MD Sein One briefs them on the availability of raw materials and production of electrical equipment at the factory.

NLM, 11/07/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080711.htm>

Maj-Gen Khin Zaw of the MoD visits the aluminium wire factory project in Magway where he is briefed on the construction of roads and bridges and staff quarters in the factory compound by Project Director Win Myint.

NLM, 25/06/08. <http://www.burmalibrary.org/docs5/NLM2008-06-25.pdf>

An Indian delegation led by Minister of State for Commerce and Power Shri Jairam Remesh called on Minister for National Planning and Economic Development U Soe Tha at the ministry in Nay Pyi Taw where they frankly discussed matters on bilateral co-operation in economic and trade sectors. After the meeting, the two ministers signed a Bilateral Investment Promotion Agreement. A credit line agreement between the Exim Bank of India and the Myanmar Trade Bank for \$ 20 million for financing the establishment of an aluminium conductor steel reinforced (ACSR) wire manufacturing facility and a credit line agreement between the [Exim Bank of India](#) and the Myanmar Foreign Trade Bank for \$ 64 million for financing three 230-kV transmission lines in Myanmar were signed by Managing Director of Myanmar Foreign Trade Bank U Than Yi and Mr Sunil Trikha of the Exim Bank. The Agreement for providing the banking arrangement was signed by managing directors of Myanmar Foreign Trade Bank and Myanmar Investment and Trade Bank and Mr Ashok Rai of United Bank of India.

NLM, 04/05/07. www.myanmargeneva.org/07nlm/n070504.htm

Industry Minister No 2 checks the site chosen for construction of an aluminium wire factory in [Pahtosan Village of] Magway township and is briefed on land condition and availability of water and power by MD U Aung Kyi of Myanma Industrial Construction Services.

NLM, 30/05/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060530.htm>

MMTEI GM U Than Ngwe conducts the Minister of Industry-2 around the ACSR cable factory in Indagaw and explains the process for producing aluminium wires.

NLM, 31/12/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n031231.htm>

Construction of an ACSR factory and installation of machinery is underway in the 400-acre Indakaw IZ.

Swe Thant Ko, NLM, 23/08/03. <http://www.burmalibrary.org/docs6/NLM2003-08-23.pdf>

The Indagaw IZ of the Ministry of Industry-2 along the Yangon-Bago highway was set up from 2001 to 2003. In co-operation with the Angelique Co of India and the Complant Co of China, a power sub-station is operated in the zone.

NLM, 22/06/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010622.htm>

MD U Kyaw Win of Myanma Machine Tool and Electrical Industries (MMTEI) reports on the site chosen in the Indagaw IZ near Bago for a plant where Aluminium Conductors Steel Reinforced (ACSR) cable will be produced.

Production of enamelled copper wire and polyvinyl chloride (PVC) cable at the Nyaungchidauk factory of MMTEI

Additional references:

See above: ['Padaung factories](#) begin production of generators and meters' (NLM: 17/10/06)

NLM, 31/07/07. <http://burmalibrary.org/docs4/NLM2007-07-31.pdf>

Production of electric wire continues at No 1 Machine Tools Factory in Nyaungchedauk.

NLM, 17/11/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n031117.htm>

During a visit to No 1 Machine Tools Factory in Nyaung-chehtauk, SPDC Secretary-1 Soe Win check on and party check on import-substitute items produced by the factory, including production of enamelled copper wire, copper rod and cable wire.

NLM, 18/02/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020218.htm>

Official opening of the power cable manufacturing shop, the vertical enamelling plant and the copper rod casting and rolling plant in the compound of No 1 Machinery Factory of MMTEI at Nyaungchehtauk. The cable shop can produce 2,000 kms of power cable per year. The vertical enamelling plant can produce 200 tons of insulated copper rods per year and the copper rod casting and rolling Plant can produce 2,000 tons of copper rod per year.

NLM, 06/09/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010906.htm>

Minister for Industry-2 Saw Lwin meets with Chinese technicians who are assisting with installatons at the power cable workshop of MMTEI in Nyaungchedauk. Afterwards, he inspects the work being carried out on the copper rod casting and rolling Plant and the power cable production machines.

NLM, 08/12/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n001208.htm>

Minister for Industry-2 Saw Lwin is briefed on the importation and installation of machinery from the PRC at Machine Tool Factory No 1 in Nyaungchaydauk. Afterwards, he checks on the installation of the machinery at the copper rod casting and rolling workshop, the production of copper cable at the vertical enameling workshop, the construction of the power cable workshop and the production of PVC cables in power cable workshop.

DAM DESIGN AT [YEYWA](#) HYDROPOWER PROJECT SAVES TIME, COSTS

Kyaw Thu, Myanmar Times, 04/04/05.

(Compiler's note: Issue 261 of the Myanmar Times is no longer available on-line.)

The Yeywa hydropower project, which will generate 3,550 million kWh a year when it comes on stream in 2007-2008, will be one of the biggest in Myanmar according to the assistant director of the DHP, U San Wai, who said the dam wall, of 2.8 million cubic metres, was being built using the roller compacted concrete method. "By using the RCC method, which has been widely used in the world since the 1980s, we can reduce both the cost and the construction time," he said.

Work on the Yeywa project, on the Myitnge River about 31 miles south-east of Mandalay, began in 2001. About 5,000 workers are employed on the project at a site selected in 1997 about two miles downstream from an area previously chosen for the dam. U San Wai said Myanmar engineers built two tunnels to divert water from the Myitnge River before work began on the dam, which will have a storage capacity of 2,114,200 acre feet. The tunnels are 33 feet in diameter and 3,117 feet long, he said.

The Yeywa project will use four turbines each capable of generating 197.5 MW, giving it a total capacity of 790 MW. The power house for the turbines is 510 feet long, 148 feet wide and 197 feet high. U San Wai said the power house and the dam wall would be able to withstand earthquakes of up to eight on the Richter scale. He said a Swiss company, Colenco Power Engineering, was acting as technical consultant for the project, which is being built by the department and three Chinese companies. U San Wai said the construction work was proceeding smoothly because of the experience gained by most of the engineers and other staff on the Paunglaung project, near Pinyinmana.

When the Yeywa project is completed its waters will reach 25 miles upstream, but it will not affect farming or people. "There is no town or agricultural land upstream from the dam," U San Wai said. The residents of the three villages near the dam had been relocated to a site about a mile away when work began on the project. "We provided them with 24-hour electricity and good accommodation," U San Wai said.

Electricity generated by the project will be fed into the national grid via two 230-KV lines linked to substations in Patheingyi and Thazi townships. Substations would also be built at Shwesaryan and Belin in Kyaukse township to handle output from the project.

U San Wai said big hydropower projects were helping to generate more electricity and would replace fuel-powered facilities as the main sources of electricity. Existing and planned hydropower projects would supply thousands of megawatts needed to meet future energy demands, he said. The government plans to establish another 24 hydropower plants, which will range in capacity from 48 MW to 7,100 MW. [A good picture of the dam site accompanies the original article.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-09: Mandalay Yeywa dam [21° 41' N, 96° 24' E], grid square reference: 13\2, 25\9

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-9.jpg>

The Google Earth exposure shows roads built to the dam site before extensive clearing took place and construction of the main dam began.

See, also: <http://wikimapia.org/7910263/Yeywa-Hydroelectric-power-Project>

Website references

Win Kyaw, et al. "Yeywa Hydropower Project: an Overview". 8-page paper delivered at the 5th International Symposium on Roller Compacted Concrete Dams, Guiyeng, PRC, 2-4 November, 2007. See either <http://www.vncold.vn/Modules/CMS/Upload/13/Documents/YHPPEW.pdf> or <http://burmalibrary.org/docs4/Yeywa%20profile.pdf>

A technical presentation, well-illustrated with maps, photos, diagrams. The article provides an overview of the design and fascinating details about some of the key issues involved in the construction of the roller-compacted dam and powerhouse. Particular attention is paid to the discovery, testing and use of pozzolan along with other aggregates in the construction of the dam embankment. Problems, setbacks and delays in the construction phases of the project are described with refreshing frankness. A major flood that occurred at the end of the rainy season in October 2006 which brought water cascading over already constructed RCC sections of the embankment is seen in a positive light. "This has proved beyond doubt the major advantage of an RCC dam, as opposed to a CFRD or rock fill dam, since the foreseen overtopping of the RCC section, is taking place at the same time as [work] continues with RCC construction on the left bank section. Such a very major flood security advantage is not to be underestimated, especially in countries where extreme power shortages combined with frequent shortages of fuel, pumping capacities etc are prevalent." This paper is definitely worth a read for its valuable insights into dam construction in Burma/Myanmar.

Francisco Ortega S. "Construction of Yeywa Hydropower Project in Myanmar: Focus on RCC Technology". [2007]. http://talsperrenkomitee.de/pdf/talsperrensymposium_2007/53_Ortega.pdf

The focus in this article, written during the construction period of the dam, is on the use of roller-compacted concrete (RCC) in the construction of the dam at Yeywa. "The capacity and specifications of the main construction equipment was prepared with the aim of achieving a high speed of construction with the use of local resources and taking into account the particular difficult site conditions. One key aspect for the success of the construction of Yeywa RCC dam has been the comprehensive training programmes made to the local staff during preparative works and initial stages of the construction. The RCC mix has a total cementitious material content of 220 kg/m³. The aggregate is crushed limestone from a quarry source near the dam area and a natural pozzolan available in the country has been researched, tested and finally used as a replacement of 66% of the total cement content. The concrete mix is designed to withstand by itself the strength and impermeability requirements of the structure. This has made it possible to design a simple mass concrete structure with very little interferences so that the dam could be built rapidly. It is planned to complete the RCC in the main dam by end of year 2008, with a total placing time of just 34 months." Two

useful photos are included: one showing the batching plant and the other showing concrete work underway on the main dam.

Wikipedia has a well-researched article on the Yeywa dam and power plant that appears to have been prepared early in 2010. The section on the dam design is especially useful.

http://en.wikipedia.org/wiki/Yeywa_Dam

Colenco Power Engineering website information [n.d.] <http://www.colenco.ch/en/cpe/services.html>

Colenco Power Engineering Ltd, founded in 1895, concentrates on supplying consulting and engineering services worldwide in all areas of energy and environmental technologies. Hydropower project services include conceptual studies, project design and management, construction supervision, financing, operation and maintenance

Additional references

Data summary [Yeywa](#)

See above: 'General Than Shwe visits the [Upper Yeywa](#) hydropower project' (NLM: 22/04/10)

Mann Thar Lay, Myanmar Times, 20/12/10. Condensed.

<http://www.mmtimes.com/2010/news/554/news55407.html>

The fourth and final turbine at the 790-megawatt Yeywa hydropower plant in Mandalay Region came online in the third week of December more than 10 years after the project was initiated. At a ceremony to officially open Yeywa on December 15, Prime Minister U Thein Sein said the “huge investment” – estimated at US\$700 million – would “contribute much to [the] development of [Myanmar’s] industrial sector and [to] satisfying [the] demand of local electricity consumption”. “The plant will fulfill electricity needs of the nation,” he said, adding that the nation’s 31 power plants were capable of generating 3045MW. Minister for Electric Power 1 U Zaw Min said Yeywa was the first RCC embankment dam in Myanmar, and the third-largest RCC dam in the world. “This project is built with new technology and the investment is very high. There were many challenges for us. About 1500 government staff from our ministry and 12,000 workers from private companies participated in the construction of this project,” he told The Myanmar Times. Planning for the Yeywa project began in 2000 and work started in late 2001. Completion was originally scheduled for 2008 but the first of four 197.5MW turbines only came online in February 2010, while the second and third generators were launched in July and October.

NLM, 16/12/10. Edited and condensed. <http://www.burmalibrary.org/docs09/NLM2010-12-16.pdf>

A ceremony to open the embankment and the hydropower plant of Yeywa Hydropower project of the Ministry of Electric Power No 1 was held at the power plant in PyinOoLwin township, Mandalay Region, on 15/12/10. Speaking at the opening, Prime Minister Thein Sein said that the State is speeding up the generating of electricity by joining hands with local and foreign companies and building power grids and sub-power stations simultaneously. The newly-opened Yeywa Dam is of RCC [roller-compacted concrete] type and has two diversion tunnels, each 33-ft in diameter and 3117-feet in length. The 2264 ft long and 433-ft high embankment has a 448 ft wide spillway and full-brim water storage capacity of 2.114 million acre-ft. Four 197.5-MW generators, totaling 790 MW, can generate electricity of 3550 million kWh a year. [Photos of the reservoir, the front face of the dam, the control room and of the opening ceremony are included in the print edition of NLM.]

NLM, 17/10/10. Edited and condensed. <http://www.burmalibrary.org/docs09/NLM2010-10-17.pdf>

No-3 generator of the Yeywa hydropower plant was commissioned at the power plant in PyinOoLwin township at a ceremony attended by Prime Minister Thein Sein. Assistant Engineer Daw Win Pyae Phyo of Hydropower Generating Enterprise reported on the generation of power from the Yeywa plant and the supply of electricity to sub-power stations. Plant Manager Tin Maung Oo explained the computerized operation of the power plant. Fruit baskets were presented to the foreign experts and officials of the plant. EPM-1 Zaw Min reported on the co-operation between foreign and local experts and staff members and implementation of project work with international level technologies. No. 4 generator will at the Yeywa station will go into operation in the near future. At present, the country has 15 hydropower plants, one coal-fired power plant and 15 gas power plants, totaling 31. Together they have a generating capacity of 2848.4 megawatts.

[Among the photos accompanying the article is a spectacular one showing the release of water from the main gate of the dam. Meanwhile, at Myitnge downstream from Yeywa flood waters on the Dokhtawady have been reported to be well above the danger level of 870 cm for more than a week]

NLM, 06/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-06.pdf>

EPM-1 Zaw Min checks the inflow of water into the main dam at Yeywa, overflow of water into the spillway, installation of the steel penstock, construction work at the power station and measures being taken to safeguard the tailrace channel and switchyard slope. Electricity is being by generators No-1 and No-2 at the power station, preparations are being made to install the rotor at No. 3 generator and work is underway on the stator of No-4 generator. In the access gallery to the main dam, a thermocouple to measure the temperature of the instruments of the dam that are affected by dehydration is being installed, as well as a piezometer, a jointmeter to indicate the gap and movement among the blocks of the dam, a plumb line to measure the the storage of water at the embankment, a rockmeter to determine the movement of the cornerstones and a clinometer to measure the tilting of the embankment. Geodetic survey instruments are being fitted at the dam to detect movement in the embankment. The minister stresses the need to assign duties to the staff to check the inflow of water at the dam around the clock and to put it on record. Farther down the Dokhtawady, the Hydrology and Meteorology Dept issued a warning that the water level in the river reached at 851cm at Myitnge on 05/08/10 and could reach the danger level of 870 cm in the town by noon of 06/08/10. [A photo of water being released at the main gate of the dam accompanies the article.]

NLM, 21/07/10, <http://www.burmalibrary.org/docs09/NLM2010-07-21.pdf>

The test running of generator No-1 of Yeywa hydropower station was launched on 18/02/10, and the power supply programme was launched on 24/02/10. The test running of generator No-2 was launched on 08/07/10 and it started to generate power on 14 July 2010. Currently the two generators produce 3.3 million kilowatts a day. Generator No-3 and generator No-4 are in the process of being installed and the whole process will be completed by this coming October.

NLM, 12/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-12.pdf>

PM Thein Sein visits the Yeywa hydropower project in PyinOoLwin township and views the inflow of water into the dam and the installation of electric turbines 3 and 4. In the control room of the power house he is briefed on process of generating electricity. Hydropower is already being produced by generators 1 and 2 at the station. Fruit baskets are handed out to foreign and national experts. The Yeywa project is now 96.45pc complete. [Several photos of the dam, reservoir and power station are included.]

NLM, 28/06/10. <http://www.burmalibrary.org/docs09/NLM2010-06-28.pdf>

EPM-1 Zaw Min visits Yeywa hydropower project and is briefed on the work going on there. [A photo showing the generating hall of the station accompanies the news item. Two of the turbine stalls are empty. Work appears to be taking place on the installation of the second turbine-generator. Some activity is taking place on the first turbine-generator which is not completely visible in the foreground. It is not clear when the picture was taken.]

NLM, 23/02/10. <http://www.burmalibrary.org/docs08/NLM2010-02-23.pdf>

PM Thein Sein visits the Yeywa power station where turbine No 1 is generating power on a trial basis and the installation of three other generators continues. The main dam, diversion tunnels-1 and -2, the spillway, the intake channel, the switch yard and the power supply station of the project have been completed. Electricity generated from turbine no 1 will be transmitted to the national power grid. [Photos of the intake channel the switch yard and the control room are included in the print edition of NLM.]

Mandalay new team, Monthly Eleven, January-10. Edited and condensed.

http://eversion.elevenmediagroup.net/index.php?option=com_content&view=article&id=377%3Awater-in-wells-down-due-to-water-depletion-in-dothtawady-river-&Itemid=110

The water level in the Dohtawady (Myitnge) river has been falling since mid-Nov-09, according to the 45-year records issued by the Meterology and Hydrology Department. "Water in wells and water taps in the village is down due to lack of water in the river. We have to share drinking water from some wells. We are using water with care. We have to go down to the river to do washing and take a bath," said a woman in Setkway village in Amarapura township. The water levels have fallen for a distance of 35 nautical miles (65 km)

along the Dothtawady. "The water remained at a level of 42 cm between the 12th and 16th of January, but on the 17th of January, it gradually started to increase up to a level of 46 cm," said a villager. "It is learnt that the river water will go up high on the 25th of January. If so, it will be convenient for us to get drinking water and the wells in the villages will again be filled with water," said a Setkway local. [**Compiler's note:** The dramatic changes in the water levels of the lower Dohtawady noted in this item can almost certainly be attributed to the need to build up water levels at the Yeywa dam in preparation for the testing of the first turbine-generator at the Yeywa dam in mid-February. The article is accompanied by some very attractive photos showing the low water levels in the river.]

NLM, 17/12/09. <http://www.burmalibrary.org/docs07/NLM2009-12-17.pdf>

Gen Than Shwe visits Yeywa hydropower project and is briefed on developments. EPM-1 Zaw Min reports on the installation of the four 197.5-MW turbines. No 1 turbine will start generating power in the near future and construction tasks are being expedited on the remaining three turbines. The construction of the main dam, water intake structure, spillway and the two diversion tunnels has been completed and water is being stored at the dam. Tasks for the installation of machines to be used in generating power and construction of drainage areas and the switch yard are in their final stages. Completion of the project is expected two years earlier than scheduled. Equipment being installed at the dam will make it possible to detect the strength, movement of water, water pressure and temperature of the main embankment. Than Shwe and his party look into the storage of water at the dam, the removal of rock from the drainage area of the [power] plant, the construction of the power plant and subpower stations, the intake structure and installation of the sluice gate. At the power plant final work on the installation of No 1 generator is ongoing and the installation of parts on No 2 generator is underway. The generators weigh over 1500 tons, and over 100,000 parts have to be systematically installed in each. The Yeywa plant alone will produce 3550 million kwh annually, which is about 70pc of the 5000 million kwh generated by the 15 power plants that are currently operated by the Ministry of Electric Power No 1. [Photos showing the area where the turbines are being installed and the power house area are included in the print edition of NLM.]

NLM, 14/11/09. <http://www.burmalibrary.org/docs07/NLM2009-11-14.pdf>

EPM No 1 Zaw Min formally launches the storage of water at Yeywa dam by closing the valves on the water diversion tunnels-1 and -2. A 70-ton crane is used to close the gates.

NLM, 13/11/09. <http://www.burmalibrary.org/docs07/NLM2009-11-13.pdf>

EPM No 1 Zaw Min visits the Yeywa project and checks on preparations for the installation of the gate on Diversion Tunnel-2 upstream of the dam. He also inspects work being done on the spillway bridges that links the left and right embankments with the main embankment. Then he views construction of the switch yard and the water outlet channel.

Rajeev Syal and Daniel Pye, The Observer, 27/09/09. Edited and condensed.

<http://www.guardian.co.uk/world/2009/sep/27/burma-dams-human-rights>

The British construction company, Malcolm Dunstan and Associates, has been condemned by human rights campaigners amid reports that the projects led to the forced relocation of villagers. The Devon-based, family-run firm has been involved in concrete construction on the Yeywa dam in central Burma and the Ta Sang project on the Salween river. The projects have been targeted by human rights activists after reports that thousands of villagers were removed from floodplains and opposition to the removals ruthlessly crushed. According to the firm's website, it was still involved in the Yeywa project in December 2008, but Dunstan declined last week to say whether it was still working on the site. He confirmed that his firm had been involved in the Ta Sang project but said that this work was completed some years ago.

Aung Shin, Myanmar Times, 14/09/09. <http://mmtimes.com/no488/b005.htm>

Yeywa hydropower is due to start producing electricity in December 2009, a senior ministry official told the Myanmar Times. It is expected that Yeywa will reach full production capacity in 2010, he said.

NLM, 17/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-17.pdf>

Gen Than Shwe visits the Yeywa project and gives guidance on the installation of 'heavy machinery' in the power plant. Arrangements are being made for the transport of imported parts for the power plant from Yangon to the project site. Deputy Hydropower Minister Myo Myint reports that the Upper Yeywa dam that

will be constructed upstream from the Yeywa dam will be of built of concrete and will be 200 feet high and 1640 feet long. It will be able to generate 140 megawatts and will contribute to the production of electricity at the Yeywa plant. [Some good aerial photos of the dam and power plant and one of the turbine units is included in the print edition of NLM.]

NLM, 08/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-08.pdf>

EPM No 1 Zaw Min visits the hydropower plant which is under construction. Work on project as a whole is now 76.35pc complete. [A photo in the print edition of NLM shows the installation of one of the turbine units.]

NLM, 24/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-24.pdf>

The construction of the main dam, the intake channel, spillway and diversion tunnel are nearing completion.

NLM, 14/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-14.pdf>

Work on the Yeywa hydropower project is proceeding smoothly. Installation of the 230-kV, twin-bundle-circuit lines between Yeywa and [the main power station at] Belin continues. Construction of the Kyaukse-Phyaukseipin-Yeywa road by Public Works of the Ministry of Construction is ongoing. The reconstruction of the cement plants of Myanmar Elephant, Tiger Head, and AAA companies, [which are being transferred from Htonbo to the limestone deposits near Kyaukse], is still underway.

NLM, 20/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-20.pdf>

Ceremony to finalize laying of concrete held at Yeywa hydropower project on 15/12/08 attended by ministry officials, Chinese Ambassador Guan Mu and company representatives. Last stretch put into place by means of a 2.5-ton vibrating roller.

NLM, 14/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-14.pdf>

EPM No 1 Zaw Min reports to Gen Than Shwe that the dam embankment is almost 100pc complete. He also reports on progress in the construction of the diversion tunnel and inlet and outlet, the intake structure and spillway, the installation of the penstock and the building of the power station and switch yard. The project will be finished on schedule. Arrangements are being made to store water in the reservoir in the coming rainy season. MD San Oo of MEPE reports on construction of the 230-kV power line between Yeywa and Belin (Kyaukse), the 230-kV power line between Yeywa and Meiktila and the 230-kV power line between Belin and Meiktila which will connect the Yeywa hydropower station to the national grid. He also reports on the construction of sub-power stations and the 230-kV power lines between Belin and Shwesaryan and between Meiktila and Thazi. [Several photos of the dam site are included in the print edition of NLM.]

Maung Maung Htwe, NLM, 13/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-13.pdf>

[This is a translation of a feature article originally published in Myanma Ahlin on 12/11/08. Several photos of the dam structure are included in the print edition of NLM. Much of the factual information in the article has already been included in other articles noted below and is not repeated in this resume.]

The Yeywa dam is the third largest and the fifth highest of its kind in the world and is the first roller compacted dam of its kind. The main dam is now 100pc complete and work is proceeding on the separation wall that buffers the power house. The power intake structure consists of four 22-foot-diameter and 492-foot-long high-pressed steel pipelines. Four Francis-type turbines each capable of generating 197.5 MW are to be installed. The total project is now over 65pc complete.

NLM, 12/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-12.pdf>

The construction of the main dam at the Yeywa hydropower project site is 96pc complete. Total construction work for the project is 65.52pc completed. [The print edition of NLM includes a good photo showing the main dam and countryside below the dam.]

Maung Maung, NLM, 11/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-11.pdf>

This feature article in the print edition of NLM about the Yeywa dam has little new factual information, but is accompanied by several photos of construction work in progress. The most interesting photo shows a scale model of an auxiliary dam with the power house at its foot and the switching yard in the foreground.

According to information presented in the article, the “separation wall” of the auxiliary dam is 568 feet long, 50 feet wide and 121 feet high. Another photo shows the power house under construction. Other information presented in the article states that the water catchment area of the Myitnge River [above the dam] extends over 10,890 square miles, that the dam will have a total inflow of approximately 12.1 million acre-feet [per year], and a storage capacity of 2.114 million acre-feet of water at its highest level and 1.304 million acre-feet of water at its “stable level”. The lake behind the dam will cover 23 square miles in the rainy season. Surplus water will be drained out through a 448-foot-wide, ogee-type, ungated spillway installed with a 56-foot wide, 39-foot-high outlets.

NLM, 20/09/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080920.htm>

EPM No 1 Zaw Min meets with Pres Jean Zhou Oin of CITIC and Deputy MD Shen Decai of Sinohydro J-V CCYW Co of the PRC for discussions about the turbine generator[s] and the hydraulic steel structure of the Yeywa hydro power project.

NLM, 05/09/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080905.htm>

EPM No 1 Zaw Min checks on the Yeywa hydropower project. Work continues on the main dam and the power plant. He also inspects the site for the construction of the switch yard. The dam is now 95pc complete, while the whole project is 64.43pc complete. [A photo of work on the main dam is available on p 9 of the print edition of NLM.]

NLM, 20/04/08. <http://www.myanmargeneva.org/08nlm/n080420.htm>

Laying of concrete at Generator Unit-1 and installation of the ‘Druft tube’ and grouting work at Generator Unit-2 is underway. Work continues on the water intake structure. The main dam is 82pc complete and the entire project, 54.12pc.

NLM, 19/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080219.htm>

Installation of the penstocks and construction of the flit [filter?] bucket and spillway continue. The bottom outlet gate chamber is being installed. Construction of the power station is still underway. On-site activities include concrete and earth work, production of steel pipes and test-production of brick blocks. Upon completion, the project will be able to generate 3,550 million kWh,

NLM, 13/01/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080113.htm>

EPM-2 Khin Maung Myint meets with Lu Wenjun of the China National Heavy Machinery Corp to discuss matters related to the construction of the [grid linking the] Yeywa project to the national system and materials for the main power station.

NLM, 13/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071213.htm>

Gen Than Shwe visits the Yeywa hydropower project and is briefed on the laying of pipelines and the construction of the power station. He presents fruit baskets to consultant engineer Ljubomir Djordjevic of Colenco Power Engineering Ltd, project manager Ye Zhijiang of China Gezhouba Group and Director Myint Oo of No 2 Construction Group of the HPID. The two diversion tunnels, the concrete work on the diversion structure and the earth work for the switching yard are 100pc complete.

Myanmar Times, 29/10/07. <http://mmtimes.com/no390/n006.htm>

According to EPM-1, the Yeywa hydropower project will be completed by December 2009.

NLM, 29/10/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071029.htm>

Lt-Gen Ye Myint of the MoD visits the Yeywa project site and checks on the installation of the pre-stressed steel pipelines and placing of concrete. Installation of the pre-stressed steel pipelines is 54pc complete. Construction of the RCC main embankment is 62pc complete, the power intake building 61pc, the power house 31pc and the spillway 27pc.

Shan Herald, 11/10/07.

<http://www.shanland.org/environment/2007/dam-project-suspended-junta-hits-pay-dirt/>

The 780-MW Yeywa dam project has been put on hold indefinitely, because of a super-rich vein of gold in the area, according to a businessman from Mandalay. The lode was discovered while soldiers, who doubled as

hired laborers, were digging through solid rock. They visited gold traders in Mandalay who offered them K10 million (\$7,690) for each day's excavations which they smuggled out by night for delivery to the traders before the news inevitably leaked to Nay Pyi Taw in Sept-07. All dam project activities have since been postponed to make way for gold mining

NLM, 07/10/07. <http://www.ibiblio.org/obl/docs2/NLM2007-10-07.pdf>

Scholars of Friedrich Ebert Foundation (FES) headed by Dr P Christian Hauswedell visited the Yeywa hydroelectric power generation project in Kyaukse township on 2 October. They inquired whether the project was harmful to the environment. Deputy EPM Myo Myint clarified that feasibility studies were made for environmental conservation before starting the project. After the project got underway, a consultant team from Switzerland had been hired to avoid [harmful] effects to the environment. No villages were removed by the project which was being implemented by Myanmar technicians only, he explained. Then, FES scholars viewed round the Yeywa hydel power project site. [A good photo of what looks to be the main gates at the dam can be found on p 8 of the print edition of NLM.]

NLM, 12/08/07. <http://myanmargeneva.org/NLM2007/eng/8Aug/n070812.pdf>

Contract signed with Liebherr Singapore Pte Ltd to buy a travelling-type tower crane, model-630 EC-H40 (20) to be used in building the Yeywa power station.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)

In December 2000, Nippon Koei completed a feasibility study for the 780-MW Yeywa plant on the Myitnge River. In September 2003, it was reported that China would lend \$200 million for the project. In June 2006, China's Sinohydro Corp and China International Trust and Investment Co Ltd (CITIC) signed a US\$125-million engineering, procurement, and construction (EPC) contract for the plant with completion scheduled in 2007. The project design includes a \$ 120 million RCC dam and a powerhouse with four 195-MW Chinese T/G sets. Yearly output is expected to be about 3.6 TWh. A double-circuit, 230kV line on the route Kyaukse-Meikhtila-Mandalay is part of the project.

NLM, 13/07/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070713.htm>

Over 37pc of the project work has been completed.

NLM, 03/07/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070703.htm>

Deputy Director U Khin Maung Latt of No 2 Construction Group of HEPID briefs Lt-Gen Ye Myint on completion of RCC concrete tasks of main embankment, arrangements for the installation of the penstock, work on the power house and water source prospects. Work on covering the main embankment with roller-compacted concrete continues, also connecting steel pipe at the water intake structure.

China Gezhouba (Group) Corporation, [undated]. http://www.gzbgj.com/english_n/news15.htm

On 16/04/07, the Yeywa Project Dept.of Gezhouba reached a total placement of 1 million m3 of RCC, amounting to 40% of the total needed to complete the project, half a year ahead of schedule. 2007 is the peak year for Yeywa project construction. The concrete conveyor system has been examined and repaired. Communication with the employer and engineers has been strengthened to obtain their understanding and support. RCC placement so far this year up to April 16 amounted to 360,000 m3. Currently the left bank of the dam has been raised to an elevation of 127.4 metres and the right bank to 109.4 metres.

MIC, 10/04/07. www.myanmar-information.net/infosheet/2006/070410.htm

HPID of EPM No 1 and Jiangsu Pengfei Group Co Ltd of the PRC signed a contract for the construction of a 500-T plant for grinding pozzolan in Popa, the HEP Dept will purchase machinery from Jiangsu Pengfei to run the plant, expected to produce 500 tons of pozzolan a day. A 1000-ton grinding plant is already producing pozzolan which is used in the construction of the concrete dam at Yeywa. [See also the following edition of NLM for more information about and a photo of the pozzolan mill of the EPM No 1:

NLM, 04/09/08. <http://www.foreverspace.com.mm/newspapers%5C08%5C9%5C4908newsn5.pdf>

CHMC, 05/04/07. <http://www.chmc2003.net/news.do?cmd=show&id=1654>

The sub-station at Yeywa is now in operation and being tested. For further information on this item on CHMC's Chinese language website, see the report, *China-Burma Development Projects*, of Earthrights International (March 2008).

China Gezhouba (Group) Corporation, [undated]. www.gzbgj.com/english_n/news03.htm

On 28/12/06, Yeywa Project Dept of Gezhouba completed a total RCC of 625,000 m³, three days ahead of the contracted schedule for 2006. 2006 is the key year for Yeywa project (LOT CW2) construction. The staff and workers overcame a lot of difficulties to meet the deadline. Special emphasis has been put on key points of the concrete construction. The concrete conveyor system was completed and maintained on time, ensuring normal operation of equipment. The daily output reached 5,240 m and the maximum shift output reached 3,000m³. Since the concrete conveyor system was put into operation in early Dec 2006, the Yeywa Project Management has strengthened the on-site construction organization and management as well as communication with the employer and engineer to obtain their understanding and assistance. This has enabled us to complete the contracted schedule and accelerate the concrete placement.

NLM, 06/11/06. www.myanmar-information.net/infosheet/2006/061106.htm

At Nanning in the PRC, EPM No 1 Col Zaw Min met with Chairman Zhao Ruolin and party of China National Electric Equipment Corporation about the timely arrival of electronic and mechanical equipment for Yenwe, Yeywa, Khabaung and Kengtawng hydel power projects.

NLM, 26/09/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060926.htm>

On 23/09/06, PM Soe Win inspected the Yeywa hydel power project where he was briefed on the laying of concrete and stockpiling of electrical tools and machines by EPM No 1 Zaw Min. EPM No 2 Khin Maung Myint briefed him on measures for the erection of the power grid, sub-power stations, power lines and towers. Afterwards, the PM and party inspected the water intake structure and work on the main dam. 35pc of the whole project has been completed.

Kudo, Toshihiro, *Myanmar's Economic Relations with China: Can China Support the Myanmar Economy?* Institute of Developing Economies, July 2006. p 14.

http://www.ide.go.jp/English/Publish/Dp/pdf/066_kudo.pdf

Yeywa will cost US \$700 million. In August 2003, the China Exim Bank approved a US \$200 million loan at preferential interest rates for the project. The China Water Resources and Hydropower Construction Group (Sinohydro) and the China International Trust and Investment Corporation (CITIC) got contracts to provide generators and other equipment for the project. In addition to low-priced machinery and equipment and services, long-term and low-interest loans and export credits offered by public financial institutions made it possible for Chinese enterprises to become major players in this field.

China National Heavy Machinery Corp (CHMC), 06/04/06. <http://www.chmc2003.net/news.do?cmd=show&id=1436>

A project to construct a sub-station and distribution network for the Yeywa hydropower dam is being implemented. Further information about this item on the CHMC's Chinese language website is available in the report, *China-Burma Development Projects*, of Earthrights International (March 2008).

NLM, 30/01/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060130.htm>

PM Soe Win and party check the production of natural pozzolan at the site of the HEPD at Mt Popa in Kyaukpadaung township. Deputy EPM Myo Myint reports on the construction of a roller compacted concrete (RCC) dam using a mixture of cement and natural pozzolan, the discovery of natural pozzolan at extinct volcanoes in the country, completion of the natural pozzolan factory in the Popa region, construction of the RCC dam at Yeywa, prospects for extraction of 74 million tons of natural pozzolan in Myanmar and plans to produce pozzolan for export. At the factory laboratory they watch testing of natural pozzolan and the production process. The factory is located near Ngayantgon village, two miles east of Mount Popa. P1-9 camp site can produce 3.5 million tons of natural pozzolan and P1-13 camp 32 million tons of natural pozzolan. A total of 14,000 tons of pozzolan can be stored at the warehouse. The factory can produce 1,000 tons of finished goods daily. Production started in April 2005.

NLM, 05/10/05. http://groups.yahoo.com/group/myanmar_information/message/12776

Gen Maung Aye and party visit Yeywa hydel power project on the Myitnge River near Ye-Yaman Village, 31 miles south-east of Mandalay. EPM Tin Htut briefs them on construction and tarring of the approach roads on both banks of Myitnge, installation of crushers, stockpiling of gravel, sand, cement, natural pozzolan, iron rods, diesel and supplies. The visitors check construction of the concrete separation wall, flow of water in the river, construction of the power intake and digging of the main embankment. They are briefed on the RCC [roller compacted concrete] and CVC [conventionally vibrated concrete] mixing processes. The dam will be 2,264 feet long and 433 feet high. A pozzolan plant has been built and is producing cement and natural pozzolan which will be used in construction of concrete dam. According to the data collected in 2003, there are 287 RCC dams in the world. The RCC dam of Yeywa hydel power project will be one of the largest ones in the world.

Xinhua 02/09/05. http://english.peopledaily.com.cn/200509/02/eng20050902_206116.html

China National Heavy Machinery Corporation (CHMC) signed contracts with Myanmar's Dept of Hydroelectric Power on 02/09/05 to supply 230-kV transmission lines and substations for the Yeywa hydropower project. The contract is worth of US\$ 45.84 million.

Xinhua, 01/08/05. http://english.people.com.cn/200508/01/eng20050801_199558.html

China's Gezhouba Water and Power (Group) Co Ltd signed a contract in Yangon with the DHP to build the dam of the Yeywa Hydropower Project. Under the contract worth US\$ 46.3 million the Chinese company will supply machinery and equipment for the construction of a re-inforced concrete dam. Signing was witnessed by EPM Tin Htut, the PRC Ambassador Li Jinjun and Gezhouba president Yang Jixue. The contract is the fourth for the Yeywa hydropower project. China National Electric Equipment Corp* signed a US\$ 2.2-million contract in March 2004 to build the dam gate. The second and third contracts worth US\$ 125 million were inked in July 2005 by a Chinese joint-venture consortium including China International Trust and Investment Corp (CITIC) Technology CL and Sinohydro Corp Ltd. Under the second and third contracts, the Chinese side will supply the hydraulic steel structure and electro-mechanical equipment including turbine/generators and transformers. The 790-MW hydropower project, is being built on the Myitnge river, 50 km south-east of Mandalay. It is expected to generate 3.55 billion kWh hours of electricity per year on completion.

* The Hunan Savoo Overseas Water and Engineering Co has also been among the PRC companies that have participated in the construction of the Yenwe dam and powerhouse, probably as a sub-contractor to CNEEC for hydraulic steel equipment. See pictures and text in Chinese on the Hunan Savoo website. <http://www.hhpdi.com/hhpdi/ShowArticle.asp?ArticleID=113>

NLM, 10/04/04. <http://www.myanmar.gov.mm/Article/Article2004/Apr/Apr10a.htm>

Annual volume flow of the Myitnge river is 12 million acre-feet.

NLM, 25/03/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040325.htm>

Myanmar and the PRC signed a number of agreements in the presence of PM Khin Nyunt and Vice Premier of the PRC Wu Yi. Governor of Central Bank of Myanmar Kyaw Kyaw Maung and President of the China Export-Import [Bank] Yang Zilin signed a loan agreement on the Hydraulic Steel Structure (Lot HSS-1) of the Yeywa hydro power project. D-G of the HPD Win Kyaw and President of China National Electric Equipment Corp (CNEEC) Jia Ding signed a commercial contract for the supply of the hydraulic steel structure (Lot HSS-I) for the project. U Win Kyaw and the GM of China International Trust and Investment Corporation Technology Co, Sun Xiaowsen, and the Vice GM of China Water Resources and Hydropower Construction (Group) Corp, Liu Qitao, signed an MoU on hydraulic steel structure (Lot HSS-2) and electromechanical equipment (Lot EM-1) of the Yeywa hydro power project.

NLM, 16/08/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030816.htm>

Myanmar and the PRC signed an agreement on a special loan at the Central Bank in Yangon. According to the agreement, the Chinese government granted foreign currency equivalent to US\$ 200 million to Myanmar for promotion of bilateral friendship and economic co-operation. Governor of the Central Bank of Myanmar Kyaw Kyaw Maung and Chairman and President of the China Export-Import Bank Yang Zilin made speeches and signed the agreement. During a visit by Head of State Than Shwe to the PRC in January 2003, an agreement on the loan was reached by both sides. The loan will be used to import heavy machinery and machines for the Yeywa hydropower project on the Myitnge River, 31 miles south-east of Mandalay. On completion, the Yeywa Hydropower Station will be able to generate 790 MW..

NLM, 19/04/03. http://www.myanmar.gov.mm/NLM-2003/enlm/apr19_rg3.html

Drilling of diversion tunnel No 2 of Yeywa hydel power project was completed by Construction Gp 2 of the HPD. D-G Win Kyaw of the dept reported on both diversion tunnels: No 1 is 1,444 feet in length and 33 feet in diameter and was completed 01/01/03; drilling of diversion tunnel No 2, which is 1,673 feet in length and 33 feet in diameter, was completed on 14/04/03.

NLM, 26/12/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n021226.htm>

The EPM signed an agreement on importing machinery and construction of a pozzolan grinding mill with Chairman Krishna Sivakrskul of Siam Industrial Corp Ltd and the MD of the Olympic Co [of Myanmar]. The pozzolan grinding mill will produce 1,000 tons of pozzolan powder a day which will be used in building a roller compacted concrete [RCC] dam for the Yeywa hydel power project. Construction of the mill will be undertaken by Siam Industrial Corp Ltd and Olympic Co in co-operation with the HPD. [A photo of the mill now operated by the HPID of EPM No 1 can be found in the print edition of NLM for 28/12/08. The accompanying article has some useful information about the properties of natural pozzolan. According to the article, extensive deposits of pozzolan exist around the area of extinct volcanoes in the Lower Chindwin basin.. See <http://www.burmalibrary.org/docs6/NLM2008-12-28.pdf>

NLM, 24/10/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n011024.htm>

SPDC Sec'y-1 Khin Nyunt visits Yeywa hydro-electric power project in Kyaukse township and is briefed on the results of a hydrological and geological survey, soil conditions, sand and rock supply for the project, construction of the main concrete dam, building of a test tunnel, spillway, diversion tunnel, pressurized pipes and power station by Deputy EPM Myo Myint and on the construction of the diversion tunnel, granite supply, a road from Kyaukse to the project site, and the discovery of pozzolan rocks by EPM Tin Htut. They check work on the main dam and the digging of No 2 test tunnel. The main dam will be built with roller compacted concrete. It will be 2,264 feet long and 433 feet high. The power station will be installed with four 175-MW turbines and will produce 3,316 million kWh of electricity annually

MEPE website information. [circa 2001]. [no longer available on-line]

A contract for the detailed design of a 780-MW (195 MWx4) power plant that will produce 3,316 GWh annually was signed with Colenco Power Engineering CL of Switzerland 03/05/01.

Muay Sai Leng, "The spirit of Nang Tsao Mawnla and the Yeywa Dam". Watershed, March-June, 2002, pp 52-54 [Excerpted]. [http://www.terraper.org/pic_water/Watershed%207\(3\).pdf](http://www.terraper.org/pic_water/Watershed%207(3).pdf)

I travelled from Mandalay to site of the proposed Yeywa dam in the hot dry season of 2001. The existing road runs parallel to the Doukhtawaddy river (aka as the Namtu or the Myitnge) across which the dam will be built. Alongside the road are villages which house the workers who are building the new road which will be used to haul construction materials to the dam site in the midst of small clumps of trees and vegetation, and barren hills. Because the area is in the plains with a hot climate, there are few green forests. A range of bare mountains stands out clearly on the landscape. At the end of the road lies the village of Yeywa with about 30 households. Local people report that the government has been thinking about building the dam for the past 20 years. Three years ago [in 1998], some geologists from Japan joined with local engineers and members of Rangoon University's Geology and Zoology departments in surveying the area for its suitability for dam construction. They studied the flow of the river, water level height behind the dam, the flood area, the villages and farmland that would be submerged, the ancient culture in the area, the aquatic life in the river and other topics. Once the dam is in operation, the water level in reservoir will rise about 180 metres above the present level of the river. Though there are many small villages within the flood area they are not classified by the government as villages. Consequently the villagers will not receive any compensation for the loss of their homes and land. The DHP has issued orders to the villages to vacate the area, but some in the flood area in villages such as Ngayu Chaung, Kyauk Pong, Thayi, Tan, Myitpauk, Lema have not yet left. The villagers along river make a living by fishing, logging, farming and other activities. They depend on the Doukhtawaddy which is home to many kinds of marine life including fish species known as the nga balu, nga yway, nga zinyaing and the nga chaung grows to the size of a human. Soldiers are present at every boat landing along the Doukhtawaddy on the lookout for locals who transport logs along the river without authorisation. [Compiler's note: The remainder of the article describes monasteries and temples in the

villages of Slin and Kyauk Pong, as well as some of the traditional customs that will be lost when the area is flooded. Pictures and a map accompany the article.]

NLM, 14/04/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010415.htm>

Gen Than Shwe and party visit Yeywa hydroelectric power project and are briefed on the results of the feasibility study, the watershed area of Myitnge River and the conditions for generating hydroelectric power. EPM Tin Htut reports on the suggestions given by consulting companies. They inspect samples of sand and stones from Paleik and Htonbo to be used on the project. A roller compacted concrete dam 2,060 feet long and 400 feet high will be built on the Myitnge River. It will be able to hold 19,051,000 acre-feet of water. The hydroelectric plant will be 413 feet long, 121 feet wide and 164 feet high. Four 175-megawatt turbines will be installed in the plant.

NLM, 12/07/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n000712.htm>

Gen Maung Aye and party helicopter to Yeywa hydel power dam project 28 miles east of Mandalay in Kyaukse township. EPM Tin Htut reports that MEPE has conducted a feasibility study for the dam project on the Myitnge River which it is estimated will generate 700 MW. Preparatory arrangements including improvement of roads to the project have already been started.

Mya Buzz, 29/11/99. [not available on-line]

The D-G of Yunnan Machine Building Bureau met with EPM Tin Htut on 24/11/99 with Myanmar Electrical Power Minister about a 600-MW hydro power plant construction project in Mandalay province to be undertaken by the Chinese provincial bureau.

Nippon Koei Co Ltd website information, [n.d.]. <http://www.n-koei.com/english/profile/index.html>

Nippon Koei Co Ltd carried out a study (1994-1995) and a feasibility study (1998-2000) of the Yeywa hydropower project for the Myanmar Government. The study was to confirm the feasibility of the project from technical, environmental and economic viewpoints. The basic design of the project at the time was for a facility that would include a 600-MW (150 MW x 4 units) power plant that would generate 2,815 GWh annually.

Nippon Koei Co Ltd website information, [n.d.]. <http://www.n-koei.com/english/profile/index.html>

Nippon Koei Co Ltd, a Japanese technical assistance consulting firm, carried out a feasibility study for a multipurpose dam at Yenwe in 1980-81. The study proposed a 72-metre-high, earth-filled barrier using 2,200,000 m³ of fill that was designed to irrigate 48,000 ha and generate 16,000 kWh annually. The study was commissioned by the Asian Development Bank.

See also the following editions of the New Light of Myanmar: 15/04/01, 02/08/01, 10/08/01, 22/06/02, 17/07/02, 02/01/03, 23/01/03, 19/04/03, 05/09/03, 23/12/03, 08/09/04, 20/12/04, 03/09/05, 23/03/06, 04/06/06, 2/06/06, 21/08/06, 26/09/06, 06/11/06, 06/12/06, 04/02/07, 22/04/07

KUNCHAUNG MULTIPURPOSE DAM PROJECT NEEDS BETTER CO-ORDINATION

NLM, 16/03/05. <http://www.ibiblio.org/obl/docs2/NLM2005-03-16.pdf>

Gen Than Shwe, accompanied by SPDC members, senior military officers, ministers and department heads, helicoptered to Kunchaung hydropower project on Kun Creek, nine miles west of Pyu in Pyu township. EPM Tin Htut reported on construction of the tunnel, plans to be implemented season-wise, arrangements for supply of electricity through the grid, and measures for arrival of machinery; Ministers Tin Aung Myint Oo and Industry Minister No 1 Aung Thaung spoke on steps for supply of materials for the power lines; Minister for Agriculture and Irrigation Htay Oo on the diversion weir and irrigation system for the Kunchaung project; Energy Minister Lun Thi, on measures for the constant supply of fuel for the project, and Forestry Minister Thein Aung, on conservation of forests in the Bago Yoma mountain range.

In response, Gen Than Shwe gave guidance on completion of the dam ahead of schedule so that the people could enjoy the benefits of the facilities as soon as possible. He stressed the importance of simultaneous

implementation of related tasks instead of doing only one after another. Parallel completion of the dam and canals is necessary. Innovative measures are to be taken with added momentum for production of electrical apparatuses, he said.

HPD Group No 3 is in charge hydropower section of the Kunchaung project, while the Irrigation Dept is to work on the construction of diversion weir and irrigation system. A 1,260-foot-long, 240-foot-high rock-filled dam with earth core will be constructed. The project is designed to generate 60 MW and benefit 110,000 acres of farmland.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NE 47-05: Toungoo Pyu creek dam, 9 mi west of Pyu [18° 29' N, 96° 26' E], grid square reference: 9\4, 25\7
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-5.jpg>

Additional references

Data summary [Kun](#) creek dam and power station

NLM, 02/03/11. <http://www.burmalibrary.org/docs11/NLM2011-03-02.pdf>

Water is being stored in the reservoir. Work continues on the installation of equipment at the plant and the transformer and switch yards. The hydropower part of the project is 93pc complete.

NLM, 09/01/11. <http://www.burmalibrary.org/docs11/NLM2011-01-09.pdf>

EPM-1 Zaw Min and D-G Maw Tha Htwe of HPID visit Kunchaung hydropower project 9 miles SW of Pyu. It is being constructed by No-3 Construction Group of the department. It is being equipped with three 20-MW generators that will be able to provide 190 million kilowatts per hour a year. The project is now 92.46pc complete. [A photo showing installation of what appears to be part of the penstock is included in the print edition of NLM.]

NLM, 09/12/10. <http://www.burmalibrary.org/docs09/NLM2010-12-09.pdf>

EPM-1 Zaw Min is briefed on construction of the main embankment and hydropower station. Installation of steel pipelines and construction of the spillway is continuing. Installation of the stator for turbine-1 and the pit liners for tubines 2 and 3 is underway. The whole project is now 92pc complete.

NLM, 24/04/09. Article and photos by Maung Maung. (edited and condensed)

<http://www.burmalibrary.org/docs07/NLM2009-04-24.pdf>

The region where the Kunchaung project is located receives about 100 inches of rainfall yearly. The catchment area of the creek is 338 square miles and a total of 763,000 acre feet of water flows through it annually. The reservoir has been designed to store between 800,370 and 1,190,000 acre feet of water for agriculture and electricity generating purposes. A roller-compacted 60-foot-wide spillway with ogee-type crest and chute with flip bucket that can release 4,500 cubic feet of water per second is being built to handle surplus water. The three 20-megawatt vertical-type Francis turbines in the powerhouse will be fed by 16.5-foot diameter, 500-foot-long prestressed steel penstocks. The whole project is now 73pc complete. [A close-up photo of the intake channel and the main embankment and spillway and another showing land preparations for the power house accompany the article in the print edition of NLM.]

NLM, 14/03/09. Article and photos by Khin Maung Than (Sethmu). (edited and condensed)

<http://www.burmalibrary.org/docs6/NLM2009-03-14.pdf>

The Kun creek hydropower project was originally included in the UN development plan for the country in 1964. The Hydropower Implementation Dept is currently working on the main embankment, the spillway, the conduit, the water control tower and the water intake structure, and is laying the prestressed steel pipelines. The embankment is 95.6pc complete; the spillway, 76.6pc; the intake structure, 95pc; the water intake tunnel; 57pc; the surge tank, 94.8pc; and the power plant, 25 pc. As a whole, the project is 71pc complete. The intake tunnel will be 4,340 feet long and is being dug from both ends. Necessary maintenance operations are being carried out on the section of the tunnel that is already completed. The surge tank will need 38,530 cubic feet of concrete in total. Water from the power intake structure will be supplied through the tunnel along a low-stressed steel pipeline. High stressed steel will be used for the penstocks that

convey the water to the power turbines. A diversion weir and irrigation facilities are also under construction at the site. The Kun creek project will eventually irrigate mixed crop farmlands in the Kanyutkwin and Penwogon regions of the Sittoung valley. [Photos of the main embankment, the entrance to the penstock tunnel and the surge chamber are included in the print edition of NLM.]

NLM, 28/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-28.pdf>

The Kun creek project is being implemented by Construction Group 3 of the Hydropower Dept about nine miles west of the town of Pyu in Bago Division. Earth work, construction of spillways and work on the afflux dam [bund] continues. The entrance to the intake tunnel is being dug, frames for laying concrete are being installed and preparations for construction of the power station are underway. The project is currently 70pc complete.

NLM, 14/09/08. <http://www.burmalibrary.org/docs6/NLM2008-09-14.pdf>

EPM No 1 Zaw Min checks on earth work at the site of the power station. Work continues on the main embankment, spillway, control tower and the power intake. The project is 69pc complete.

NLM, 28/09/07. <http://www.ibiblio.org/obl/docs4/NLM2007-09-28.pdf>

EPM No 1 is making increased efforts to complete the Kunchaung and Khabaung hydropower projects ahead of schedule. The hydel power project located over Kun creek, west of Pyu, is 57pc complete.

NLM, 20/09/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070920.htm>

Earth work for the power station and the digging of approach tunnel No 1 and the power intake channel are ongoing, also the installation of steel pipelines, earth work on the main embankment, construction of the power intake structure and the approach bridge to it.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf

The Kunchaung dam and power station with a planned capacity of 60 MW is under implementation by the HPID. It will generate 190 million kWh annually when it comes on line in Dec 2008.

Platts Myanmar Country Energy Profile, [mid-2007] [edited]. For access information, see [Power Profile](#)

In July 2004, Tianjin Alstom Hydro in China received an order from China Heavy Machinery Corp (CHMC) to supply three 22-MW Francis turbine/generator sets for the Kunchaung hydro plant. The project has a 385-metre-long, 73-metre-high, rockfill dam on Kun creek located 15 km from Phyu. Completion is expected in 2007.

NLM, 14/02/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070214.htm>

The 60-MW Kunchaung hydel power plant will generate 190 million kWh yearly. At present, 149 feet of the 335-foot-long intake tunnel have been dug. Dredging of up-stream tunnel and down-stream tunnel at the approach tunnel No 1 and construction of the 18-foot-diameter and 5,756-foot-long tunnel is underway. Work on the power intake building, water control tower and spillway are continuing. Three 20-MW turbines will be installed. The project will supply water to 110,000 acres of farmland.

NLM, 04/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061204.htm>

Officials report on building the main embankment, placing of the steel pipe lines, construction of the spillway and the water-intake facility. 60pc of the project has been completed.

NLM, 06/11/06. www.myanmar-information.net/infosheet/2006/061106.htm

[In Nanning in the PRC] V-C Zhu Xu and party of China National Heavy Machinery Corporation called on EPM No 1 Zaw Min and discussed timely sending of the electronic and mechanical equipment and the hydraulic steel structure for the Kun and Khabaung Hydel Power Projects.

Sinohydro website, 17/01/05.

http://www.sinohydro.com/portlet?pm_pl_id=7&pm_pp_id=13&ARTICLEID=11471537840078&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1

Sinohydro's 1st Engineering Bureau was awarded contracts from CHMC to prepare and install metal structures at the Kunchaung project. The contracts were worth almost RMB 39 million. Translation of the information in Chinese on the the Sinohydro website courtesy of the Burma team of ERI. See *China-Burma Development Projects* (March 2008).

Alston Brazil website, circa July 2004 http://www.alstom.com.br/Ingles/Noticias_Detalhes.asp?noticia=307&Idioma=8

In May [2004], ALSTOM [Brazil] signed a contract with China Heavy Machinery Corporation (CHMC) for the supply of three 22-MW Francis turbine/generator units to the Kun hydro power station in Myanmar. The equipment is scheduled for delivery between 2005 to 2006. This is the first success for both ALSTOM and CHMC in Myanmar's booming hydro market. Both partners hope the successful co-operation on Kun Hydro Power Station is the starting point for similar collaborations on other international projects in the future.

CHMC website, 10/05/04. <http://www.chmc2003.net/news.do?cmd=show&id=1053>

Picture and news item in Chinese about the signing ceremony on 24/03/04. CHMC will supply three 20-MW generators and hydraulic steel structures for the project. Reference and translation courtesy of ERI's *China-Burma Development Projects* (March 2008).

NLM, 25/03/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040325.htm>

D-G of the HPD Win Kyaw and President Lu Wenjun of China National Heavy Machinery Corp signed a commercial contract for supply of the hydraulic steel structure works and electrical and mechanical equipment for the Kun creek hydro power project.

NLM, 22/09/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030922.htm>

Gen Khin Nyunt and party visited Kunchaung hydel power station project, nine miles to the south-west of Pyu. The earthen-type dam will be 990 ft in length and 240 feet in height. Three 20-MW generators will be installed that will generate 190 million kWh per year.

NLM, 28/11/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n021128.htm>

The dam at Kunchaung hydel power project is rock-filled with an earth core, 990 ft long, 240 ft high. It can hold a maximum of 1,190,000 acre-feet of water. Spillway and conduit will be of reinforced concrete. It will be able to generate 60 MW. The project started in Jan 2001 and will be completed in Dec 2005.

MEPE website information, [circa 2001] [no longer available on-line]

Feasibility study and detailed design of the Kunchaung multipurpose dam and power station were contracted to NEPS Myanmar on 26/02/01. [**Compiler's note:** NEPS is a Myanmar company, headed by U Htay Win. Apart from the fact that it occasionally makes contributions to government-sponsored causes, little other public information is available about the company, but it would appear to be a consulting engineering firm.]

NLM, 18/01/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010118.htm>

Gen Than Shwe inspects Kun creek hydro-electric power project. MEPE is implementing the project on Kun Creek, a tributary of the Sittoung River, seven miles west of Phyu. The power plant will be capable of generating 60 MW, and the project will irrigate 110,000 acres.

Myanmar Snap Trade Directory, [n.d., circa 1999]. <http://www.myanmarsnap.com/investment07.asp>

A feasibility study on the Kun creek project has been completed by the China National Agricultural Machinery (E & I) Corp. The power plants will be capable of generating 84 MW.

NLM: 25/05/96. <http://www.ibiblio.org/obl/docs3/BPS96-05.pdf> [doc p 28]

MEPE represented by MD U Zaw Win, and the China National Agricultural Machinery Corp and the Hunan Hydroelectric Power Survey and Design Institute signed an MoU for the 90-MW Kun hydel power plant project in Phyu township.

WPD, 15/09/90. <http://www.ibiblio.org/obl/docs3/BPS90-09.pdf>

The Special Projects Implementation Committee, chaired by SLORC V-C Gen Than Shwe, met to review hydel power and energy projects. Among the projects planned for later implementation are the Kun Hydel Power Project in Pyu township (84 MW) at a cost K 1,110 million (including US\$ 100 million).

PAUNGLAUNG POWER PLANT MYANMAR'S FIRST UNDERGROUND STATION

Kyaw Thu, Myanmar Times, 14/03/05.

(Compiler's note: Issue 258 of the Myanmar Times is no longer available on-line.)

Myanmar's biggest power plant is due to come on stream in the near future and is expected to increase the country's energy generating capacity by nearly 19pc. The Paunglaung project, 224 miles north of Yangon, is also the first underground hydropower plant in the country. Its four 70-MW turbines will produce 911 million kWh of energy a year. The turbines are powered by water from the Paunglaung river, that is stored in a reservoir behind a dam built as part of the project. The reservoir has a surface area of 559,410 acres. The water is collected behind a zone-type rock-filled dam with an impervious earth core measuring 3084 feet wide and 430 feet high.

In Nov 1999, the water flow from Paunglaung River was diverted through two diversion tunnels in order to construct the zone-type rock-filled dam across the river. "The rock-filled dam as well as all structures are designed to withstand an earthquake of between magnitude 8 and 9 on the Richter scale", said U Ngwe Thein, the superintending engineer at the plant. "The electricity generated by Paunglaung will be sent to Pyinmana power substation, 11 miles from the site, by two 230-kilovolt power lines, and then into the national grid to be distributed throughout the entire country," said U Ngwe Thein.

Work on the project started in 1997 and took seven years to complete at total cost of K 7.9 billion, US\$ 170 million and 1.7 billion Yen. The project, which was designed in 1982 by the Norwegian company, Norconsult, was reviewed in 1997 by the Yunnan Machinery and Equipment Co (YMEC). The underground power plant, 310 ft by 50 ft and 140 ft high, was built by engineers and technicians from DHP under technical guidance from YMEC.

Energy-generating capacity will vary according to the available water flow from the reservoir. The turbines will only operate at full capacity when the water level is between 455 ft and 623 ft. "Normally we will be able to operate all four turbines from July to September, three from October to December, and just one during the rest of the year", said U Ngwe Thein. "Because the power plant is underground, the turbines will get a higher head inflow of water" said Major Ko Lay, deputy director of the DHP. The water that powers the turbines flows from the reservoirs through two tunnels, 28 ft in diameter and 263 ft long.

Although the Paunglaung power plant is Myanmar's biggest energy project, its construction went smoothly, said Major Ko Lay. "We did not encounter any major difficulties," he said. More than 100 Chinese technicians and about 1200 Myanmar employees are working on the final installation of electrical and mechanical equipment at the project. Four 10- member teams will operate the turbines continuously, with most of the staff already fully trained. "Chinese experts have been giving our staff on-the-job training, and we have also sent our engineers to a similar underground hydropower plant in China for further training," said U Ngwe Thein.

Myanmar enjoys an abundance of water resources. A report by the World Bank in 1995 said the country could produce 108,000 MW of hydropower. However, even including the new Paunglaung project, Myanmar is currently producing only 1486.9 MW of power from all sources within the national grid. [Compiler's note: A good photo of the inside of the generating plant is available with this article.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-01: Pyinmana Paunglaung river dam, near Kyitaung Khawma [19° 46' N, 96° 19' E], grid square reference: 10\9, 25\7
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-1.jpg>

The intake structure is easily located on Google Earth at 19° 46' 59" N, 95° 30' 32" E along with the impressive dam barrier and large reservoir.

Website reference

Yunnan Machinery I & E Co Ltd, [circa late 2002]. http://www.ymec.com.cn/en/hpp/project_pl.htm

A contract for the Paunglaung project was signed by YMEC in Oct 1998. It was a joint effort with the Kunming Hydroelectric Investigation Design and Research Institute (KHIDI) of the State Power Corp of China and the 14th Construction Bureau (FCB) of Water Resources and Hydropower of China [later known as Sinohydro]. Construction of the project was the responsibility of YMEC as of the end of 1998. . . . The underground powerhouse of the project was on a large scale and technically complex. It consisted of 32 tunnels with an overall excavation length of 3 km. The total contract value of US \$ 170 million was provided by the Chinese government on a seller's credit basis. [Compiler's Note: Good photos of the intake structures and interior of the underground station are available on this site.]

Additional references

Data summary: [Paunglaung](#)

See above: 'Diversion phase of [Nancho hydropower project](#) nears completion' (NLM, 25/02/09)

'Agreement signed on [Upper Paunglaung](#) hydropower project (MIC: 04/09/05)

See below: 'Paunglaung plant to supply [Mandalay with 24-hour electricity](#)' (MT: 16/08/04)

Kyaw Sein, NLM, 31/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-31.pdf>

The Paunglaung diversion weir is located on the Paunglaung river 11 miles downstream of the Paunglaung dam near Thitseintpin Village in Pinyinmana township. Construction started in 2005-2006, following the completion of the dam. The weir is 750 feet wide and 15 feet high, while the sluice gate has two 4-feet by 6-feet valves and one valve that is six square feet. It was built to minimize the wastage of water that flows from the hydropower generating plant. There are main canals on both sides of the river, each over 29 miles long. The left canal will irrigate 16,000 acres while the one on the right will irrigate 19,000 acres. An afflux bund has also been built to prevent flooding at the villages on its right side. The bund is over 20,000 feet long. Construction costs of the project are estimated at K 16,143.526 million.

NLM, 29/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-29.pdf>

The Paunglaung Diversion Weir, built by Construction Group 5 of the ID, was opened at the diversion weir near Thitseintpin Village of Nay Pyi Taw Pinyinmana Township on 25/03/09. The diversion weir will control the water from Paunglaung dam and other water sources between Tatkon and Pinyinmana townships. Eventually, the right and left canals will irrigate 35,000 acres of farmlands in Pinyinmana, Lewe and Yedashe townships. The main canals will stretch 59 miles and the tributary canals over 127 miles with 922 canal structures. This year, the diversion weir is supplying water to 1,000 acres of summer paddy.

NLM, 28/11/08. <http://www.burmalibrary.org/docs6/NLM2008-11-28.pdf>

On a visit to the Paunglaung dam, Maj-Gen Ohn Myint of the MoD viewed the flow of water into the dam, functions of the water channels and the spillway. In the underground power plant he looked into the control room and turbines. Paunglaung Dam is of roller-compacted concrete type and has a 430-foot high and 4,100-foot-long embankment. The maximum water storage capacity of the dam is 560,000 acre-feet and a minimum capacity of 283,760 acre-feet. The water surface of the dam is 4,102 acres and the dam benefits 50,000 acres of farmland. The power plant, installed with four 70-megawatt generators, is generating 911 million kilowatt hours yearly. Two 230-kV power lines from the power plant at the dam supply electricity to the entire nation through the Pinyinmana power station.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)

In Oct 1998, YMEC and MEP signed a US\$ 160 million deal to build the Paunglaung hydroelectric plant in Pinyinmana township. The first feasibility studies for this multipurpose project were conducted by America's Knappen Tippetts Abbett Engineering Co in 1953. Additional work was done by the UNDP in 1964, Japan's NEWJEC in 1976, and Norway's Norconsult from 1982-1990. The project was approved in April 1990 with a capital budget of K 16,019 million. The 945-metre rock dam across Paunglaung creek is 131 metres high,

the tallest in the country. Paunglaung has four 70-MW turbine-generator sets in an underground powerhouse, the first in the country. In Sept 2000, China Export-Import Bank (CIEB) signed an agreement with MEP approving a \$US120 million export seller's loan to help finance the plant. This was in addition to a \$US7.2 million loan approved earlier. The ID of the A&IM took the lead on the civil works. MEP started work on the diversion tunnels in 1996 and the plant was inaugurated in March 2005. Paunglaung is connected to the grid at 230kV through an expanded substation at Pynmana.

Mizzima, 12/04/06. www.burmanet.org/news/2006/04/12/

Despite the Paunglaung plant's capacity of 280 MW, sources said water levels were so low only two of four turbines were operational, meaning many towns were going without electricity. "Last night, the light went out at midnight. We can get power back again only at 2 pm tomorrow. Previously we got power regularly from Paunglaung power plant. We got power whole day and whole night. Since last two months back, we have been facing this load shedding," a Pyi resident told Mizzima.

NLM, 25/09/05. <http://www.myanmargeneva.org/05nln/n050925.htm>

The A&I Minister inspects the Paunglaung project. Director of Construction Gp 5 of the ID U Victor reports on water flow into the dam, storage of 560,000 acre feet and release of surplus water.

NLM, 26/03/05. www.ibiblio.org/obl/docs2/NLM2005-03-26.pdf

A ceremony to inaugurate Paunglaung Multi-purpose Dam Project near Kyitaung-Khawma village in Pynmana township was held near the dam. PM Soe Win said underground tunnels had been built to harness the Paunglaung which has a flow of 3.3 million acre-feet of water annually. Hardships were faced in building the power station according to design. As the work volume was large, the project had needed sophisticated technology. In addition to the high rock-fill dam, the Ag & Irrig Ministry had built the four-step spillway with much difficulty. The EPM had built two diversion tunnels, the intake structure and the power plant and cables including 37 large and small underground tunnels. The Paunglaung project is a symbol that engineering technology has reached a higher level of development in Myanmar. New hydel stations can be built only if the economy is robust. The big task is strengthen the national economy. Rather than relying on outside assistance, the nation should do its best with its own capital and strength. EPM Tin Htut said the Paunglaung power plant was the first underground hydel station in the country. It can generate 280 MW but cannot produce power at full capacity in the rainy season. So the Ahtet Paunglaung hydel project will be implemented on the Paunglaung river, 32 miles above the lower station. General Maung Aye said the Paunglaung multi-purpose dam project had emerged from a 30-year long-term project to ensure all-round development in the nation. He presented cash awards to the staff who participated in the dam construction through Director U Vita of Construction Group 5 of the ID. At the hall of the power plant, the vice-governor of Yunnan province of the PRC formally unveiled a signboard reading 'Perpetual flow of the Paunglaung River and perpetual amity between Myanmar and Paukphaw' [sic] written bilingually in Myanmar and Chinese. Afterwards, General Maung Aye and party went to the site of Ahtet Paunglaung hydel power project. [Good photos of the Paunglaung dam, site and power plant are available in the print edition of NLM.]

Sinohydro, 24/02/05.

http://www.sinohydro.com/portlet?pm_pl_id=7&pm_pp_id=13&COLUMNID=111111&ARTICLEID=11471537120007

This URL and several others posted on Sinohydro's Chinese website indicate that the company was heavily involved as a sub-contractor in construction activities and supplying and installing equipment and machinery at the Paunglaung hydropower dam and station. See the report, *China in Burma: The Increasing Investment of Chinese Multinational Corporations in Burma's Hydropower, Oil and Natural Gas and Mining Sectors*, Earthrights International (Updated September 2008) for further details.

<http://www.earthrights.org/sites/default/files/publications/China-in-Burma-update-2008-English.pdf>

See also the following article from the Daily Star of Bangladesh (15/09/10) questioning the role of Sinohydro in the construction of the Paunglaung dam and power station.

<http://www.thedailystar.net/newDesign/news-details.php?nid=154491>

NLM, 31/08/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nln/n040831.htm>

Deputy EPM Myo Myint reported to PM Khin Nyunt and party on power supply through the grid after installation of turbine No 4 at the underground power station at Paunglaung. More power will be supplied

after installation of turbine No 3 in September. Arrangements are being made for installation of turbines No 1 and 2 in Nov and Dec 2004. The visitors viewed construction of the main dam and construction of stable water pond levels 1, 2, 3 and 4, and intake tower. The PM gave instructions on conservation of the forests and trees in accord with rules and regulations for greening of the project area. They also inspected power control room. A fruit basket was presented to YMEC Chairman Feng Ke and party who are engaged in the project.

Sinhhydro, 04/08/04. [http://www.sinohydro.com/portlet?](http://www.sinohydro.com/portlet?pm_pl_id=7&pm_pp_id=13&COLUMNID=111111&ARTICLEID=11471537000061)

[pm_pl_id=7&pm_pp_id=13&COLUMNID=111111&ARTICLEID=11471537000061;](http://www.sinohydro.com/portlet?pm_pl_id=7&pm_pp_id=13&COLUMNID=111111&ARTICLEID=11471537000061)

First generator at Burma's largest hydropower plant becomes operational. Translation from Chinese courtesy of Earthrights International report, *China-Burma Development Projects* (March 2008)

Than Zin Tun, Aung Naing Oo, NLM, 28/08/03. Edited and condensed.

<http://www.burmalibrary.org/docs6/NLM2003-08-28.pdf>

The Paunglaung River is a tributary to the upper reaches of the Sittoung River. It rises on the Shan plateau and its current flows at a rate of 4,520 cu ft/second. Hsinthay creek from the Yamethin region and Ngalaik creek that flows through Pinyinmana meet east of Pinyinmana and together with the Paunglaung form the Sittoung River. Water flows in the creeks only in the rainy season and is hardly seen there in other seasons. The Paunglaung dam stretches between the mountains on either side of the Paunglaung river. It is 3,084 ft long, 430 feet high. Its storage capacity is 559,410 acre feet of water at full brim, of which 283,760 acre feet of water can be used. The spillway is of the ladder type with no gate. It is 410 feet wide and designed to release 353,160 cu ft of water per second. The underground power plant under construction by the HPD will house four 70-MW vertical Francis turbines. Women engineers are working alongside the men on the project. Asst Engineer Daw Aye Aye Than leads the women's group involved in digging the tunnels, building the diversion wier and intake building and carrying out tasks along the high-pressure pipe lines and the underground power station. Myanmar women can take pride in the young women engineers who are taking part in nation-building tasks like this. By July 2003, 95pc pf the tunnel work and 97pc of the tunnel for the underground power station had been completed. Priority is now being given to building of major structures such as water inflow gate and the power intake. The first turbine of the power station will be installed in December and the fourth and last turbine in 2004. Efforts are being made to distribute electricity in 2004-2005.

Yankin Soe Min, NLM, 31/01/03. <http://www.myanmar.gov.mm/Article/Article2003/jan/jan31a.html>

Yankin Soe Min, NLM, 02/02/03. <http://www.myanmar.gov.mm/Article/Article2003/feb/feb2d.html>

(Compiler's note: These articles are no longer available on-line)

Feasibility studies for the multipurpose Paunglaung dam project were conducted by Knappen-Tippetts Abbett (KTA) in 1953, the UNDP in 1964, New Japanese Consultants (NEWJEC) in 1976, and Norconsult in 1982, 1983, 1987 and 1990. By filling the dyke with rocks produced by the digging of the spillway, the cost of building the dam is being reduced. Additional costs are saved by not attaching a sluice gate to the spillway. Some of the special difficulties encountered in building a rock dam: frequent changing of the drill bits, machinery is frequently out of order with consequent shortage of spare parts, difficult terrain, heavy trucks have to be driven with great over narrow hilly roads slowing down the process, less equipment available because of the heavy costs involved. Special technologies used for the first time in building a dam in Myanmar include: high pressure pump washing in preparing the dam bed, mining technique in preparing the spillway, use of consolidation grouting and the anchor volt system.

NLM, 19/09/01. <http://www.myanmargeneva.org/01nlm/n010919.htm#%284%29>

At the Paunglaung project site, Lt-Gen Khin Nyunt and party hear a report by the Irrig Dept's Win Maung on construction of the main rock-filled dam and spillways and building of irrigation facilities. MEPE project director Soe Myint, reports on construction of related structures including two tunnels and power intake, construction of the 230-KV power line, the 3,300-metre-long tunnel, power station and 37 different sizes of tunnels and plans for the installation of turbines and transformers on completion of the construction work. The visitors inspect the power intake structure undertaken by MEPE, building of the spillways, construction of the tunnels for power house, work at pressure shaft No 2 and construction of the main stone embankment by the Irrig Dept. The stone embankment dam is 430 ft high and 3,100 ft long. The dam will be able to irrigate 50,000 acres and generate 280 MW.

Ningbo Huyong Electric Power Material Co Ltd website [n.d.] www.hydl-cn.com/en/aboutus.htm
 Ningbo Electric Industry Bureau, Ningbo Huyong Electric Power Material Co Ltd of Ningbo City in Zhejiang Province produced the 230KV steel power transmission towers for the Paunglaung Hydroelectric Station of the State Power Industry Ministry of Myanmar.

Xinhua, 19/09/00. <http://www.ibiblio.org/obl/docs/SW08.htm>

The Export-Import Bank of China (Eximbank) has signed an agreement with MEPE to provide an export seller's loan worth 1 billion yuan (US\$ 120 million) to help build Myanmar's largest hydro-power project to date. The loan will enable the Yunnan Machinery and Equipment Import and Export Co (YMEC) to provide power-generating equipment for the Paunglaung Hydro-electric Station which will have an installed capacity of 280,000 kilowatts. Prior to this, Eximbank approved another 60 million yuan (US \$ 7.2 million) loan for the project. The power station will supply one-third of the electricity for Myanmar when it is commissioned in 2003. YMEC clinched the US\$ 160-million dollar contract to supply machinery for the project with MEPE in 1998.

Xinhua, 11/11/98. http://www.ibiblio.org/obl/docs4/China-Burma_Chronology.pdf [doc p 198]

State-run MEPE and YMEC of the PRC signed a second contract in Yangon on the implementation of the Paunglaung hydroelectric power project. According to the US\$ 10 million contract, YMEC is to provide machinery, equipment and spare parts for construction of the underground generating station. Under the \$ 160 million first contract for the project, signed in October, YMEC will provide a complete set of machinery and equipment, as well as designing and building the generating station. The Chinese side will extend a seller's credit, while the Myanmar side is to make an advance payment of 5pc. The term of repayment is 5 years with a grace period of 2 years. YMEC has been co-operating with Myanmar since 1989 in building hydroelectric power stations and has exported to the country complete sets of related equipment for 17 small and medium stations, accounting for 94pc of the country's hydroelectric power stations.

NLM: 07/10/98. http://www.ibiblio.org/obl/docs4/China-Burma_Chronology.pdf [doc p 192]

A ceremony to sign an agreement on implementing Paunglaung hydroelectric power project between MEPE of the EPM and Yunnan Machinery & Equipment (I & E) Corp (YMEC) was held at the International Business Centre on Pyay Road this morning. Maj-Gen Tin Htut said the Ministry of Electric Power was implementing power projects in accord with the guidelines of the Government, but the demand for electricity is growing at such a rate that it cannot be fulfilled. He thanked the Government of the PRC and the Yunnan provincial government and YMEC for the technical and financial assistance needed to implement Paunglaung project. MEPE Managing Director Yan Naing said that MEPE, in co-operation with YMEC, had built 15 hydroelectric plants since 1990, with total value in machinery of US \$ 50 million and projects such as Yeywa, Bilin, Shweli Thaukyekhat and Kun would be implemented one after another. The agreement on the Paunglaung project was worth about US \$ 160, and it was the biggest project in the course of the economic co-operation of the two nations. Later, U Yan Naing and Chairman Lin Zai You of YMEC signed the agreement and exchanged documents.

Lu Nuo and Li Ziliang, Xinhua, 22/08/98. http://www.ibiblio.org/obl/docs4/China-Burma_Chronology.pdf [doc p 182]

In the coming five years, Yunnan will export \$250 million's worth of mechanical products, electrical products, and technologies to Burma to build the Banlang [Paunglaung] power station, the biggest in Burma. The two sides signed a co-operation agreement a few days ago. This is China's biggest trade co-operation project with Burma, and even with Southeast Asia as a whole. It will be carried out by means of an export credit. The Yunnan Provincial Machines and Equipment Import and Export Co will provide Burma with a large and complete set of equipment, construction machines, power station design, and construction guidance needed to build the power station.

NLM, 13/02/98. http://www.ibiblio.org/obl/docs4/China-Burma_Chronology.pdf [doc p 155]

An MoU regarding the implementation of the Paunglaung hydropower project involving a loan of US \$ 250 million was signed between MEPE and YMEC at in Yangon on 12 February. The project is situated near Pinyinmana in Mandalay Division. It will have an installed capacity of 280 MW and will annually generate over 900 million kWh which will be distributed through the national grid. The project will jointly be implemented by

MEPE and the Irrigation Dept. EPM Tin Htut said that the project had been under discussion for a long time and that the signing of the accord was an important milestone in furthering a project that would be of great importance for the economic development of the country.

NLM, 25/09/97. <http://www.burmalibrary.org/docs6/NLM1997-09-25-text.pdf>

Energy Minister Khin Maung Thein inspects Paunglaung hydro-electric power project in Pinyinmana township. Among those present at the site are engineers of Kajima Corp of Japan and engineers of other ministries who are getting on-the-job training. MD Zaw Win of MEPE and Project Manager Wan Kyi brief the minister on digging the diversion tunnels, each 33 feet wide, 46 feet high and 3,300 feet long. Work on the tunnels started on 18 September 1996. No 1 diversion tunnel will be completed in a few days.

NLM, 03/05/96. www.ibiblio.org/obl/docs3/BPS96-05.pdf [doc 27]

MEPE represented by MD U Zaw Win and NEWJEC Consultant Group of Kajima Corp of Japan, represented by Kajima Chairman Arkira Miyazaki, signed a contract to build two diversion tunnels for the 280-MW station of the Paunglaung hydel-power project.

WPD, 15/09/90. www.ibiblio.org/obl/docs3/BPS90-09.pdf

The Special Projects Implementation Committee, chaired by SLORC V-C Gen Than Shwe, met to review "hydel power and energy projects." Projects in the immediate future include the Biluchaung HEP project No 1 in 1992 (28 MW) and the Mann thermal generation project in 1993 (72 MW). Later projects planned include: Saing Din hydroelectric project, Buthidaung tsp; Paunglaung hydel power project, Pinyinmana tsp (280 MW) at a cost of K 4,250 million (including US\$ 410 million) for power, and K 135 million (incl. US\$ 14 million) for irrigation of 40,000 acres; Bilin hydel power project, Mon State, (240 MW) at a cost of K 2,590 million (incl. US\$ 245 million); Kun Hydel Power Project, Pyu tsp, (84 MW), Yenwe multipurpose dam project, Kyauktada tsp (Bago), 16.2 MW and irrigation of 40,000 acres.

Burma: Issues and Option in the Energy Sector: World Bank Report No 5416-BA: June, 1985, p 18.

<http://www->

wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/1999/09/17/000009265_3970723102606/Rendered/PDF/multi_page.pdf

An important project is the proposed Paunglaung I hydroelectric dam which has been the subject of detailed engineering and design studies. The project would have a significant irrigation component (21,520 ha) in addition to an installed power capacity of 280 MW (4 x 70 MW). Energy output would be 911 GWh, of which 342 GWh represents firm energy. The cost of the project is estimated at about US\$445 million, excluding the irrigation component. The average cost of generation for Paunglaung was estimated at 1981 prices to be 4.6 cents/kWh. If the irrigation benefits are included, the average cost would be reduced to 3.5 cents/kWh. Since completion of the design studies, a number of questions have been raised. First, as regards irrigation aspects, it is not clear that a proper optimization has been carried out in arriving at the recommended scheme. The second question relates to the reservoir capacity and operating regime -- the dry season operating regime for the recommended Paunglaung scheme provides peaking power of 197 MW for a duration of only 1.5 hours per day, which is not adequate for the daily load pattern presently experienced. Third, there is some question over the geology at Paunglaung and the way it could affect the costs of constructing a higher dam which incorporated recommended design changes. After discussion with Bank staff it has been concluded that further study of the irrigation component is warranted to see if the proposed area of 21,520 ha cannot be further increased. Regarding the reservoir capacity and operating regime of Paunglaung and the geology of the site, an independent consultant will study the possibility of adopting a steeper slope for dam height optimization. If the higher dam is feasible, the dry season peaking power and duration will be higher than in the currently proposed scheme. As an alternative, the consultant will need to study the possibility of increasing the high water level of the dam without altering its total height to gain additional storage. [Note 17: To 2 metres from the top of the dam instead of 3.5 metres]

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Start 05

DAEWOO ELECTRONICS MYANMAR LIQUIDATED

Xinhua, 11/01/05. www.burmanet.org/news/2005/01/11/

Daewoo International of South Korea has readjusted its business involvement in Myanmar by stopping its investment in electronic equipment production in the country and concentrating on new investment in oil and gas sector, according to the local Flower News journal Tuesday. Quoting the Myanmar Federation of Chamber of Commerce and Industry, the journal said the liquidation of the Myanmar-Daewoo Electronics Co Ltd would not affect its other undertakings in the country such as oil and gas exploration and development in collaboration with the Myanmar energy authorities. Daewoo Electronics stepped into Myanmar not long after the latter opened to foreign investment in late 1988, working in cooperation with the Ministry of Industry No 2 under the basis of mutual benefit and undertaking production of TVs, washing machines and refrigerators in the country. In recent years, the Daewoo International has switched its engagement mainly to the oil and gas sector.

Compiler's Note: It would appear that the former assembly plant for Daewoo's electronics products in Dagon South is now being used by the Ministry of Industry-2 to assemble electric meters for the Electric Power Ministry No 2. See NLM, 02/04/07: <<http://burmalibrary.org/docs2/NLM2007-04-02.pdf>> At the electrical and electronics manufacturing factory in the South Dagon IZ of the Ministry of Industry-2, Minister Saw Lwin and party looked into the production and testing of electrical meters. Afterwards, they were conducted round the electric meter workshop by General Manager Lei Lei Win. For more on the production of electric meters, see '[Padaung factories](#) begin production of generators and meters'.

Additional references

See below: '[Local TV manufacturer](#) takes on International competitors' (BT: March 2004)

Myanmar Times, 03/09/07. <http://www.mmmtimes.com/no382/b004.htm>

South Korea's Daewoo International Corp. formally returned to Myanmar's consumer electronics market on August 25 with the opening of a Yangon showroom, almost a decade after the company pulled out due to financial woes. Daewoo has partnered with local electronics retail chain OK Myanmar to distribute its home appliances, including televisions, DVD players, refrigerators, washing machines and air conditioners. Daewoo International is a former trading unit of the now-defunct Daewoo Group, which collapsed due to corporate corruption and massive debt following the 1997 Asian financial crisis. Daewoo stopped exporting consumer electronics to Myanmar in 1998.

Burma Independent News Agency, 30/06/99.

<http://www.ibiblio.org/obl/reg.burma/archives/199906/msg00659.html>

On May 24th, workers at the 'Small Luxury' factory staged a peaceful, silent work stoppage to display their dissatisfaction with long working hours, high travel costs and low wages. With the prices of household necessities skyrocketing, the labour force at the factory has been trying for some time to get a response from the company to their demands but without result. Daewoo officials and their Burmese partners showed up to listen to the workers' requests. But Daewoo, well experienced in dealing with worker actions, advised the military against making any direct response at that time. Shortly afterwards, all the workers who had taken part in the work stoppage were dismissed from the company. Many of them report being watched and individually threatened since that time.

Burma Net Brief Business Reports, 16/06/96.

www.burmalibrary.org/reg.burma/archives/199604/msg00111.html

Daewoo Electronics will set up a general electronics plant in South Dagon, near Rangoon, with an investment of 20 million, the company announced. The plant will initially turn out 200,000 color TVs, 200,000 VCRs, 70,000 refrigerators, and an unspecified number of parts and components yearly starting next year. In a related move, the company plans to transfer color TV and VCR lines currently operating in Rangoon to South Dagon.

WPD, 05/12/92. <http://www.ibiblio.org/obl/docs3/BPS92-12.pdf> - doc p.21

Daewoo Electronics Myanmar Co Ltd has exported US\$90,000 of electronic connecting cables to Korea. 2 Korean technicians and 86 Myanmar workers are making the components, and about US \$100,000 has been invested. US\$2 million of components will be manufactured annually.

WPD, 08/08/92. <http://www.ibiblio.org/obl/docs3/BPS92-08.pdf> [document p.17]

Daewoo Electronics Myanmar Co Ltd (DEMCO) celebrated its first export of colour television sets made in Myanmar. DEMCO, founded on July 25, 1990 with an investment of US\$ 4 million, started production for the home market on Apr 01, 1991. Its first export order, for 14"-colour TVs was received in January 1992 and will begin 07 Aug 1991. MD Sun Ryang Chung said DEMCO has a capacity of 120,000 TV sets per year (color and black & white), plus 150,000 radio cassette players and 30,000 refrigerators. It has 154 employees, of whom five are Korean. Employment will rise to 250 by the end of the year.

Soe Tin Win, WPD, 9,21/04/91. <http://www.ibiblio.org/obl/docs3/BPS91-04.pdf> [document p.19]

Daewoo Electronics Myanmar assembles TV's (14" and 20"), radios, cassette tape recorders, and refrigerators. Myanma Heavy Industries, the Myanmar partner in the joint enterprise, rents its former radio factories to the company for US\$ 50,000 per year. The company's refrigerators and two kinds of radio cassette recorders will go on sale in April and will sell for K 6,500. 14"-black-and-white TV sets will be available soon and will sell for K 19,650. Colour TVs, when available will sell at K 29,500. MD Chung says 20pc of the company's products will be sold in Myanmar with the rest going to the EC and America. The company currently employs 97 Myanmar and 9 Korean workers. Another 50 workers will be added soon and the company expects to have a total of 200 by the end of 1991. 13 Myanmars were sent for training in Korea in August 1990. Pay ranges from K 1,100 to K 3,000 for an 8-hour day.

WPD, 04-06-90. <http://www.ibiblio.org/obl/docs3/BPS90-06.pdf> [document p.45]

Ministry of Trade Notification No. 12/90 of June 3 establishes the Daewoo Electronics Myanmar Co Ltd, a private joint venture established by Myanma Heavy Industries of Ministry of Industry No 2, and Daewoo Electronics Co Ltd of Korea, represented by President Yoon Young Suk, for "manufacturing and marketing of electric and electronic household products. Its capital is US\$ 12,000,000 (equivalent to K 80,400,000), divided into 12,000 shares of US\$ 1,000 (equivalent to K 6,700), of which Myanma Heavy Industries will hold 5,400 and Daewoo Electronics 6,600. Shares will be subscribed in US dollars.

WPD, 30-03-90. <http://www.ibiblio.org/obl/docs3/BPS90-03.pdf> [document p.39]

An agreement was signed by Kim Yong-Won, President of Daewoo Electronic Co and Chairman of the Daewoo Group of Korea Yoon Young-Suk with Myanma Heavy Industries to establish the Daewoo Electronics Myanmar Co Ltd as a joint venture, with a capital of US\$ 4 million divided 45-55% between the Myanmar and Daewoo partners.

PROPOSAL FOR BARGE-BASED POWER PLANT AT MONYWA COPPER MINE

Monywa Copper Mine Electric Power Plant Project by BOL Scheme, Engineering Consulting Firms

Association -- Japan, [late 2004].

http://www.ecfa.or.jp/japanese/act-pf/H16/minkatsu_Myanmar_Eng.pdf

Note: The resume that follows was prepared by the compendium compiler. The proposal it presents for a floating power plant to service the needs of the copper mine at Monywa is interesting in itself. But the document is of special interest for the information and analysis it provides about the challenges facing the electricity generating industry in Myanmar during the period 2001-03 when most of the data in the proposal was collected. Refer to the original for full details. The pages missing from the pdf version, are available in html format accessed through Google.

Ivanhoe Mines Ltd of Canada formed a joint venture with Mining Enterprise No.1 of the Myanmar Government to develop mining sites at Sabetaung, Kyisintaung and Letpadaung near Monywa in 1996. A refinery was set up at the minesite using the advanced extraction-electrowinning (SX-EW) process to produce high quality 99.999% copper cathode. The mine is now one of the most efficient, low cost copper producers in the world. The J-V has 550 permanent employees and an additional 1,300

constructions/logistic related workers. It is the largest employer in Sagaing division. By the middle of 2004, copper production had reached 27,500 T/year and was scheduled to increase to 39,000 T/year. The J-V is trying to expand capacity to 150,000 tons per year but due to several factors, including a severe shortage of electric power supply in Myanmar, has not been able to do so.

Although Myanmar has a 30,000-MW hydro power capacity potential, only 3pc cent of this potential has been developed, 70pc of the power generating equipment in 1999 was dependent on natural gas. Natural gas is available in Myanmar, but over 90pc of the gas produced is exported to Thailand. This shortage of natural gas domestically has existed for sometime and the amount available for electric power generation within the country is considered to be only 25pc to 30pc of the total demand. A number of short-term programs to ease the power shortage in the country were mapped out between 1998 and 2000, but only two thermoelectric projects, Ahlone steam plant (50 MW) and Hlawga steam plant (50 MW), and one hydroelectric project, Zawgyi II, have reached the production state. All other projects have been deferred for lack of funds. Three large projects dependent on natural gas at Kyaikto (300 MW) [in Mon state], at Ywama (300 MW) [in Yangon] and one dependent on delta offshore gas (200 MW) [in Ayeyawaddy division] have yet to be implemented. Only the Paunglaung project and three other hydroelectric generating projects are currently proceeding, but even these have been delayed.

According to forecasts prepared by ECFA [Engineering Consulting Firms Association - Japan], Myanmar will require a base-case power plant capacity to generate 1,787 MW in 2005, and 2,984 MW in 2010. MEPE is considered to have a current operational power plant capacity of approximately 1,200 MW, which in all likelihood falls short of demand by at least 20pc to 30pc.

This is a critical issue for the Monywa copper mine. Because of favorable current and future prospects for copper market prices, a plan exists to expand mine production to 50,000 T/year within a few years from the current level of 27,500 T/year. Furthermore, the development of the Letpadaung mine site near the existing S & K pits that would bring an additional 120,000 T/year into production. Current electric power requirements by the mine and refining plant are about 20 MW which is supplied from the Kyunchaung (gas turbine) power station of MEPE. Based on the company's plan to develop the Letpadaung deposit, this is expected to increase to 100 MW by 2010 and will require a new 230-kV transmission line that will be installed by MEPE between Monywa and Mandalay in 2005-2006..

For this expansion to occur, a secure electric power supply system must be ensured. A possible timetable is shown in the Table below:

Copper Production and Expected Electric Power Requirement (MW)

	2004	2006	2008	2010
1. Copper Production (Tons)	30,000	50,000	80,000	150,000
2. Electric Power Requirement (MW)	20	34	54	100

Proposed Solution:

It is not clear when natural gas in Myanmar will become available to fuel additional generating plants for domestic purposes. Moreover, there are no major consumers of heavy fuel oil in the country, but diesel is widely used for power generators and transportation. Heavy fuel oil could be handled in a way similar to that of diesel oil except that heavy fuel oil requires heating to maintain proper fluidity for handling. The cost of heavy fuel oil is much cheaper than that of diesel oil. Given its generating capacity and the current situation in Myanmar, the introduction of heavy fuel oil as a fuel for power generation is highly recommended for immediate power development until sulfur-free natural gas becomes available for power generation at a reasonable price. Diesel engines can be operated safely with diesel oil or heavy fuel oil even though it normally contains a certain amount of sulfur. With some modifications and the addition of a gas injection system, a low speed diesel engine can also operate on natural gas. It can safely be said that the best medium-size power plant for Myanmar would be one that uses low speed diesel engine generators in areas remote from coal resources

Taking into account the additional power supply required for the next phases of the Monywa copper project and possible use in other areas of Myanmar, a low speed diesel engine power plant with a 60-MW generating capacity is recommended. To balance the need for periodical maintenance with the advantages of cost saving in having larger machines, four units of around 15 MW each would be best. A barge-mounted diesel power plant (BMDPP) would offer great advantages. It could be built where specialized production facilities of a well-equipped shipyard are available and standardized technology and stringent schedule control could be utilized. It could be used even where construction facilities are minimal or access to the site by land is difficult. It would be easy to move from one location to another desired location where power demand is high and access waterways are available. Should the total power supply system in the country become so well developed that the BMDPP were to become redundant, it could be sold to another country.

The total project including the 60-MW barge power plant (US\$ 71.5 million) and transformers and adaptor set (US\$ 8 million) would cost an estimated US\$79,500,000 at the current market exchange rate of ¥110/US\$. Based on a life-time expectancy of 25 years for the plant, a heavy fuel oil price of US\$ 200 MT (or crude at \$ 45/bbl), a system oil price of US\$ 0.90 per litre, a cylinder oil price of US\$ 1.30/litre, a load factor of 8,000 hours/year, operation and maintenance costs of US\$ 0.0139/kWh and interest costs of 5.0pc/annum on the initial project costs, it is estimated that the power generating costs of a generator terminal of the BMDPP would be approximately US\$0.065/kWh.

The BMDPP could be financed by an independent power producer (IPP) either as a BOL (build, own, lease) or a BOT (build, own, transfer) scheme under existing laws in Myanmar. The BOT option would allow MEPE, the national power company, to obtain the plant at no cost to itself after 10 years of operation by the IPP. Under the lease agreement (BOL), the power plant would be leased to MEPE who would be required to operate it in the interests of the mining company for a period of at least ten years. The BOL option is preferable because MEPE could place the BMDPP anywhere it wanted in Myanmar to generate power for other customers, as long as it supplied the requirements of the Monywa Copper project from other sources. We consider that the BOL scheme would be less risky for investors, since it would not require a special swap agreement with MEPE who could supply the power to the mine in the most efficient way possible.

Additional references

See above: [Ivanhoe looking](#) to Yeywa project for power supply (MT: 24/10/05)

MON CREEK MULTI-PURPOSE DAM AND POWER STATION OPENED

NLM: 30/12/04 <http://www.ibiblio.org/obl/docs2/NLM2004-12-30.pdf>

Mone creek multipurpose dam in Sedoktara township jointly constructed was opened on 29 December 2004 with an address by PM Soe Win, Chairman of the National Electric Power Development Project Work Committee. The dam is located two miles north of Sedoktara in Minbu district where it was constructed on Mon Creek. The project was implemented to supply sufficient irrigation water, to boost regional summer paddy cultivation by over 70,000 acres, to prevent flooding and to generate 330 kWh per year. Mone creek dam is of an earthen type. The main dam is 4,320 ft long and the embankment 200 ft high. The dam has a water storage capacity of 674,400 acre ft and will irrigate 108,000 acres. Mon Creek hydel power station is 258 ft long, 128 ft wide and 110 ft high. Three turbine generators were installed at the station which will generate 75 MW. The project was successfully implemented by Construction Group No 8 of the ID and Construction Group No 1 of the HPD.

In his address the PM said that the opening of the Mone Creek Multipurpose Dam would benefit the whole nation in addition to Magway division. Thanks to the dam, more water from Mon creek can be stored to irrigate crops the whole year round through Mezali diversion weir, so that over 100,000 acres of crops will get adequate amount of water annually. As the Mezali division weir could control Mon creek only to a certain degree in the past, farmers had to rely on North and South Mone creek canals to irrigate crops in turn. As a

result the irrigation capacity then was only about 30,000 acres. Since the completion of the multipurpose dam, the irrigated areas in the region have more than tripled.

The erection of a hydroelectric power plant at the Mon creek dam is a great victory for the people in effectively utilizing the land and water resources of the western sector of Magway division. The power station at the dam is part of the electricity grid, which covers the entire nation. The feasibility study on extended utilization of the current of the creek has led to the Buywa hydropower plant project upstream on Mone creek and Kyee-ohn Kyee-wa project downstream on Mone Creek. These are now under way and together will be able to generate 120 MW. As a result the three projects along the creek will be able to supply sufficient water for agricultural purpose and generate nearly 200 MW. [Photos of the Mon creek dam and power station can be found in the print edition of NLM in which this article appeared.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-15: Myohaung Monechaung dam near Sidoktaya [20° 27' N, 94° 15' E], grid square reference: 11\8, 23\4
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-15.jpg>

The Google Earth exposure of the dam area shows the extensive clearing that took place before the dam barrier was built.

Additional references

Data summary: [Mone](#)

See above: 'Buywa and Upper Buywa power projects take shape' (NLM: 18/12/07)

See below: 'Kyee-ohn Kyee-wa multi-purpose dam on Mon creek underway' (NLM: 01/07/03)

Khin Maung Than (Sethmu), NLM, 26/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-26.pdf>

Mone creek originates in the mountain ranges of Chin state and flows into the Ayeyawady at Kyaungdawya of Lekaing in Pwintbyu township. Mone dam is located on Mone creek between Aukpon and Thayankaing villages in Sedoktara township. It can store up to 674,400 acre feet of water and supplies water to 108,000 acres of cropland through the Mezali diversion weir. 380 million kilowatt hours are generated yearly by the power station at the dam and this is being supplied to local communities as well as to the Lawpita national grid. [A photo of the main dike of the Mone dam is included with the article in the print edition of NLM.]

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)

In December 2004, the Mone Creek multipurpose project was opened about a year behind schedule in Sedoktara township. YMEC and CITIC worked on the project with funding support from the China Import-Export Bank (CIEB). Plant construction was coordinated between MEP and the ID. The Mone plant has three 25-MW turbine-generator sets. The Mone project feasibility study led to the development of two other hydro plants, Buywa upstream and Kyee-ohn Kyee-wa downstream. These plants are now under construction and when completed will supply 120 MW.

U Zaw, NLM, 09/04/04. <http://burmalibrary.org/docs/NLM2004-04-09.pdf>

A photo taken on 02/04/04 of construction work on the interior of one of the tunnels of the Mone creek project is included in the print edition of NLM.

Kyaw Sein, NLM, 22/11/03. <http://www.ibiblio.org/obl/docs/NLM2003-11-22.pdf>

Heavy machinery at the project site is in operation 22 hours a day. The only shut-down is for maintenance purposes two hours a day. Installation of the generating equipment and work on the buildings and high-pressure conduits has been completed. 2,300 people are working onsite. The most difficult tasks involve finishing of the 3,625-ft-long diversion tunnel and the 222-foot-deep afflux dam. Embankments around the main dam total 6,490 feet in length, including the 740-foot-long dyke No 1, the 1,430-foot-long dyke No 2 and the 4,320-foot-long, 200-foot high main dam, which will have a maximum water storage capacity of 674,400 acre feet and a dead water storage capacity of 110,000 acre feet. It covers an area of 10,620 acres. [A photo of a section of the main embankment is included in the print edition of NLM.]

Kyaw Sein, NLM, 05/07/03. <http://burmalibrary.org/docs4/NLM2003-07-05.pdf>

Difficulties in transporting materials to the remote location of the Mon dam have delayed completion of project. The dam differs from others in that the separation wall was built with a mixture of sand and cement using plastic rather than iron. Another problem for the designers was that the diversion tunnel and hydel power tunnel had to be built alongside a mountain with loose layers of rocks. The overflow tank -- 87 feet in diameter and 187 feet deep -- is the biggest yet built by Myanmar engineers. Twenty-one experts of CITIC Technology Co Ltd of the PRC are participating in the project. A 132-kV line with 260 grid towers will connect the power plant with the Chauk power station. The Chauk station has provided power to the dam site during the period of construction. [Two photos showing the dam embankment and the power house site are included in the print edition of NLM. For a description of the use of trench cutters to remedy the subsoil conditions encountered in the construction of the Mone dam see the key article on the [Thahtay dam](#).]

Win Shwe, NLM, 06/02/03. http://groups.yahoo.com/group/myanmar_information/message/4435
 Surveys for the project were conducted near Autpon Village in 1966 by MEPE with the assistance of technicians from China and in 1970 and 1972, under arrangements with the UNDP. The project was approved at a meeting of SPIC on 29/03/93; work started in 1997-98; the cost is estimated at K 1,680 million and US\$ 32 million. Water stored at the dam will irrigate 108,000 acres of farmland via Mezali diversion weir originally built in 1905. Electric power generated will go to nearby towns and villages and to the power distribution network of the State; three 25-megawatt generators are being installed; the power plant will be able to generate 330 million kwh/year. The earthen dam has a catchment area of 1468 sq mi; the water level necessary for generating electric power is 359 feet; the spillway is 350 feet wide reinforced concrete, one high-pressure tunnels is 1568 feet long, the other three are 437 feet each; the tunnels are of concrete/steel type. 600 people are involved in construction operations. 75pc of the civil works and 30pc of the work on equipment installation have been completed; installation of steel plates in the large tunnel and steel pipes in the smaller tunnels is currently underway. Work on the 132 kV power line that will link the power plant to the sub-power station in Chauk is underway. [A good photo of drilling operations on the intake tunnel accompanied the article in the print edition of NLM.]

Win Kyaw Oo, Myanmar Times, 02/12/02. <http://www.ibiblio.org/obl/docs3/MT144.htm>
 (Compiler's note: Issue 144 of the Myanmar Times is now only available on-line in truncated form which does not include the information below.)

The multi-million dollar Mon hydro-electric dam is due to open in July-03, according to D-G Thein Tun of the Electric Power Dept. The project is costing US\$ 32 million for power generation equipment funded by loans provided by CITIC while the government is spending K 6 billion on engineering works. Work on The dam for the 75-MW project at Sidoktaya, 400 miles north-west of Yangon, is 2,166 yards long and 67 yards high. The diversion tunnel 1208 yards long and 37.4 feet in diameter, is the biggest of its kind in Myanmar. Asia World and Shwe Than Lwin companies were contracted to carry out earth-moving work associated with the dam. A contract was signed with the Myanmar Daewoo Construction Co early last month to provide extra earth-moving equipment. Although the dam is being built to generate hydro-power, it is also expected to provide water to irrigate more than 100,000 acres through a weir about 20 miles downstream.

Asia Pulse, 26/10/99. www.ibiblio.org/obl/reg.burma/archives/199911/msg00127.html
 Hitachi Construction Machinery Co and Nichimen Corp have received an order from Ag & Irrig Ministry of Myanmar for 70 pieces of construction machinery. The equipment is for use in the construction of a dam for irrigation and hydroelectric power is being built 390 km north of Yangon. Construction began in 1998 and will be completed around 2003. Worth roughly 2 billion yen, the order includes a request for about 30 midsize hydraulic shovels. Nichimen will accept payment over a four-year period.

NLM, 17/04/99. <http://mission.itu.ch/MISSIONS/Myanmar/99nlm/n990417.htm>
 Gen Than Shwe inspects work on the diversion tunnel and spillway at the Mon creek dam project in Sedoktara township and presents fruit baskets to Japanese experts and technicians.

NLM, 21/11/98. <http://mission.itu.ch/MISSIONS/Myanmar/98nlm/n981121.htm>
 MEPE and CITIC Technology Co Ltd of the PRC signed an agreement on implementation of the Mon creek hydroelectric power project and the Thaphanseik hydroelectric power project at the International Business Centre in Yangon on 20/11/98. Minister for Electric Power Tin Htut said the agreement is worth about US\$ 52 million.

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POWER AND IRRIGATION FUNCTIONS OF [SEDAWGYI DAM](#) TO BE IMPROVED

NLM, 28/12/04. <http://www.ibiblio.org/obl/docs2/NLM2004-12-28.pdf>

Lt-Gen Thein Sein and party inspected the Sedawgyi dam in Madaya township after a preliminary visit to the site of the Nanpet dam which will be a supporting facility for the Sedawgyi complex.

The Sedawgyi dam was built in 1987 and has a storage capacity of [only] 363,000 acre feet. [In the rainy season,] overflow water amounting to 800,000 acre feet has to be diverted to the spillways each year. To fully utilize the water of Chaungmagyi creek, on which the Sedawgyi dam is built, Nanpet dam will be implemented on Nanpet creek [aka Nampok, Nampai], approximately 12 [32?] miles upstream from the Sedawgyi dam. The supporting dam will be able to generate 60 MW and will contribute to the generation of electric power from Sedawgyi dam.

At Sedawgyi dam, officials reported on the condition of the dam and the generation of electric power. The dam is built across Chaungmagyi creek and supplies water to over 100,000 acres of cultivable lands in Madaya, Patheingyi, Mandalay and Amarapura townships. Two turbines generate 12.5 MW each.

[A photo of the main embankment is included in the print edition of NLM.]

Website references

Water and Power Consultancy Services (India) Ltd (WAPCOS), website. <http://www.wapcos.net/intro.html>
WAPCOS provided consultancy services to the Electric Power Corporation of Burma during the planning and building of the Sedawgyi hydro power project.

Myanmar Ministry of Agriculture and Irrigation, Dept of Irrigation, Irrigation Works in Myanmar.

<http://www.irrigation.gov.mm/works/between1962and1988.html>

Sedawgyi reservoir is in Madaya township of Mandalay division. The dam is 4,120 feet in length and its height is about 133 feet. Full-tank capacity of the reservoir is 363,000 acre-feet to be able to irrigate 127,000 acres of agricultural land. The main canal of the reservoir is 43 miles in length and its distributary canals are in total 584 miles long. 134 million kWh of hydro-power are being generated annually from this reservoir. The reservoir is the second largest one in Myanmar by its size. Sedawgyi Dam was constructed between 1976-77 and 1987-88.

Project funding evaluation report

Project Completion Report of the Sedawgyi Hydropower Project [Loan No. 395 - BUR(SF)] in Myanma (ADB, August 1989), 61pp. <http://www.adb.org/Documents/PCRs/MYA/36112-MYA-PCR.pdf>

An ADB loan provided a generous portion of the funding of the Sedawgyi multipurpose dam project. This report evaluates the financing of the power side of the project including the construction and equipping of the power house, the sub-station and the transmission line to Mandalay. Total cost of the power aspects was just short of \$ 30 million of which ADB provided 14 million and OPEC about 1.7 million. The rest was financed by the Myanmar government. The report is a treasure house of information about the Sedawgyi project. It includes basic data about the Sedawgyi dam and power stations, project history, a time-line from inception to finish, details about the initial appraisals leading up to approval of the funding proposal, technical consultancy services, procurement contracts, organization of the construction process, performance by the contractors, environmental impacts and benefits resulting from the project. Maps showing the location of the project and the existing national transmission grid system are provided. Two useful diagrams provide cross-sections of the dam and powerhouse. One of the most interesting parts of the evaluation analyzes the reasons for the long delays in implementing the project. The report also sheds light on the relationship between the Irrigation Dept and the Electric Power Corporation in the implementation of the project.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-05: Maymyo
Sedawgyi dam, near Sedaw [22° 19' N, 96° 19' E], grid square reference: 14\0, 25\8

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-5.jpg>

The sluice gate of the dam and the reservoir are clearly visible on Google Earth at 22° 20' 50" N, 96° 16' E.

Additional references

Data summary [Sedawgyi](#)

See above: 'Official visit gives impetus to [Upper Sedawgyi dam](#) project' (NLM: 23/04/09)

NLM, 19/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070319.htm>

In Kyaukse, EPM No 2 Khin Maung Myint briefs Secretary-1 Thein Sein on the functions of the power stations near the Kyaukse industrial region and efforts to supply power to Hsinmin cement plants and other factories there. The Ag & Irrig Minister submits a report on generating power from Hsedawgyi dam and supply of water to farmlands. Energy Minister Lun Thi reports on production of natural gas from production blocks and supply of natural gas to the factories.

NLM, 24/05/01. [http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010524.htm#\(7\)](http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010524.htm#(7))

Central Commander Ye Myint visits Sedawgyi dam; it can store 120,400 acre feet and irrigate 74,000 acres of summer paddy, 10,968 acres of summer sesamum and 1,253 acres of pre-monsoon long-staple cotton. He is briefed on water storage, irrigated plantations and power supply; he inspects the power plant.

WPD, 07/06/89. <http://www.ibiblio.org/obl/docs3/BPS89-06.pdf> [document p25]

The Sedawgyi hydroelectric power plant in Madaya township was commissioned. Besides generating electricity, it will also provide irrigation and flood control. Two 12.5-MW generators have been installed; the station has a capacity of 134 million units per year.

Far Eastern Economic Review, 17/05/84. [not available on-line]

Sedawgyi dam was begun in 1976-77 with a US\$ 45-million loan from the Asian Development Bank; work is being hampered by shortages of cement and diesel.

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SPEEDY COMPLETION OF [MANIPURA DAM](#) URGED

NLM, 22/12/04. <http://www.ibiblio.org/obl/docs2/NLM2004-12-22.pdf>

General Than Shwe and party arrived at Manipura multipurpose dam project to be implemented by the Irrig Dept in Falam township where they heard a report presented by Ag & Irrig Minister Htay Oo. He said a feasibility study is being conducted for the construction of a dam across the Manipura river where the average annual flow of water is 7 million acre-feet. The dam will not only benefit about 100,000 acres of farmland but will also prevent annual floods in the lower part of Kalay. Moreover, it will be able to generate 540 MW.

Construction Minister Saw Tun reported on matters related to the project area and the Manipura Bridge (Var Bridge) and Energy Minister Lun Thi on supply of fuel for the project. EPM Tin Htut reported on arrangements for the power plant and installation of power lines for the project. Afterwards, General Than Shwe urged officials concerned to complete the project as soon as possible because of its benefits for the Kalay, Kalewa and Gangaw regions. Then he inspected charts of the project, the current of the Manipura river and the site for implementing the project.

Afterwards, the visitors went to the site of Myittha dam to be implemented near Pyintha Village [22° 00' N, 94° 04' E] in Gangaw township where they heard a report presented by Minister Htay Oo on the salient points of the dam. Later, Energy Minister Lun Thi reported on arrangements for supply of fuel to the project. In response, General Than Shwe gave guidance, calling on officials concerned to fulfil the needs including fuel since the two dam projects are huge ones, and the Irrig Dept is to complete the tasks as soon as possible. Afterwards, Senior General Than Shwe and party inspected the site chosen for construction of the main embankment. Myittha Dam project will be implemented by Construction Group No 8 of the Irrig Dept. It will benefit 12,000 acres of farmland and generate 40 MW.

[Photos of the Manipura and Myittha dam sites are included in the print edition of NLM.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-07: Gangaw Manipur dam near Sihaung Myauk [22° 52' N, 94° 04' E], grid square reference: 6\2, 34\5
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-7.jpg>

Additional references

Data summary [Manipur river](#)

See above: 'One third of the [Myittha dam](#) embankment finished (NLM: 11/12/08)

NLM, 18/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-18.pdf>

Several generals visit the Manipura multi-purpose dam project on the Manipura river. It is under construction by Construction Group 4 of the ID. They check on the construction of the water intake tunnels. The gravel-filled embankment of the dam will be 527 feet high, the highest in Myanmar. It will have a storage capacity of 1.26 million acre-feet of water. Four 95-megawatt generators to be installed at the dam are expected to generate 1,903 million kilowatt hours yearly. The dam will prevent flooding of the Myittha plain and keep the Chindwin river downstream from Kalewa from overflowing its banks. It will also irrigate about 50,000 acres of farmlands. [Photos giving a bird's eye view of the dam site and one of the interior of one of the intake tunnels accompanies the article in the print edition of NLM.]

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

At the co-ordination meeting (1/2008) of the Special Projects Implementation Committee in the office of the Commander-in-Chief (Army), EPM No 1 Zaw Min gave a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the Committee. [Among] the the fifteen are the Manipur hydropower project (380 megawatts) in Sagaing [sic] division.

NLM, 04/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080204.htm>

Lt-Gen Ye Myint of the MoD visits the Manipur multipurpose dam project where earth and gravel work is ongoing and steel ribs are being installed and concrete poured at the two diversion tunnels. The gravel-filled dam is being built on the Manipur river near Hsetaw village in Kalay township.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf

Manipur dam and power station with a planned capacity of 340 MW are under implementation by the ID and HPID. It is expected to generate 1905 million kWh annually when it comes on line in 2010.

NLM, 30/07/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070730.htm>

Deputy EPM No 1 Myo Myint checks sites chosen for the power station and embankment at the Manipur project. Work continues on the outlet to diversion tunnel No 2 and arrangements are being made for construction of the outlet to diversion tunnel No 1.

NLM, 30/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070130.htm>

PM Soe Win and party view the building of diversion tunnels and preparations for the Manipura multipurpose dam project in Kalay township. Director of Construction Group No 4 of the Irrig Dept U Victor reports on construction of the diversion tunnel and the hydel power tunnel.

NLM, 23/09/06. <http://www.ibiblio.org/obl/docs2/NLM2006-09-23.pdf>

SPIC report: Manipura multi-purpose dam project will be implemented on Manipura river, 2.5 miles upstream from the Gabarni [Var] Bridge in Kale township. The dam will be 527 feet high and 2,444 feet long. It will prevent floods in the Myittha river valley, reduce floods caused by Chindwin river in the lower Kalewa region, irrigate 50,000 acres of farmland and generate 380 MW of electricity.

NLM, 12/04/06. www.mission.itu.ch/MISSIONS/Myanmar/06nlm/n060412.htm

Lt-Gen Ye Myint and party visit Manipura multi-purpose dam project site in Kalay township. The gravel-filled dam will be 2,444 feet long and 527 feet high. Water storage capacity at full brim will be 1.26 million acre feet. Four 95-MW turbines will generate 1,903 million kWh annually.

NLM, 03/12/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nml/n051203.htm>

PM Soe Win visits Manipura multi-purpose dam project in Kale township. Officials of the Irrigation Dept report on pre-engineering tasks including the volume of water flowing in the Manipura river. Lt-Gen Ye Myint inquires about the connection between the watershed areas of the dam and the Var Bridge in Chin State. The project will be implemented on the Manipura River, downstream from the Gabarni Bridge on Kale-Gangaw Road in Kale Township. The dam will prevent flooding of the plains along the Myittha River including lower regions of Kalewa. It will benefit 50,000 acres of farmland and generate 300 MW.

NLM, 24/03/05. <http://www.ibiblio.org/obl/docs2/NLM2005-03-24.pdf>

Lt-Gen Ye Myint inspects ground clearing work for the Manipura multi-purpose dam in Kalay township. The earth core, rock filled dam will be 2,600 feet long and 525 feet high. Its storage capacity will be 1.26 million acre-feet. It will have an outflow tunnel and another tunnel to run turbines that will generate 2,680 million kWh annually. It will prevent flooding of Myittha plain and lower regions of Kalewa and will irrigate 50,000 acres of crops.

NAMWOK HYDROPOWER PLANT RE-OPENED

Shan Herald, September 2004.

<http://www.shanland.org/oldversion/index-1831.htm>

More than 600 townspeople of Kengtung went through an ordeal of forced diet when they were ordered by its military commander to attend the inauguration of the city's hydroelectric power plant on 16 September, reports Pegasus from Maesai. The people had been ordered to arrive at the city hall by 06:30am although the ceremony started at 10:00am and went on until 2:00pm, when they were finally allowed to go home and break their fast.

According to the Lahu National Development Organization, the hydropower plant is in Mongkhawn, 10 miles south-west of Kengtung. It was originally completed in 1990 through a 50-million kyat international assistance program, but it soon broke down forcing the residents to rely on the daily three-hour power supply by the local government electricity board.

Early this year, Shwe Lin Star Company, the firm owned by Sai Leun (a.k.a Lin Mingxian), leader of the Mongla-based Special Region No 4, was contracted to build and renovate power plants in eastern Shan State at a total price of 300 million yuan (US\$37.5 million).

Power produced by the Mongkhawn will be free for the military and government personnel while other users will be required to pay K250 (US\$ 0.25) per unit.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-11: Kengtung

Note Nam Wop creek in the upper part of grid square P5/12/5. It runs into the Nam Hkawn river which flows north through Kengtung and eventually empties into Nam Lai, one of the main rivers in eastern Shan State. Namlat creek is not as easy to identify, although it appears to be a tributary of the Nam Namoi.

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-11.jpg>

Additional references

See below: 'Meipan creek hydropower plant inaugurated' (NLM: 16/05/02)

See also several projects listed under 'Hydro power station commissioned in Kaungkha' (NLM: 26/07/05).

See also Shan State projects listed 'Hydropower plants in Myanmar with capacities up to 10 MW' (JICA: Sept 2003)

FBR, Lahu Relief Mission Report, 15/01/04. <http://www.dictatorwatch.org/articles/fbrlahu3.html>

Although two power plants are supposed to be serving Kengtung, the administrative centre for eastern Shan state, both the Mongkhun [Mongkhawn] and Namlet hydropower stations are in disrepair. Effectively, there is no electricity in Keng Tong. At best, the residents occasionally get a dim light. Students have to buy candles from Thailand in order to study their lessons. It is very difficult for people to earn a living. Patients in the hospital also sleep without light. They are "full of grief and anxiety," said one of the patients.

NLM, 06/02/02. [http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020206.htm#\(4\)](http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020206.htm#(4))

Maj-Gen Soe Win of the Ministry of Defence and party inspected the Namwok hydroelectric power plant in the Mongkhon region of Kengtung township. U Aye Kyaw, the state electrical engineer for Shan state and MEPE engineer Khin Maung Htay reported on the power plant, power supply and the site chosen for the next plant.

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Appendix A*: pp 30-31 (September 2003).

[http://lvzopac.jica.go.jp/external/library?](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=0000000000&filename=11734092_05.pdf&seqno=5)

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=0000000000&filename=11734092_05.pdf&seqno=5](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=0000000000&filename=11734092_05.pdf&seqno=5)

In 2001-02, a Japanese study team looking into prospects for developing small and mini-electricity generating projects in rural Myanmar visited the Nam Wop (Nam Wat = Mongkhun) and Namlat (Namlet) stations that were set up to provide electricity to Kengtung (Kyaington). The Namwop station is said to be 10 miles south of Kengtung, while the Namlat station is 8 miles to the southeast of Kengtung. They found that two of the three 1000-kW turbine-generators at Namwop and that two of the three 160-kW machines at Namlat were out of order and in need of rehabilitation. Interior photos of the Namlat station are provided.

Report of the Commission of Inquiry appointed under article 26 of the Constitution of the International Labour Organization to examine the observance by Myanmar of the Forced Labour Convention, 1930, Geneva, 2 July 1998.

[http://www.ilo.org/public/english/standards/relm/gb/docs/gb273/myanma3b.htm#\(7\)%20Other%20infrastructure%20work](http://www.ilo.org/public/english/standards/relm/gb/docs/gb273/myanma3b.htm#(7)%20Other%20infrastructure%20work)

The report published by the ILO Commission of Inquiry states that documentary evidence was presented to it of forced labour being used to construct "a major dam project in Shan state" (Section 447). The corresponding footnote (743) refers to a report received from the Karen Human Rights Group and names the project as "the Nam Wok (Mong Kwan) dam project near Kengtung, completed in 1994". The document is referred to as "Karen Human Rights Group, 001-0028; Heppner, XII/56-57". [Compiler's note: This is the only reference available to a dam at the site of Namwok hydro power plant. The KHRG report appears to be 'SLORC in Southern Shan State' published on 20/08/94. It quotes Sai Khorn Mong, a farmer from Kengtung township, as saying that he had been drafted to work on the Mong Kwan electric power plant project [called 'Nam Wok' by the SLORC] about 10 miles south of Kengtung, in brigades numbering 80 -100 people three or four times a year starting in 1991. "The dam was very long, about 12 feet broad, and the height of 3 or 4 people. We had to level the ground, carry dirt for the dam, and build roads too. There were soldiers working too, about the same number as the civilians. The project was just finished on 24/07/94, and now it's sending electricity to the town."] http://www.khrg.org/khrg94/94_08_20.html

NLM, 17/07/94. <http://www.ibiblio.org/obl/docs3/BPS94-07.pdf> [document, p19]

The K93.8-million, Namwok hydel power plant was inaugurated by SLORC Secretary-2 Lt-Gen. Tin Oo. It will generate 10.5 million kWh [annually], saving K11 million in costs for diesel oil, and will provide 24-hour power to Kengtung.

YMEC, 1992. http://www.ymec.com.cn/en/about_yj_2.htm

YMEC (Yunnan Machinery and Equipment Corp) lists the Nam Wop hydropower project as one of the projects in Myanmar for which it supplied three turbine-generator sets, each with a capacity of 1000 kW, as well as construction services.

WPD, 30/11/91. <http://www.ibiblio.org/obl/docs3/BPS91-11.pdf> [document, p24]

The Namlat creek hydroelectric power station in Kengtung township was inaugurated November 28. It will supply Kengtung with 24-hour per day electricity. This phase will supply 500 kW, while a 3,000 KW second phase on Namwok Creek will be completed in a year and a half. The State spent US\$130,000 and K14.7 million on the Namlat project; the Namwok project will cost US\$600,000 and K36 million.

YMEC, 1990. http://www.ymec.com.cn/en/about_yj_2.htm

YMEC (Yunnan Machinery and Equipment Corp) lists a 'Kyaing Tong' hydropower project as one of the projects in Myanmar for which it supplied two turbine-generator sets, each with a capacity of 160 kW, as well as construction services. (Compiler's note: This could be the Namlat Creek project referred to in the WPD news item above.)

PAUNGLAUNG PLANT TO SUPPLY [MANDALAY WITH 24-HOUR ELECTRICITY](#)

Zin Min, Myanmar Times, 16/08/04.

(Compiler's note: Issue 229 of the Myanmar Times is no longer available on-line.)

Mandalay will be guaranteed 24-hour electricity once the new Paunglaung hydroelectricity plant is running at full capacity, according to a Mandalay division government official. The new power plant has been running on one turbine since tests began on July 15, but once all four are running – which is expected next month – Mandalay will be energy sufficient with excess power for the national grid, the official says. "Within the next two months or so, all four turbines will begin to operate at full capacity and provide 24-hour electricity to Mandalay," he said, adding that the power plant will be able to produce 70 MW of electricity. Larger towns in Mandalay division, including Amarapura, already have round-the-clock power as a result of the project, according to reports.

Ahead of the proposed full-scale operation of the plant, 32 power transformers will be required in Mandalay as part of the project. By last week, 28 were still required at a cost of about K 4 million each, the government official said. The Mandalay City Development Committee plans to buy 10 transformers soon, at a total cost of K40 million, he added. Aside from the convenience the project will afford, the state and private sector are also looking forward to the boost the new power station will give to the local economy. "Many private clinics, hotels and supermarkets use air conditioners round-the-clock and often have to spend about K80,000 a day on diesel (to power generators). When they get guaranteed electricity they will save money and this will make all of us happy," the official said.

Additional references

See above: '[Paunglaung](#) power plant Myanmar's first underground station' (MT: 14/03/05)

May Kyaw, Mizzima, 16/07/09. Revised and condensed.

<http://www.mizzima.com/news/inside-burma/2463-burma-buys-electricity-from-china-.html>

Electricity supplied from China [Shweli-1?] will be distributed in both Mandalay Industrial Zone and the Mandalay urban area, which are currently receiving inadequate power supply. Once connections are completed, the industrial zone, which is currently receiving five hours of power daily, will receive 10 hours. The Industrial Zone, where cars and vehicles are produced, has a demand for a minimum of 40 MW but suffers from a deficit of 20 MW. To meet its electricity needs, the IZ is preparing to set up its own electric generation and distribution network at a cost of Kyat 300 million [US\$ 300,000]. The Sein Pan industrial area has been divided into two districts. "The power supply to our area is from 7am to noon for the first half of the day and from noon to 5pm in the second half," said U Myint Swe, Chairman of the Industrial Zone. (Compiler's note: Although 'China' is referred to the probable source for improved power supply in Mandalay in this article, it is likely that it was the Shweli-1 power plant near the Yunnan border which was the real source. Shweli-1 came on-line in May 2009. MEPE signed a power purchase agreement with the consortium that operates the plant in Sept 2009. See '[Shweli-1 hydropower plant](#) officially inaugurated' (NLM: 17/05/09)]

Kyaw Ye Min, NLM, 20/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-20.pdf>

Up to 1988, Mandalay Division had only one large hydropower plant “Kinda”. After 1988, it has seen Hsedawgyi (25 megawatts) and Paunglaung (280 megawatts) hydro plants. Yeywa (790 megawatts), Upper Paunglaung (140 megawatts), and Nancho (40 megawatts) hydropower plants are under construction. On completion, they will be able to generate 970 megawatts. The electricity consumption of Mandalay Division was 183.59 million units in 1988, and now it has increased to 1058.613 million units. In order to distribute the electric power to the people, In Mandalay Division, electric power is distributed with the use of eight 230 KV grids, seven 132-KV grids, seven 230-KV main power stations, and two 132-KV main power stations, apart from Shweli-Mansan-Shwesaryan grid. In 1988, the number of households using electricity was 80,420 in Mandalay Division, and the number has increased to 311,696.

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BIOGAS POWER PLANTS SUPPLY ELECTRICITY TO RURAL AREAS

Kyaw Thu and Khin Hninn Phyu, Myanmar Times, 16/08/04.

Compiler's note: Issue 229 of the Myanmar Times is no longer available on-line.)

Biogas energy systems are playing an increasingly important role in supplying electricity to villages that are too remote to be connected to Myanmar's power grid, said an official from the Ministry of Science and Technology. “Myanmar is an agricultural country, and the abundance of cows means there is plenty of dung to use as fuel for biogas systems,” said Dr Mya Mya Oo, a professor and the head of the Dept of Technology Promotion and Coordination under the ministry.

Biogas is produced by fermenting manure in a special tank called a ‘digester’. The process generates a gaseous mixture of methane and carbon dioxide, which is then burned in a power plant and converted to electricity.

The ministry built its first biogas power plant in the village of Panan in Kyaukse township, Mandalay Division, at the end of 2002. There are now biogas plants in 16 villages in Mandalay and Sagaing divisions, and 14 more are under construction. “We plan to use biogas to provide electricity to 54 more villages,” said Dr Mya Mya Oo. “The project is aimed at villages that are far from cities and are difficult to supply with electricity using other methods,” she said. Most of the villages benefiting from the project are in central Myanmar, where the cow dung needed to run biogas generators is readily available.

The generation of enough methane for six hours of electricity requires 840 kilograms of dung, the amount produced by about 80 cows in a day, which is then mixed with water and put into a special tank (called a digester) to ferment and make the gas, Dr Mya Mya Oo said. The tanks – which are 17.2 feet wide and 13 feet high – cost K 2 million, but will last about 20 years, and the cost can generally be recovered within the first year of use, she said.

The biogas system can provide electricity for all the households, monasteries and streets in a village for two hours in the morning and four hours after dark. The lives of people in villages without electricity end when darkness falls, but with a power supply life goes on, said Dr Mya Mya Oo. “With electricity at night, children can read and people can carry on their work even after dark, so life becomes more active for them,” she said.

Another benefit of biogas power systems is that the dung left over in the tanks following fermentation can be used as a natural fertilizer, which can save farmers the cost of buying chemical fertilisers, she said. A village using the system can save K 2.3 million a year in fertiliser costs, and biogas burns cleanly and is renewable, so it helps protect the environment, Dr Mya Mya Oo said.

Website information:

<http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>

Information presented by the Energy Planning Dept of the Myanmar Ministry of Energy at the second subregional energy forum in Ho Chi Minh city on 22/11/08 indicates that the installed electrification capacity of renewable energy sources at the end of 2008 was as follows: Solar power: 0.1157 MW, Wind power: 0.5194 MW, Mini hydro power: 8.3530 MW, Bio-mass power: 18.1942 MW; Bio-gas power 1.5993 MW.

Additional references

- See above: 'PM calls for [bio-batteries](#) in every cyclone-hit household' (NLM: 07/04/09)
 'Use of [bio-diesel fuel](#) for rural electrification to get attention' (NLM: 28/09/08)
 '[Natchaung model village](#) well supplied with electric power' (NLM: 15/09/08)
 '[Homemade lighting system](#) for noodle vendor' (MT: 21/07/08)
 'Village rice husk power plant will serve as [research centre](#)' (MT: 24/09/07)
 'Plans for [7-million-dollar](#) rice husk power plant edge forward' (MT: 27/08/07)
 '[Rice-husk generators](#) slated for villages in Yangon division' (MT: 11/06/07)
 '[Inventor co-op](#) society exports first rice-husk generators' (MT: 21/08/06)
 '[Interest growing](#) in rice-husk generation' (MT: 10/07/06)
 'Paddy husk power plant tested to cut rice [milling costs](#)' (MT: 19/12/05)
- See below: 'Engineer touts [methane from landfills](#) to generate electricity' (MT: 09/08/04)
 'Biomass gasifier used for [tobacco curing](#) in Myingyan' (TERI: 08/04)
 '[Cogeneration potential](#) of Myanmar's production of sugarcane' (Appendix 17)
 'Case study of [MOST's village biogas electrification](#) project' (Appendix 18)
- See also the section on biogas energy in '[Electricity potential](#) of energy sources available in Myanmar'.

NLM, 10/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-10.pdf>

Prime Minister Thein Sein visits the Shan Yoma livestock breeding zone which is being set up in Tilawka village-tract in Nyaungshwe (Yawnghwe) township. During his visit he is briefed by Zone Head Dr Win Myint on the availability of water and electricity, among other things. Electric power will be supplied to the farms by utilizing biogas for generating purposes. Chickens, goats and cows will be raised on over 300 plots in the zone. Friesian dairy cows have been imported from Germany and the government's livestock department is providing assistance with crossbreeding and growing of imported grass for pasture.

NLM, 28/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-28.pdf>

Prime Minister Thein Sein together with other generals, SPDC officials, government ministers and deputy ministers and local officials visit the integrated farm of U Kya Mawt near Naungkok Village in Kengtung township where they inspect the generation of electricity from biogas, the biogas tank and the cattle farm. The PM tells officials to demonstrate the benefits of integrated farming and to provide assistance for wider implementation of the integrated farming in rural areas.

NLM, 25/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-25.pdf>

Gen Thein Sein and party visit Moeyaung village in Naunglay village-tract in Taunggyi township where they observe the generation of electricity using a bio-digester built with the technical assistance of the Applied Post-harvest Technology Branch-2 of Myanma Agricultural Produce Trading company. Commerce Minister Tin Naing Thein reports on the construction of the bio-digester and the supply of electricity to village households using the biogas-fired generator. Chairman of Naunglay VPDC Tint Lwin reports on the supply of cow dung and the consumption of electricity in the village. The Prime Minister urges the villagers to use the electricity produced by the bio-digester to improve their living standards and to grow vegetables with the use of the left-over liquid from the bio-digester. The bio-digester was constructed using locally-produced bamboo mats that were painted with liquid from rubber trees. It is equipped with four devices that can produce 70 cubic feet of biogas daily, and it can generate enough electricity to power a TV set, a video recorder and forty 2-foot-long florescent lamps for four hours.

NLM, 05/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-05.pdf>

Demonstration of the use of bio-gas to generate power in Yekhalar village of Thongwa township by the employees of Shwe Khaing Win Co Ltd of Bahan township in Yangon. They show how diesel- and petrol-powered engines can be operated with the use of bio-gas. A petrol-powered engine can generate two kW which can be used to supply power to a hundred and fifty 13-watt lamps. It takes about a week to construct a bio-gas tank on a 17x17 ft plot of land which can last for 20 to 30 years. The tank uses the droppings from cattle and decayed leaves to produce bio gas. The company will see to the construction of the gas tank until it can be used and will present a bio-gas-powered oven, rice cooker and lamp to those who install a tank.

Xinhua, 01/03/09. <http://www.hindu.com/thehindu/holnus/008200903020331.htm>

Bio-digesters, which produce energy from animal waste, have electrified over 2,000 houses in 12 villages of Bago and Ayeyawaddy divisions, according to the Industrial Producers Association. Application of the bio-digesters has become widespread since 2007. Use of the digesters in place of firewood, coal and other fuels can reduce energy costs and prevent environmental pollution and deforestation, experts say. Apart from small-scale digesters for individual homes, large bio-gas digesters can also be built to supply electric power to a whole village.

NLM, 17/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-17.pdf>

Minister for Industry-1 Aung Thaung checks on arrangements to store natural waste to generate power using bio-gas and engine rooms at Kyaukka village in Taungtha township in Mandalay division.

NLM, 16/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-16.pdf>

Triangle Region Commander Kyaw Phyto looks into cooking meals and [home] lighting with the use of gas from animal waste at the integrated farm of U Kya Mawt in Katpha village and at the house of U Sai San in Yinhla village of Kengtung township in Shan State East.

NLM, 14/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-14.pdf>

PM Thein Sein visits 3rd Mile Pakye Village in Nwalawoe Village-tract in Loikaw township. At the house of U Shar Yei, the PM looks into generating of electricity through biogas, cooking of meals and lighting of fifteen 2-foot fluorescent lamps. Afterwards, he instructs officials to organize local people to use biogas at all the houses so that they can use bio-energy resulting from animal waste in cooking meals and in using bio-solution as a natural fertilizer. Officials are to provide the necessary technology to the local people.

NLM, 30/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-30.pdf>

Seventy-five bio-digesters shipped by the Food and Agriculture Organization (FAO) were delivered to Rakhine state on 17 January. The bio-digesters will be provided to Maungtaw Township with 35 kits, Buthidaung Township with 25 kits and Rathedaung Township with 15 kits. The digesters, which are fed with animal waste, produce bio-energy that can be used in cooking food as well as in generating electric power. The bio-digesters are useful in conserving other forms of fuel and reducing costs. [A photo showing several of the bio-digesters lying on a jetty ready for shipment is included in the print edition of NLM.]

Perspectives, NLM, 23/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-23.pdf>

The generation of electric power from biogas has proved successful in rural areas where 70pc of the population of Myanmar make their living from agriculture and livestock farming. Biogas can be extracted from animal waste. Gases that are extracted from animal dung are methane, carbon dioxide, nitric oxide, ammonia and carbon monoxide and they can be [used to generate] electric power. Now, innovation has been carried out to build biogas digesters to supply of electric power in rural areas. Farmers can use biogas to generate electric power, and as a substitute for firewood. In the process, byproducts can be used as organic fertilizer. Apart from small-scale biogas digesters for houses, large biogas digesters can be built to supply electric power to a whole village. Biogas can be produced from animal wastes such as cow dung, pig dung, chicken and goat droppings. The dung of five to seven cattle, or pigs, buffalos and goats is enough to produce electricity through biogas for a household. If biogas is extracted from animal wastes extensively, rural areas can get sufficient electricity and many other benefits at low costs. Therefore, rural residents should use biogas on a wider scale for multipurpose benefits.

NLM, 22/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-22.pdf>

Forestry Minister Thein Aung visited Kontha village in Loikaw township, Kayah state, where he viewed a demonstration of the use of a natural waste bio-digester. The bio-digester occupies a space about 10 square feet in the ground. Lunch and dinner can be cooked for a family of five and three bulbs can be lit for about four hours at night using the waste from a single cow. Measures are being taken for supply of electricity to the rural areas using bio-gas from animal waste. [A picture of the bio-gas digester tank is included in the print edition of NLM.]

NLM, 08/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-08.pdf>

A bio-fuel electric power station was opened in Yagyi village, Kani township, Sagaing division, on 06/01/09. Sports Minister Aye Myint also opened a signboard saying 'Our village gets electricity'. The 15-kVA power station was built at a cost of 9.7 million kyats contributed by local people and wellwishers including Deputy Chief Justice Thein Soe. The generated power is enough for 235 houses and lamp posts.

NLM, 27/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-27.pdf>

Nay Pyi Taw Commander Wai Lwin inspects bio-gas tanks set up on a manageable scale at farmer U Choe Tae's home in Khitaye village and farmer U Mya Maung's home in Otshitkon village and gives necessary instructions after hearing the reports of the officials concerned.

NLM, 11/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-11.pdf>

Lt-Gen Myint Swe of the MoD inspected the integrated farm of the command in Mingaladon township where the the farm in-charge reported on the breeding of layers and the use of electricity supplied by the bio-gas fired generator at the farm. During his tour the general checked into the process of extraction of bio-gas from chicken dung and power supply from the bio-gas fired generator. Afterwards, he went to Ngasudaung Village in Hlegu township where he checked into the extraction of bio-gas from dung on a pig farm there.

NLM, 25/11/08. <http://www.burmalibrary.org/docs6/NLM2008-11-25.pdf>

Yangon Commander Win Myint observes cooking and lighting at peasant U Mya Kyaing's house in Hnawgon village, Hmawby township. The [gas used as fuel in the process] is produced by a bio-gas digester supplied by TAS Co. Ltd and is sufficient to light a 60-watt bio-gas used bulb. The commander calls for extended use of the bio-gas digesters. "It is learnt that Yangon Division PDC will provide multi-use bio-gas digesters to each and every village in Yangon division." [A full-view photo of a digester available from TAS is included in the print edition of NLM. TAS advertises itself as trading company in the business of exporting agricultural products and importing insecticides and small machinery used in the farming business. <http://www.made-in-china.com/traderoom/tascoltd> http://www.bizearch.com/company/TAS_Co_Ltd_298332.htm An article in the Yangon Times (01/12/05) noted that the company planned to promote the use of small-scale bio-fuel "casing" [digesters?] that could produce enough fuel for cooking and lighting in rural households. <http://burmalibrary.org/docs3/Yangon-Times2005.html>]

Maung Maung Htwe and Nyi Nyi Tun, NLM: 20/11/08

<http://www.burmalibrary.org/docs5/NLM2008-11-20.pdf>

[The excerpt below is from a feature article originally published in Burmese in Myanma Alin on 19/11/08. The article describes in some detail the use of biogas digesters as a source of the gas used for cooking and lighting purposes in an individual home and in a communal setting in two villages near the administrative capital of Nay Pyi Taw. Several photos show the bio-digesters and there is one of the village power plant in Shwepay Village in Pyinmana township. Photos and further details are also available at <http://www.mrtv3.net.mm/open5/201108for.html>]

U Win Shwe, a village elder, in Shwepay village said, "Our village got a bio-fuel digester on 10 February 2005. And we [started to] run it on 23 May 2005. At that time, villagers found it difficult to believe it. But, when the lamps were lit in the evening, they shouted out of joy. Now we cannot stay without electricity." Chairman Myint Soe of Kyunyaung VPDC, in which Shwepay is located, said the Bio-gas Research Technological Institute of Kyaukse had set up the bio-gas power plant with the assistance of the government; that they used 243 fluorescent lamps, including video lounges and televisions; that 550 viss of cow dung was used a day to generate electric power; that the village had 225 cattle and the total cattle dung was more than enough. They said that the natural waste liquid was distributed to the farmers to put in 450 acres of paddy and 475 acres of other crops.

NLM, 11/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-11.pdf>

The bio-gas research team of the Technological University (Kyaukse) gave a demonstration of building bio-gas digesters and their usefulness at an agricultural farm near Webyan Village in Tatkon township. Daw Soe Soe Ohn of the Bio-gas Research Dept at the university explained the process involved in building bio-gas digesters and their usefulness for the local people. Commander Wai Lwin of Nay Pyi Taw said the gas produced by the digesters can be used to generate electricity and as a firewood-substitute in cooking. The what is left over can be used as fertilizer. He urged the local people to build and use bio-gas digesters. After

Daw Soe Soe Ohn replied to the queries raised by the people, a demonstration of the use of the gas in lighting bulbs and fluorescent tubes and in cooking and the operation of engines took place. Bio-gas digesters will be built in 10 villages in Pyinmana district.

NLM, 27/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-27.pdf>

Prime Minister Thein Sein examines a bio-gas digester on display in the briefing hall of the Myanmar pharmaceutical factory in Yangon. The display includes a demonstration of cooking rice, boiling water and lighting storm-lanterns with the use of bio-fuel produced by the digester. The PM believes bio-gas digesters should be built in every village to convince households that they can cook and have light storm-lanterns using bio-fuel derived from the animal waste of five or six heads of cattle. Whatever remains after the bio-gas has been produced could serve as fertilizer or feedstuff for pigs and fish. About 20 pounds of the waste produced by four or five head of cattle, five pigs or 15 goats would be enough to run a bio-fuel digester and would be sufficient for cooking, water boiling and the lighting of two 40 watt bulbs per night. [Photos of the bio-digester and the cooking demonstration are included in the print edition of NLM.]

NLM, 06/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-06.pdf>

At the briefing hall of the bio gas-fired power station in Tasoe village of Kyaukse township, Prime Minister Thein Sein is briefed on on the production of bio-gas and bio-fertilizer by Deputy Minister for Science and Technology Kyaw Soe and on the operation of a bio-gas tank by Dr Soe Soe Ohn of the Chemical Engineering Dept of Kyaukse Technological University, while while Dr San San Yu of the same university speaks about the remarkable qualities of Shweziwa bio-fertilizer and the germs that produce bio-gas. The PM instructs officials to build gas tanks for families as samples and to conduct multiplier courses that will help families to build their own tanks. Six to ten cattle will produce sufficient bio gas for a storm-lantern and a stove. Afterwards, he inspects Shweziwa bio-fertilizer and raw materials and the ignition of a storm-lantern and a rice cooker using bio gas produced by the bio gas-fired power plant in Tasoe.

NLM, 30/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070330.htm>

The central fish farm of Yangon Command in Mingaladon township is breeding 1.2 million fish in fish ponds covering 68 acres, selling fresh water fry shrimps, raising 3,200 layer hens, breeding over 180 pigs and over 80 milch cows. Col Thaung Win of the Yangon Division Renewable Energy Research and Development Work Cte reports on generating electricity using bio-gas produced from animal waste and on arrangements for the use of the electricity as a wood-substitute fuel.

NLM, 26/04/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nml/n060426.htm>

On 22 April, Maj-Gen Tha Aye and Sports Minister Aye Myint attended a ceremony to open a bio-gas-run power station in Winmana village in Kani township in Sagaing division. Deputy Chief Justice U Thein Soe and family donated K5 million and the public provided K0.65 million to erect the 15-kilowatt station. It is supplying power for 200 two-foot fluorescent lamps, two television sets and two video houses in the village. At Tapon village, they launched another biogas-fired power station that was financed by the deputy Chief Justice and family at a cost of K 5 million.

NLM, 09/10/05. <http://burmalibrary.org/docs2/NLM2005-10-09.pdf>

Panan [model] village is located four miles from the Kyaukse-Myittha short-cut road in Kyaukse township. The village is set up on 17 acres. Over 1,700 people of 282 households reside in the village which has 886 acres under cultivation. Ten TV sets and two video houses provide entertainment for the villagers. The village is supplied with power through a bio-gas power station that is operated with with a 10-kv generator. At present, the station supplies power to 156 fluorescent lights in houses, 35 street lamps, 15 electric lights in the school and 20 at the pagoda, for a total of 226. [A photo of officials examining what appears to be an opening in the bio-gas digester tank at the village power station accompanies the article in the print edition of NLM. See the key article above.]

NLM, 28/09/05. <http://burmalibrary.org/docs2/NLM2005-09-28.pdf>

A ceremony was held to launch a biogas power station at Ywathit village in Patheingyi township. U Soe Maung on behalf of villagers said that the village has 210 houses, 224 households and 1161 villagers. The 4-million-kyat bio-gas station can run a 28-hp generator which is a diesel engine converted into a gas-fired engine. It is supplying power to 203 two-foot florescent lamps, three video houses and 20 televisions for six

hours every night. The long-lasting wish of the villagers has been fulfilled. Arrangements are under way to set up bio-gas power stations in other villages. [A photo of the building where the generator is located is included in the print edition of NLM.]

NLM, 22/02/05. <http://burmalibrary.org/docs2/NLM2005-02-22.pdf>

A bio-gas electric power plant was inaugurated at Myaingtha village, 12 miles northeast of Thazi in Meiktila district on 18 February. U Aung Myaing, chairman of the electricity supply committee, reported on measures taken to arrange for the supply of electric power and U Kyi Tin, organizer of the Myaingtha VPDC, expressed thanks. The power plant was built at a cost of 3.8 million. Similarly, a ceremony to open another bio-gas electric power plant was held at Phayangahsu model village in Thazi township. On behalf of the villagers, U Mye expressed thanks. The power plant was built at a cost of 4.8 million.

NLM, 11/01/05. <http://burmalibrary.org/docs2/NLM2005-01-11.pdf>

A bio-gas power plant has been launched by local authorities in Ma-le Nattaung village in Singu township. The 15-kVA plant generator will be able to provide power for 200 two-foot florescent lamps, 40 road lamps, five florescent lamps at the village pagoda and five TVs for four hours in the evening.

NLM, 20/12/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n041220.htm>

On 17 December, a ceremony was held to inaugurate a bio-gas power plant in Thongwa model village in DaikU township. The plant can generate 50 kilowatts of electricity. It would need 480 gals of diesel per month worth over K 950,000 to generate the same amount of electricity that can produced with an expenditure of K 50,000 for paddy husks. Thus the village is able to save over K 900,000 a month by using the paddy-husk gas system.

NLM, 11/11/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n041111.htm>

Co-operatives Minister Zaw Min visits the Pyinmabin pedigree pig farm in Mingaladon township where he checks on a project of the Cottage Industries Dept (CID) to test the generation electricity through the use of bio-gas. Technicians of the CID are working together with Japanese colleagues on the project. Methane gas produced by pig excrement is being used to fuel a 24-kW engine and a 20-kW dynamo. The electricity produced can light 400 four-foot fluorescent lamps. The residue of the excrement can be used as good fertilizer in crop cultivation.

Editorial, WPD, 10/01/88. <http://www.ibiblio.org/obl/docs3/BPS88-01.pdf>

The first of 15 bio-gas tanks has been inaugurated in Danubyu township. Over 110 are already in use in Irrawaddy division. "Extensive use of bio-gas will contribute much towards improving the social and economic standing of the people in the countryside."

PUMP PROJECT TO IRRIGATE SEMI-ARID FARMLANDS

May Thandar Win, Myanmar Times, 09/08/04.

(Compiler's note: Issue 228 of the Myanmar Times is no longer available on-line.)

The Ministry of Agriculture and Irrigation expects to complete construction of what will be Myanmar's biggest electrical pump irrigation project later this month, said a government official. The project will supply water to 11,000 acres of cultivated land near Lawka-nanda Pagoda in Bagan, Mandalay Division. "The project will be a cornerstone of efforts to transform land in semi-arid regions in the middle of Myanmar into paddy land," said U Tin Htut Oo, the director-general of the Department of Agricultural Planning under the ministry.

Construction on the Lawkananda project, which includes seven pumping stations, was started by the ministry in 2001 and is expected to cost about US\$2 million, once completed. "It has been built with the ministry's own money, but the pumps and electrical appliances have been imported from China," said U Tin Htut Oo.

Because the average annual rainfall in Bagan is only 24 inches, most farmers in the area grow crops that do not require much water, such as sesame, peanuts, and other tropical beans and peas. Although paddy can be cultivated in the region during years of exceptionally high rainfall, under normal conditions local paddy

farmers would face a rice deficit. "The irrigation project will help solve the rice deficit problem in the Bagan area," said U Tin Htut Oo, adding that it will make water available not only for monsoon paddy but also for summer paddy.

The pump system will bring water from the nearby Ayeyarwaddy River, which is a less expensive way to irrigate land than building a dam, he said. The Lawkananda pump irrigation project is the second to be built in Mandalay Division. The first, the Ngathayauk system, irrigates 8,700 acres. "Including the Lawkananda project, there are now six pump irrigation systems in Myanmar that irrigate a total of 79,000 acres of land," said U Tin Htut Oo. An additional 16 projects are currently under construction, which will irrigate a further 152,000 acres once completed. [A photo of the Lawkananda project site accompanies the article.]

<http://www.hipponet.nl/>

The HIPPO foundation was created in 1997 to promote the availability of affordable high-efficiency irrigation pumps. The emphasis is on the low-lift pumping conditions typical of small-scale irrigation along major Sahelian rivers, such as the Niger in Mali, West Africa.

Additional references:

See above: 'Paddy [husk-fired engine used to irrigate](#) crops in Balar region' (NLM: 08/01/09)

Tin Htwe, NLM, 29/09/08. <http://myanmargeneva.org/NLM2008/eng/9Sep/n080929.pdf>

A photo of a 66/11-kV, 10000-KVA transformer installed at the Lawkananda pump project accompanies this article. The transformer was entirely produced at the factory of Yangon Transformer & Electrical Company in the Shwepyitha industrial park in Yangon.

NLM, 26/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080826.htm>

Maj-Gen Ohn Myint of the MoD visits the Lawkananda river water pump project where he is briefed on the supply of irrigation water using electric power. There are four other river water pump projects in NyaungU district which can irrigate 29,700 acres of land.

NLM, 10/08/06. <http://burmalibrary.org/docs2/NLM2006-08-10.pdf>

A&IM Htay Oo and FAO Myanmar Representative Tang Zhengping visit the Lawkananda pumping project where it is reported that water is being supplied to 5,293 acres of farmland through canals.

NLM, 21/12/04. <http://burmalibrary.org/docs2/NLM2004-12-21.pdf>

At the Lawkananda river water pumping project, Gen Than Shwe is briefed on the project and on the current of the Ayeyawady river by A&IM Htay Oo. D-G of the WRUD Win Shwe explains the seven stages of the project, completion of the main canal and 12 tributary canals, and installation of 42 pumps, and D-G Chit Khin of the Directorate of Water Resources and Improvement of River Systems speaks reports on changes in the current off the river. Lt-Gen Ye Myint and Minister for Electric Power Maj-Gen Tin Htut briefed the Senior General and party on power supply for the river water pumping projects.

NLM, 05/12/04. <http://www.burmalibrary.org/docs/NLM2004-12-05.pdf>

Lt-Gen Ye Myint of the MoD inspects pumping of river water and the control units at various pumping stations of the Lawkananda project. Construction of the 30,500 feet main canal has been finished. Laying of bricks for 12 smaller canals stretching 157,000 feet is proceeding and 42 pumps have been installed at seven pumping stations. On completion, the project will benefit 11,000 acres of cultivable lands. A total of 500 acres of monsoon paddy and 150 acres of summer paddy were grown in 2003-2004.

Xinhua, 05/02/02. <http://www.encyclopedia.com/doc/1P1-50011034.html>

Under an agreement signed in Yangon by the China National Machinery and Equipment (I&E) Corp International Engineering Co Ltd and the Water Resources Utilization Dept (WRUD) of the Myanmar A&IM, China will supply 228 units of centrifugal water pumps for pump irrigation projects of the Ministry. The projects are designed to expand the country's irrigated area and raise paddy production. In Myanmar, 1.92 million hectares -- 18.96pc of the total -- is cultivated by irrigation. Up to now, the country has 253 river-supplied pumping stations.

Website Information on CMEC

<http://www.alibaba.com/company/10229230.html>

Established in 1978, China National Machinery & Equipment Import & Export Corp (CMEC) deals principally in contracting international engineering projects, exporting complete plants and equipment, importing and exporting mechanical and electrical products and engaging in external economic and technical cooperation. Its turnover in 2004 reached US\$1.7 billion.

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ENGINEER TOUTS [METHANE FROM LANDFILLS](#) TO GENERATE ELECTRICITY

Khin Hninn Phyu, Myanmar Times, 09/08/04.

(Compiler's note: Issue 228 of the Myanmar Times is no longer available on-line.)

A Myanmar electrical engineer is promoting the use of landfill to generate energy and reduce pollution. U Win Kyi, who has recently returned from two years in Thailand, says that using landfill waste to generate energy will reduce air pollution and poisonous liquids produced in open dumps. He said that the rubbish in landfill areas could be used to produce methane. The gas can be used to operate modified diesel engines, which in turn create electricity. Using five acres of landfill, the system will generate 500 kilowatts of electricity. Each landfill project takes a year to implement.

U Win Kyi says there are some initial drawbacks. "The surrounding areas suffer from bad smells at the rubbish collection stage, while it is being treated with liquid chemicals, but after that the landfill is sealed to produce electricity 24-hour a day for the next three years," he said. He said that after three years, much of the waste left in the landfill area could be used as fertiliser. The cycle then starts again with the collection of new waste.

U Win Kyi was working in Thailand for the Daven Co., Ltd., which has developed technology for using landfill as an energy source. Before he returned to Myanmar, U Win Kyi was developing more efficient design systems for landfill areas in Thailand. He worked on several landfill projects, including a site near Bangkok where 15 acres of land was treated to generate electricity.

U Win Kyi said he had come back to Myanmar to contribute the technology. However, he is facing difficulties in implementing the landfill system because it requires extensive land and a huge amount of waste to fill it. "To implement the system we need cooperation with Yangon City Development Committee which could provide a large dumping area and we need a funding agency," he said.

Additional references:

See above: ['Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)

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BIOMASS GASIFIER USED FOR [TOBACCO CURING](#) IN MYINGYAN

Sunil Dhingra, *Use of Biomass Gassifier for Thermal Application in Myanmar*. (New Delhi: The Energy and Resources Institute: August 2004)

<http://www.resourcesaver.com/file/toolmanager/CustomO105C399F74445.pdf>

Tobacco curing is a traditional industry practiced for a long time in Myingyan township in the central part of Myanmar. It is a good income generating business. Tobacco plantations are traditionally established on sediment and alluvial islands in and along the banks in Ayeyarwadi River. These temporary islands are formed after the rainy season and planting time is generally from October to January. Around Chin-byitkyin and Kokke villages, tobacco plantations are already in existence and hence it was decided to set up the biomass gasifier based on the tobacco-curing plant in the region.

Before attempting the design of the gasifier and associated components, a study was undertaken to assess the potential of different energy resources available and their suitability for gasification. Four agro residues, namely pigeon bean, cotton, sesame and maize stalks, are available in the region. Of the four, the pigeon bean stalk was found to be the most suitable for gasification purpose. A sample of the bean stalk was collected for chemical analysis. It was found that a surplus of more than 1,250 tonnes of pigeon bean stalk per annum is available in the village.

TERI team conducted a survey of the existing tobacco curing barns to assess fuel consumption and other process parameters in April 2003. The study revealed that there are more than 108 tobacco barns in operation in Myingyan township. Tobacco leaves have to be cured within 70 hours after picking. The curing season is usually from February to May. Within a season, each unit cures five times. In the year 2000-2001, tobacco green leaf production was about 5 million kg while cured leaf production was about 1 million kg. In a plant, about 4100 kg of green tobacco leaf is used for each processing. The curing system uses hot air passing through pipes. Fuel wood consumption for a batch is about 7.5 -10 tons.

Based on the energy balance of the existing process, TERI team designed a gasifier system suitable for tobacco barn which burned fuel-wood. A down draft gasifier system of 50,000 kCal/h was fabricated and installed at Myingyan in January 2004. Comparative tests were conducted to assess its performance against that of a traditional system. The gasifier-based system reduced fuel consumption by more than 75pc. Time and productivity of the end produce also improved due to better burning.

Through this project, the gasifier technology was successfully introduced in Myingyan district for tobacco curing application. The biomass fuel for the gasifier is mainly local agricultural stalks abundant in the area. The technology is expected to extend to water pumping and rural electrification purposes. A three-day workshop was organised at the project site in August 2004 by TERI and the Myanmar Energy Ministry to share the project experience among member-countries and exchange information on gasifier applications and technologies in the BIMST-EC region.

In Myanmar, the use of gasifier technology could be further extended to community cooking and to the sericulture industry and other small rural industries. In future, the biomass gasifier technology could also be used to provide electricity in remote rural areas.

[Compiler's Note: Consult the article for complete information, technical details, diagrams and photos.]

Additional references

See the listings under '[Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)

Xinhua, 25/07/07. <http://www.indiaenews.com/asia/20070725/62355.htm>

An India-built biogas plant in Myanmar has been completed and will be commissioned soon to electrify a village in northern Mandalay division, according to a Yangon Times report. The Pesinngone plant in Myingyan, built by India's Tele Corp, is a co-operation project of the sub-regional socio-economic group, BIMSTEC. 200 households in Kokke village will soon be electrified by the gas generated by the plant.

NLM, 18/08/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040818.htm>

Under BIMSTEC energy co-operation programme, a workshop to share experiences and to demonstrate the use of a biomass gasifier system for SMLs was held in NyaungU. Representatives from India, Sri Lanka, Myanmar and Thailand studied the functions of a biogasifier which was built in March 2004 in Kokke Village, Myingyan township. They also discussed the use of gas produced from biogas wastes in generating electricity, river-water pump projects and the development of biogasifier technology and energy co-operation among the BIMSTEC countries.

NLM, 18/03/04. <http://www.ibiblio.org/obl/docs/NLM2004-03-18.pdf>

Under joint sponsorship of the Myanmar Forest Dept and the Energy and Resources Institute of India (TERI) a pilot SMI industry run on bio-gas was opened at Kokke village in Myingyan district on 3 March.

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PRIVATE SECTOR PROMOTING INTEREST IN RENEWABLE ENERGY

Khin Hninn Phyu, Myanmar Times, 12/07/04.

(Compiler's Note: Issue 224 of the Myanmar Times is no longer available on-line.

The private sector is playing an important role in efforts to promote the use in Myanmar of renewable energy sources, an issue highlighted at an ASEAN conference in Manila last month. Encouraging the wider use of indigenous and renewable energy sources was among the commitments made by energy ministers from ASEAN and its dialogue partners, China, Japan and South Korea at the June 9 conference. It was held to discuss ways of securing energy supplies in the region to minimise the impact on its economies of any volatile changes in the price of fossil-based fuels, such as oil and gas.

In Myanmar, technologies based on the sun, wind, water and even farm-waste are being developed and marketed by entrepreneurs whose interest in renewable energy is motivated partly by a concern for the environment. "If we don't use renewable resources instead of conventional energy sources, the environment will be affected," said U Kyaw Soe Win, who makes mini-hydro systems at the Ayethaya industrial zone at Taunggyi. "I became interested in this technology because it can be used efficiently for the benefit of the people and the environment," said U Kyaw Soe Win, whose company designs and makes mini-hydro systems capable of generating from five to 50 kilowatts. Apart from being sustainable, he said the advantages of hydro-power systems include lower maintenance and operational costs than those using fossil fuels.

Science Magazine publisher and well-known science writer, Theikpan Hmutin, says Myanmar has huge potential for developing hydro-power. "Hydro power is the most promising renewable energy source in Myanmar," he said, adding that a major concern about fossil fuels was the pollution they caused, which was contributing to global warming.

Apart from hydro-power, Theikpan Hmutin says there are also excellent prospects in Myanmar for harnessing the power of the sun to generate power. He said that while solar systems were durable and easy to maintain, many prospective users were put off by their high cost. Solar power is one of three energy sources being used in south-east Asia's first hybrid power system at the popular beach resort town of Chaungtha in Ayeyerwaddy division. The system, developed since 2000 in cooperation with the DHP and the Tokyo-based New Energy and Industrial Technology Development Organisation, also uses wind power and diesel generators.

Inventors are also developing bio-mass energy technology which uses agricultural waste as fuel. The technology offers a cheap power source, especially for farming communities, because huge amounts of the waste are available. They include abundant supplies of rice husks, said Theikpan Hmutin. The founder of the Myanmar Inventors' Cooperative Ltd, U Soe Tint Aung, says bio-mass systems – which produce power from gas created by the waste – provide a cheap alternative to diesel generators. U Soe Tint Aung says modifications carried out since 1995 to a bio-mass converter he developed have made it more efficient and easier to operate. The latest model consumes fewer rice husks to produce the same amount of energy as earlier versions and the gas it creates is not as offensive. "The cost of running a rice mill for a year using a diesel generator is nearly the same as that of an [entire] gas plant," U Soe Tint Aung said. "It can recover the cost of the capital outlay within a year."

Advocates of non-renewable energy say awareness needs to grow before the market for the technology will expand. "We should cooperate with the concerned government depts, participate in exhibitions and demonstrate these technologies to widen public knowledge of their benefits," said U Soe Tint Aung. An NGO, the Renewable Energy Association Myanmar (REAM), is one of the groups working to create greater awareness of the technology through activities involving the government, the private sector and other NGOs. REAM says the renewable energy can make an important contribution to raising standards in rural areas and in efforts to achieve sustainable development. "We can't achieve sustainable development without these technologies," a REAM spokesperson said.

Additional references

See above: 'Call for [energy co-operation](#)' (MT: 13/02/06)

See below: 'Rural areas encouraged to make [greater use of renewable](#) energy' (MT: 05/01/04)

HYDRO POWER PROJECTS [NEARING COMPLETION](#)

Myanmar Times, 28/06/04.

(Compiler's Note: Issue 222 of the Myanmar Times is no longer available on-line.)

Two hydro power projects in central Myanmar are expected to be completed in July at a cost of about K23 billion, an official from the ID said last week. The department's director general, U Kyaw San Win, said the Paunglaung dam in Mandalay division and the Mon dam in Magwe division would have a combined capacity of 355 megawatts. The Paunglaung dam has four turbines each capable of generating 70 MW and three 25 MW turbines have been installed at the Mon dam.

A senior official from MEPE said it was unlikely that all seven turbines would go into operation immediately. U Kyaw San Win said electricity from the Paunglaung dam would be fed into the national grid through a relay station at Pynmana. Power from the Mon project will be linked to the Chauk power station in Magwe division. MEPE has been providing about 560 MW nationally, according to an official from the power company.

U Kyaw San Win said work on the Mone dam began in 1995 and the Paunglaung project started three years later. He said work had begun last year on the Kyeohn Kyeewa dam in Magwe division, which was due to begin generating power by the monsoon season in 2006. Construction would begin later this year on another five dam projects. Three of the dams will be for irrigation and the rest for generating electricity.

"We have been inviting tenders for technical and financial assistance for the new projects," said U Kyaw San Win. "Before we build a dam, we have to make extensive cost-benefit surveys; normally we recover costs more quickly from using a dam for irrigation than for generating power." He said using dams for irrigation produced more benefits than generating electricity. "Senior officials have instructed that the six projects are to be implemented as quickly as possible without placing much emphasis on benefit," U Kyaw San Win said.

Additional references

See above: 'National [hydropower project schedule updated](#)' (MT: 21/07/08)

'Completion of hydropower plants assigned [highest priority](#)' (MT: 12/02/07)

'Government will [prioritize hydropower](#) projects over gas' (MT: 10/07/06)

See below: 'Generation facilities scheduled for [commissioning in 2002-2004](#)' (MT 07/01/02)

'More inputs needed to power a [hydro future](#)' (MT: 04/06/01)

ELECTRONICS INDUSTRY [SPREADING ROOTS IN INDUSTRIAL SECTOR](#)

NLM, 06/06/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040606.htm>

A meeting of the Electronic Products Industries Supervisory Cte was held in conjunction with the Electronic Products Exhibition in Yangon. Among those in attendance were SPDC Secretary No 1 Soe Win and Minister for Science and Technology U Thaung as well as ministers, deputy ministers and senior military officers, officials of the SPDC Office, heads of departments, officials of the UMFCCI, and officials of organizations and electronic companies and guests.

Lt-Gen Soe Win, chairman of the committee, spoke of the importance of the electronics industry to the industrial sector and of efforts to keep abreast of other nations. Encouragement is to be given in Myanmar to

low level programming in the development of electronic industries. Myanmar produces electronic apparatus through three processes: those it develops through its own design system, the assembling of imported parts and the CMP system. The productive sector has not improved as much as it should due to various reasons. However, there are around 250 services, shops or training centres in the electronic sector in Yangon.

Only when the country is able to manufacture modern electronic products, will it be able to reduce its reliance on foreign countries, produce more import-substitute items and penetrate foreign markets. Discussions held prior to the committee meeting have shown the benefit of more contacts between State and private electronic entrepreneurs to exchange views, experiences and technical know-how. By bringing together electronic entrepreneurs from across the nation, a start has been made in the formation of an electronic association that will give a lift to the development of electronic industries and the manufacture of electronic products of an international standard. Private electronic entrepreneurs are urged to work together in producing quality products; to promote the CMP sector which will serve to producing skilled workers; to set up joint ventures that could obtaining technical know-how from abroad; and to undertake research works that would enable them to develop their own technical know-how.

CPT Minister Thein Zaw briefed the Committee on research and development tasks to be carried out by electronic companies and assistance to be provided in accord with the laws and disciplines. Minister U Thaung reported on turning out of technicians from universities, colleges and institutes under the Ministry of Science and Technology and assistance available to entrepreneurs.

Afterwards, U Myat Thin Aung of AA Electronics reported on electronic industrial development, U Kyaw Min of Earth Industrial on productivity systems and quality control, U Soe Myint of General Service Engineering on services for electronic control and automation systems, U Myint Zaw of T & D Co on electronic research and development, U Myint Zaw of Mectronics on the indigenous electronic industry, U Zaw Win of Fisca on promotion of an electronic park in Myanmar and other entrepreneurs on establishing an electronic entrepreneurs association. Minister Thein Zaw and Deputy Minister for Science and Technology Chan Nyein also reported.

Booths with electronic apparatus on display at the exhibition included those of Queen Star Computer Centre, MMTEI, Hong Pang Group, Earth Industrial (Myanmar), AA Electronics, Master Power, Nibban Electric & Electronics, Linyama Electronic Gates, Electronics Sale & Service, Mectronic General Electrical Products, Trust & Development Co Ltd, Texcel U Pe Thein Electrical & Electronic, Toe Electric, Myanmar World Distribution, Fisca, PQ Electrical Engineering and the Directorate of Signals.

Additional references

See above: [Homegrown software](#) industry struggles on (MT: 12/03/07)
 'Collaborate on contracts, [ICT sector](#) urged' (MT: 12/12/05)
 See below: [Software growth](#) badly in need of human touch' (MT: 16/10/00)

[HYDRO-POWERING THE REGIME](#)

Yuki Akimoto, Irrawaddy Magazine, June 2004. www.irrawaddy.org/article.php?art_id=3757

See [Appendix 8](#)

[THE ECONOMIC CASE AGAINST BIG DAMS](#)

Editorial, Irrawaddy Magazine, June 2004. www.irrawaddy.org/article.php?art_id=3769

Even disregarding the social and environmental problems caused by big dams, they tend to be a net-liability in economic terms—especially in developing countries. In 1998 the World Bank and the World Conservation Union (a Paris-based multilateral environmental agency) set up the World Commission on Dams, or WCD.

One of its tasks was to assess the effectiveness of large dams. The US \$10 million study reviewed 125 dams in 56 countries and made in-depth case studies of eight large dams on five continents. The commission's report, released in November 2000, *Dams and Development: A New Framework for Decision-making*, made for sobering reading.

Dams, have on average, generated less power, irrigated less land and provided less water than forecast, and in some cases have increased the risk and severity of flooding (there is also evidence that mega-dams located on or near fault lines may increase the risk and severity of earthquakes — the huge weight of water seems to make tectonic plates less stable). Fifty five percent of projects with a hydro-power component generated less electricity than forecast. A quarter of the 28 dams that exceeded targets did so only because installed capacity was increased, which required a larger investment (irrigation and water supply dams performed even worse). "Large dams have demonstrated a marked tendency towards schedule delays and significant cost overruns", the WCD report stated. On average, the cost overrun of the 81 large dams reviewed by the commission was 56 percent. Half the dams in the sample also had construction delays of a year or more.

Evaluating the economic returns of dams was problematic, but the WCD was able to analyze the results of 20 hydro-power projects carried out by the World Bank, Asian Development Bank, or ADB, and African Development Bank. Of the 20, nine had Economic Internal Rates of Return, or EIRRs, of less than 10pc (infrastructure projects in developing countries are normally considered successful if their EIRRs exceed 10pc). The report estimated that 0.5 - 1 percent of world reservoir volume is lost to sedimentation annually. Silting tends to be a much worse problem in tropical climates than in temperate zones.

But how, one might ask, are developing countries to get cheap electricity?

Smaller and mid-sized hydro is less subject to cost overrun and construction delays, performs better and causes fewer environmental and social problems than big dams. Natural gas-fired generation is cheap and fairly clean. Within a few years "clean coal"- burning power stations should be economically viable. With new, increasingly affordable technology, the world — particularly the developing world — is going to witness a paradigm shift in the way electricity is generated and distributed.

Wind power in good locations is now comparable in price to conventional generation techniques. The price of photovoltaics (solar power), although still too expensive to be economically viable, has dropped by 80pc over the last two decades and within a few years should be competitive, especially now that fuel-cell technology is increasingly affordable.

A number of farsighted, progressive companies, such as Ballard Power Systems of Canada, Siemens of Germany and Capstone Turbine of the US are making cheap micro-turbines of from 1kW to 10MW. Meanwhile, Swiss-Swedish firm ABB is working on developing "microgrids" that will electronically link together dozens of micro-power units, so doing away with the need for a National Grid.

Countries with poor electricity infrastructures such as Burma and Laos could benefit immensely from the technology leap, in the same manner that wireless telephony can benefit developing countries with farsighted leaderships. Unfortunately, as Burma proved with mobile phones, the problem isn't the technology — it's the leadership!

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HYDROPOWER PLANNED FOR [BORDER INDUSTRIAL ZONES](#)

Thet Hlaing, Myanmar Times, 31/05/04

(Compiler's note: Issue 218 of the Myanmar Times is no longer available on-line.)

Myanmar and Thailand have begun discussions on a project to establish industrial zones as part of an economic co-operation strategy agreed at a four-nation summit in Bagan in November 2003. Deputy D-G L Zaw Shan of the Directorate of Industrial Supervision and Inspection of the Ministry of Industry No 1 told the Myanmar Times that work on developing the three zones would begin soon and take up to two years. One of

the zones would be developed in a 950 acre area around the Kayin State border town of Myawaddy while the others would be developed on 980 acres near the Kayin State town of Hpa-an, about 100 miles (166 kilometres) from the border and on a 680 acre site near Mawlamyine. The department is cooperating with the Industrial Estate Authority of Thailand in the project, U L Zaw Shan said.

The project forms part of a wide-ranging strategic cooperation program agreed by Myanmar, Thailand, Laos and Cambodia at the Bagan summit. Known as the Ayayar-waddy-Chao Phraya-Me-khong Economic Cooperation Strategy, it provides for cooperation in five strategic areas, including agriculture and industry. The other sectors are trade and investment, transport links, tourism cooperation and human resources development.

U L Zaw Shan said a delegation from the Industrial Estate Authority of Thailand will visit Myanmar soon to discuss details for developing the industrial zones. He was one of seven members of a delegation led by the Minister for Industry No 1 Aung Thaung that travelled to Bangkok on May 3 at the invitation of Thailand's Industry Minister, Mr Phinij Jaru-sombat, to promote investment opportunities in the zones.

The delegation had also explained the assistance that the Myanmar government would provide to Thai investors. As well as holding talks with Mr Phinij, the delegation discussed the project with officials from the Industrial Estate Authority of Thailand, the Thai Board of Investment, and the Federation of Thai Industries, as well as more than 60 Thai entrepreneurs, U L. Zaw Shan said.

U L. Zaw Shan said the government planned to establish two hydro-power facilities to supply electricity to the zones. One was near Hpa-an and the other was about 55 kilometres (35 miles) from Myeik.

U L. Zaw Shan said Thai investors were interested in establishing operations in the zones to make products for the Chinese and Indian markets. He said that as well as transferring technology to Myanmar, the zones would also create employment opportunities.

Additional references:

See above: 'Hydropower Dept and EGAT ink agreement on [Hutgyi](#) project' (NLM: 10/12/05)

PRIME MINISTER VISITS [KENGTAUNG FALLS](#) HYDROPOWER PROJECT

NLM, 26-05-04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040526.htm>

The references previously included with this key article can now be found above in the article titled: '[Kengtawng hydropower plant](#) nearly ready to produce' (MT: 29/09/08).

THAN SHWE ON [KEY ROLE OF ELECTRICITY](#) FOR NATIONAL DEVELOPMENT

NLM, 28/04/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040428.htm>

A meeting concerned with the co-ordination of national electric power development was held at the Office of the Commander-in-Chief (Army) with an address by General Than Shwe. He said the electricity sector is like a driving force that plays a key role in national development. There is a close connection between electric power development and the socio-economic progress of the nation. Step-by-step implementation of power development projects must be based on national resources and other conditions in the nation.

The electric power sector has two main subsectors: projects covered by the national grid and those related to regional use. The projects included in the national grid have to do with the whole nation and the supply of electricity to national hubs and the main industrial zones. The regional projects are for the economic and social development of the respective regions. An integrated plan must be drawn for the harmonious development of the two sectors. Only then will Myanmar become a modern and developed industrial nation.

The Government is striving to implement the projects, although the nation is not fully enjoying sufficiency in all sectors. All departments concerned are required to collectively render assistance for the projects. All should understand the how the various projects fit into the overall situation of the nation. The key departments will have to make earnest efforts in implementing the projects and the related departments will have to provide effective support for them. Only then will the the projects be completed within the four or five years needed to achieve sustainable development.

EPM Tin Htut, the secretary of the co-ordination committee, reported on the major current and future projects covered by the grid, present and future regional projects, the grid and sub-power stations, and gas-fired power stations.

In giving guidance, Gen Than Shwe noted that as some electric power projects are to be completed soon, the domestic power demand in the country would be fulfilled commensurately by the end of 2004. Thrift measures with regard to power consumption were to be taken and efforts made for the early completion of new electric power projects.

Eleven major power undertakings connected with the national power grid are currently underway: the 75-MW Mon creek HE project in Setoketara township, the 280-MW Paunglaung HE project in Pyinmana township, the 120-MW Tikyit coal-fired project in Pinlaung township, the 25-MW Yenwe creek HE project in Kyaukdaga township, the 400-MW Shweli HE project in Namhkam township, the 54-MW Kengtawng falls HE power project in Monai township, the 40-MW Phyu Creek HE project in Phyu township, the 30-MW Khabaung HE project in Toungoo township, the 60-MW Kun creek HE project in Phyu township, the 75-MW Shwegyin HE project in Shwegyin township and the 790-MW Yeywa HE project in Kyaukse township. Of these the Mon creek and Paunglaung river HE power projects and the Tikyit coal-fired power project will be opened soon. Together the three will be able to generate 475 MW.

Other major electric power undertakings are the 1,200-MW Htamanthi project in Homelin township, the 400-MW Mawleik project in Mawleik township, the 660-MW Shwesarye project in Budalin township, the 84-MW Upper Paunglaung project in Pyinmana township, the 48-MW Nancho project in Pyinmana township, the 65-MW Upper Sedawgyi project in Madaya township, the 60-MW Kyi-on-kyi-wa project in Setoketara township, the 60-MW Bu Village (Mone) project in Magway division, the 36-MW Namtu project in Namtu township, the 7,110-MW Tarsan (Thanlwin) project in Shan state, the 60-MW Pyaungsho project and the 160-MW Namlan project both in Nawnghkio township, the 48-MW Biluchaung No 3 project in Loikaw township, the 160-MW Bawgata project in Kyaukkyi township, the 150-MW Thaukyaykhat project in Thandaung township, the 600-megawatt Hatkyi project in Kamamaung Village in Kayin state, the 280-MW Bilin project in Bilin township, the 600-MW Taninthayi project in Taninthayi division and the 3,100-MW Ayeyawady Myitsone project in Myitkyina township.

For regional consumption, the hydro-electric power undertakings include the Tabatyan and Mali Creek projects in Kachin state and the Yazagyo project in Kalay township. These three projects will generate 38.5 MW. Other works planned include the Pyintha, Pani creek (Shwe creek) and Mindon projects in Magway division, the Nanlway project in Shan state east, the Thade creek, Thandwe, Kyeintali and An creek projects in Rakhine state, the Dayaing creek (Paingkyone) project in Kayin state, and the Anyapya, Namnoi, Thakayat (Myeik) and Theinkhun projects in Taninthayi division. These 13 projects will be able to generate 342 MW when completed.

Additional references

See above: 'Completion of hydropower plants assigned [highest priority](#)' (MT: 12/02/07)
'[Inventory](#) of generation facilities distribution grids and projects' (NLM: 30/07/06)
See below: '[Formation of work committee](#) for electric power development' (NLM: 01/04/04)

NLM, 23/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nln/n060723.htm>

From a speech by PM Soe Win to the Industrial Development Cte: The Government is making arrangements for the development of the electric power sector in conformity with that of the industrial sector. . . . At present, localized and nationalized plans are being implemented to carry out production and

supply of power. The Government's large- and medium-scale hydel power projects will have to generate about 5,000 megawatts. Presently, these hydel power plants are producing 1,500 megawatts, a significant increase if compared to the past. Furthermore, the plan is being carried out to extend the national power grid in order to connect it to the hydel power projects under construction.

NLM, 30/12/04. <http://www.ibiblio.org/obl/docs2/NLM2004-12-30.pdf>

From a speech by PM Soe Win at the opening of the Mon Creek dam and power station: Power consumption in the nation is growing at 15pc annually. Yangon alone consumes about 450 MW at present, up from about 130 MW 15 years ago. The Government has been implementing projects in accord with the guidance of the Head of State to generate 2,000 more MW during the current five-year plan. The Government with the collective participation of the ministries concerned founded the Leading Committee to Develop National Power Project and the work committee.

NLM, 19/11/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n021119.htm>

From a speech by Gen Than Shwe at the AGM of the USDA: Projects are being implemented simultaneously to meet the rising need of electricity, which is the result of extension of industrial enterprises and rapid development of manufacturing and service industries and urban development. Before 1988, hydel-power and natural gas burning power plants generated 588 MW but the power plants built after 1988 are generating an additional 560 MW. To fully meet the electricity needs of the public and industries, nine hydel power plants with a capacity of 1,790 MW and a steam power plant with a capacity of 120 MW -- totalling 1,910 MW -- are under construction. In addition to these projects, it has been planned to build 5 hydel power plants and one steam power plant in the period from 2006-2007 to 2010-2011. These plants will be capable of generating 5,468 MW. However, it is necessary not only to produce more electricity but also to use it systematically. The use of electricity in government offices has been sharply reduced. This measure is aimed at supplying more electricity to the public and industrial enterprises.

NLM, 27/12/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n011227.htm>

From a speech by Gen Than Shwe at the opening of USDA study courses: Electric power supply projects have been implemented to increase the ratio of the industrial sector for national economic growth. 26 power projects have been implemented during the period of over ten years; and large-scale power projects are also being implemented at present. The power demands of the extending industries, other sectors and the social sector will be fulfilled when the long-term and medium-term power projects are completed. Economic infrastructure development directly contributes to progress of the economic power. The aims of the third five-year short-term national economic plan from 2001-2002 to 2005-2006 are 1) to extend agro-based industries; 2) to develop the power sector in accord with the growing demand of the industrial sector; 3) to extend the agricultural and livestock breeding sectors to ensure domestic sufficiency and to boost exports; 4) to extend health and education tasks and 5) to develop the rural areas.

UN Conference Least Developed Countries, Brussels, 14-20 May 2001.

http://www.un.org/events/ldc3/conference/address/myanmar17_e.htm

From a speech by Myanmar's National Planning Minister U Soe Tha: One of the main aims of the current Five-Year Plan from 2001 to 2005 is to develop the power and energy sectors. In Myanmar, the electricity supply system is based on hydropower and gas turbine stations. The average annual growth rate in electricity generation over the past ten years has been 11.4pc, and sales have grown at the same rate. To promote the capacity utilization of electric power, Myanmar plans to commission four gas turbine projects and eight hydropower projects during the current Five-Year Plan. The government, with the participation of private sector, plans to invest more in infrastructure development endeavours.

COPING WITH POWER BLACK-OUTS IN RANGOON

Myo Myint Aung, Mizzima News, 27/04/04. <http://www.ibiblio.org/obl/docs/BNI2004-05-03.htm>

Private power suppliers in Rangoon are in high demand as the city's power supply fails every alternate day. A sales woman of the Rangoon-based Twin Star Gen-set Co told Mizzima News that the demand for the portable generators depends on the number of containers that arrive. No matter how many come, they get

sold-out. Supply of electricity in Rangoon has been on an alternate day schedule since February causing people to rely more on generators. People in the slums who cannot afford to use private generators are forced to buy electricity from neighbors who own generators.

While Chinese-made inverters cost about K50,000, depending on the category, portable generators from the PRC ranging from K90,000 to K1 million, are in highest demand. Japanese made gen-sets range from K 900,000 to K 12,00,000.

"Previously electricity never failed in the business districts of Rangoon, but nowadays almost everywhere there are regularly power blackouts," said a salesman at Seiko Co Ltd in Rangoon's business district, speaking during a power failure in his office.

"Chinese made generators don't last and the good ones are very expensive. Petrol and diesel are so expensive that it is much cheaper to buy electricity from neighbors who can afford generators," said a resident of South Okalappa township, three of whose five family members are employed.

People who take electricity from neighbors who own generators are charged K40 daily for a tube light, and in some areas up to K60 per tube light, depending on the number of users. The fewer the users, the higher the fee. The current charge for a gallon of petrol or diesel is K1,800.

Water problems go with the regular power blackouts in Rangoon. People rush to put on their motors to pump as much water as they can while there is electricity. However, the pressure this generates in the power supply causes fluctuations in voltage, in turn causing damage to electronic equipment such as televisions and refrigerators.

"While Rangoon needs 400 MW daily, the actual amount of power available is only 390 MW," said an official from the Electricity Department. According to the official, the department schedules power supplies in most areas on alternate days. But some special areas are exempt from this restriction. These include the Konemyintha Yeiktha at 8th Mile and surrounding areas, the Shwetonkya Yeiktha in Bahan township, the People's Parliament building, the Minmanaing Yeiktha, the Rangoon Zoo and most of the city's parks. On the alternate day schedule, electricity gets cut off from 2.00pm until 2.00pm on the following day. But there are reports of power failures even on days for which electricity is scheduled.

People who cannot afford to buy Gen-sets or inverters and are unable to pay the to connect to their neighbors' energy sources must rely on candles for light at night. "It is worse in the slums, especially in South Dagon township," a resident of the township said. "Sometimes there is no electricity at all. So, most of us have to rely upon candles. We have to use charcoal for cooking."

General consumers are forced to pay for increases in production costs caused by the city's power failure. "Firms like ours cannot immediately increase the prices of our products because we compete with others. So, we are facing a set-back," said an official of a magazine publisher.

Additional references:

See other entries under 'Consumer Concerns and Power Shortages' [PS](#) and 'Independent Producers' [IP](#)

See above: '[Homemade lighting system](#) for noodle vendor' (MT: 21/07/08)

'[Inverters](#) keep lights and TV sets running' (MT: 04/07/05)

See below: 'Market for power [inverters expected to dwindle](#)' (MT: 29/03/04)

'[Private operators](#) meet consumer need for alternative power service' (MT: 03/02/02)

[SHWEGYIN](#) HYDROPOWER PROJECT SET IN CONFLICT ZONE

NLM, 24/04/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040424.htm>

Lt-Gen Soe Win of the National Electric Power Development Project Work Cte, accompanied by various ministers and deputy ministers, visited the Shwegyin hydroelectric power project near Kyauknaga Village six miles north-east of Shwegyin town. At the briefing hall, Deputy EPM Myo Myint, reported on plans to build a zoned-type rock fill dam and on the laying of the foundation for the dam. The director of HPD, U Kyi Soe, informed the visitors that the separation wall was 70pc complete. He spoke of plans for the outflow pipe, power intake, spillway, sub-spillway, sub-power station and power station.

Soe Win said that increased power generation is especially needed at the present time to give extra impetus in building up Myanmar as a modern and developed nation. The State is giving priority to power projects. It is gathering capital to invest in hydroelectric power projects which need much financial power to implement. This is a time for electrical engineers to contribute their ability to the nation-building task. Efforts will have to be made for early completion of hydroelectric power projects including the Shwegyin project.

Next, the visitors viewed the work going on in the project area including preparations for building the diversion tunnel, construction of the concrete separation wall, the condition of heavy machinery and quality of concrete used for the separation wall.

The Shwegyin project is one of several being implemented in the Sittoung Basin. It will generate 75 MW. The dam on Shwegyin creek is 3,610 feet long and 185 feet high.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NE 47-05: Toungoo Shwegyin dam, 6 mi north-east Shwegyin [17° 55' N, 96° 53' E], grid square reference: 8\8, 26\4
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-5.jpg>

A good map showing the location of the dam, the rivers, the goldmining areas and the main centres of population of Shwegyin township accompanies the article, "Spaces of extraction: Governance along the riverine networks of Nyaunglebin District", (see below for full reference).
<http://eprint.anu.edu.au/myanmar/pdf/ch11.pdf> [doc p 2]

See also the map at <http://www.khrg.org/maps/2007maps/nyaunglebin.gif>

Additional references

Data summary [Shwegyin](#)

Juliet Shwe Gaung, Myanmar Times, 14/03/11 (Issue 566). Condensed.
<http://www.mmimes.com/2011/business/566/biz56603.html>

Residents of Shwegyin report that since early January they've been enjoying 24-hour electricity. That was when the first of four 18.75-MW generators at the nearby Shwegyin hydroelectric plant started operations easily sating the town's 2-MW thirst for power. One resident said some wards in the town were preparing to install higher-voltage transformers to cope with the higher loads being passed through the electricity grid. Shwegyin is at the base of the Bago mountain range and the town is famous for gold mining and rubber cultivation. A feasibility study for a hydroelectric power plant there started in 2001, with the aim of supplying the town and the national grid. The plant and its dam were mainly built by Myanmar engineers under the guidance of the Dept of Hydropower Implementation. The plant's turbines and machinery were supplied by China's Gezhouba Water and Power Group Co. An official of the HPID said the plant's second turbine is almost complete and should be in operation by the end March, while the remaining two should be up and running by the end of the year. [A photo of the upper side of the main gates at the dam is included with the article.]

NLM, 12/01/11. Condensed. <http://www.burmalibrary.org/docs11/NLM2011-01-12.pdf>

A ceremony was held to mark the operational start-up of the first turbine-generator at the Shwegyin Hydropower Station. The other three machines are expected to come on-line soon. The project is now 96.66pc complete. [A photo of one of the turbines is included in the print edition of NLM.]

Zaw Moe Thauk, NLM, 02/12/10. Selected. <http://www.burmalibrary.org/docs09/NLM2010-12-02.pdf>

The power plant at Shwegyin dam is reached through a passage under Shwegyin creek. The reservoir, which has a surface area of 44 square miles, can store up to 1,685,000 acre-feet of water at full brim and 510,800 acre-feet at still-water level. The four 18.75-MW turbine-generators at the plant are expected to generate 262 million kilowatt hours yearly. The whole project is now 96.72pc complete and work on the installation of generating unit-4 is 98 per cent complete, while concrete work on the power station is completely finished. The first three generators are already in operation. A 230-kV steel pylon for transmitting the electricity produced at the plant can be seen in the rubber plantation at the exit to the project area. Construction tasks commenced in 2002-03 and completion is expected in 2010-11. [The full article is accompanied by photos showing the main control gate with its four valves, an aerial photo of main embankment and control gate, and one showing the partially installed fourth generator. The scale model of the project found in NLM on 15/3/09 provides a useful reference for comparing the information found in this article. <http://www.burmalibrary.org/docs6/NLM2009-03-15.pdf>

Karen Information Committee (KIC), 14/09/10. Edited and condensed.

<http://www.bnionline.net/news/kic/9343-over-500-hit-by-floods-in-shwe-kyin.html>

Over 500 people from the villages of Tanayphar, Kyauk Nagar, Thetyet Chaung and Htee Kayhtar in Shwekyin township have had to move because of the rising water level in the reservoir at Shwekyin dam. "The water level is as high as the tree tops. All houses have been inundated and the people have had to move," said Phu Hkar Chu from Nyaunglebin. He said most of the villagers are slash and burn farmers who also have danyinn gardens, lemon fruit [shaut] gardens. They have lost over 10,000 acres through the flooding. The water level in the dam reservoir has been rising since August. Since construction of the dam started in 2000 the villages of So, Hsu Mu Htar, Se So Kon, Polo, Dubaw, Nyar Muu Kwe, Kasawwah Kwe, and Lal Wah have been relocated to other places. Water has been stored in the reservoir since Dec-09, according to Naw Phaw Gay Hku of Karen River Watch who said the dam has ruined over 20 villages.

KHRG, *Livelihood consequences of SPDC restrictions and patrols in Nyaunglebin District*, 22/09/09.

Excerpt. http://www.khrg.org/khrg2009/khrg09f15.html#ftn_5

Located north of Shwegyin town on the Shwegyin river, the Kyauk Ner Gha dam, begun in 2001, is still not complete. Villagers from Ler Hta Gkwee, Nya Muh Gkwe and Gk'Saw Wah Gkwee villages have lost land and orchards to the project. Many have had difficulties replacing their property, and now mostly work as wage labourers or gather fruit and other forest products. IB 57 and LIB 349 of the BA currently patrol the area and residents must purchase travel permits to leave their villages. "If the dam construction hadn't damaged their workplaces and cultivation areas, they wouldn't need to worry about their livelihoods," a KHRG researcher reported in August. "They'd have enough food for all of their family members. But when the SPDC built the dam, the villagers lost their land and workplaces. Now they are just in the business of surviving." [Two photos of the dam site are included with the article.]

NLM, 22/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-22.pdf>

A gaggle of generals headed by Shwe Mann of the MoD visits the Shwegyin dam project. Col Zaw Min of EPM No 1 reports that the reserve spillway and the ground embankment have been finished. The diversion conduit, the main dam, the main spillway, the water intake structure, the pen stock and the power plant are still under construction. The whole project is 77.5pc complete.

Maung Maung, NLM, 15/03/09. (includes photos by the journalist)

<http://www.burmalibrary.org/docs6/NLM2009-03-15.pdf>

Shwegyin creek has a catchment area of 343 square miles and rainfall averages 144 inches annually. The annual inflow of water into the dam will be approximately 2,010,000 acre feet. The reservoir will have a still-water storage capacity of 510,800 acre feet, a maximum water storage capacity of 1,685,000 acre feet and a maximum water surface area of 44 square miles. Water surplus will be let out through a 135-foot-wide spillway at the rate of 134,000 cubic feet per second when needed. An emergency (supporting) spillway is being constructed to protect the dam when inflow exceeds normal outflow in the rainy season. In addition, a 1600-foot-long diaphragm wall will be built in three months to strengthen the dam and prevent seepage from the lower part of the dam. The project was launched in 2003-04, and so far, it has been completed by 73.5pc. [Photos accompanying the article show a scale model of the project, the three-gated spillway and the intake structure, both under construction, and a panoramic view of the project site. The article was originally published in Burmese in Myanmar Alin on 13/03/09.]

NLM, 02/10/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n081002.htm>

During a tour of the Shwegyin project, EPM No 1 Zaw Min inspects construction of the main spillway, the intake channel and the installation of iron pipes. Over 63pc of the project has been completed.

NLM, 20/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-20.pdf>

On a visit to the Shwegyin hydropower project, EPM-1 Zaw Min and D-G Win Kyi of the Hydropower Dept check work on the main diversion [tunnel], construction of the intake structure and steel pipes, flow of water from the outfall channel, completion of the embankment and inflow of water [into the reservoir]. The minister gives instructions on quality control of the work on the main spillway, on setting a time-frame for completion of this work and on inflow of river water [into the reservoir] and conservation of the embankment. The project is 62.55pc complete.

Minhy Zaw, Myanmar Times, 12/11/07. <http://www.mmtimes.com/no392/n016.htm>

A hydro-electric project near Kyauk Nagar village in Bago Division is now 40pc complete and is expected to start generating power in 2009, according to U Soe Aung, an assistant engineer of HPID of EPM No 1. The dam, about 10km (6 miles) north-east of Shwekyin, was started in 2002 to boost electricity supplies to the national grid. When finished the dam will be 3600 feet long and 185 feet high, with the capacity to store 1.685 million acre feet of water and generate 262 million kWh of electricity a year. "We've built the dam up to 108 feet now. It has been designed with three sluice gates to avoid structural failure and two penstocks between the power intake and power station to generate 75 MW using four turbines," U Soe Aung said. He said the government was collaborating with three domestic companies to ensure that the project was finished by the target date in 2009. "At present the area around the dam is peaceful and local transportation has improved since the project started as well. It is a pleasant place to work." [A good photo of the dam site accompanies the article.]

NLM, 08/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071108.htm>

Project Director Shwe Khaing of Construction Group 4 of HPID of EPM No 1 reports to visiting generals that the project is 57pc complete. It is expected to generate 262 millions kWh yearly.

China Gezhouba Group website, 11/09/07. <http://www.gzbgj.com/article.asp?id=879>

A news item in Chinese characters reports that the company signed a contract with the Myanmar government in Sept 2007 to supply and install machinery and power-generating equipment at the Shwegyin hydropower project. Reference and translation made available through the courtesy of the ERI's *China in Burma: The increasing investment of Chinese multinational corporations in Burma's hydropower, oil and natural gas, and mining sectors* (September 2008).

<http://www.earthrights.org/files/Reports/China%20in%20Burma%20-%20BACKGROUNDER%20-%202008%20Update%20-%20FINAL.pdf>

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf

Shwegyin dam and power station with a planned capacity of 75 MW is under implementation by the HPID. It will generate 268 million kWh annually when it comes on line in Dec 2008.

NLM, 23/08/07 <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070823.htm>

Staff working on site have planted 3000 rubber seedlings and 350 mango plants in the project area; work on the project is 55% complete.

Free Burma Ranger Report, Nyaunglebin District, 09/08/07.

<http://www.freeburmarangers.org/Reports/2007/20070808>

The recently completed dam on the Shweygyin river has flooded more than 3,000 acres of orchards belonging to Karen villagers. Villagers have not received compensation for this loss of property.

Karen Human Rights Group, *Development by Decree: The politics of poverty and control in Karen State*, p 35, (KHRG: April 2007). <http://www.khrg.org/khrg2007/khrg0701.pdf>

The Kyauk T'Gah (Shwegyin) hydro-electric dam along the Khay Loh (Shwegyin) river in Hsaw Htee (Shwegyin) township was completed at the start of January 2007. During the period of its construction, IB 57 and LIBs 349, 350, 589 and 598 of the SPDC army took control of security in the region around the dam site, patrolling the area, forcibly evicting the communities living there and restricting any civilians from approaching the dam site. Local villagers say those in charge were particularly anxious to prevent anyone from observing the engineers working at the dam site. A KHRG field researcher working in the area reported that the dam was constructed with backing from partners in China and Korea, so it may have been engineers from these countries working on the project whom the authorities hoped to shield from observation. As the dam construction drew to a completion, the water level of the Khay Loh River began to rise. By the start of 2007, the villages of Dta Nay Pah, Kyauk T'Gah, T'Nay Htah, Htee Khay Htah and Waw Ray were flooded and villagers were forced to move to higher ground, leaving behind their plantations of dog-fruit, coconut, tobacco, banana and betel nut underwater. When the rainy season begins in May and June the water level could rise even further, threatening the villages of Ywa Myo, Dta Leh Gkyoh, Aay Gk'Neh, Yoh Dah, Dta Yoh Baw, Dt'Nay Pah, Waw Goo and Htee Gkah Htah as well as Shwegyin town. Some villagers from these areas have already abandoned their homes in search of higher ground while others have gone to Shwegyin town, despite the danger of flooding there as well. No compensation has been paid to these villagers, nor were alternate village sites provided.

NLM, 14/02/07. www.myanmargeneva.org/07nlim/n070214.htm

Gen Soe Win visits the site of the Shwegyin hydel power plant and is briefed on availability of fuel for the project. He views construction of the main spillway, the power intake building, also the sites for installation of the conduit and pre-stressed steel pipeline. Work continues on the embankment.

MacLean, Ken, "Spaces of extraction: Governance along the riverine networks of Nyaunglebin District" in *Myanmar: the state, community and the environment*, edited by Monique Skidmore and Trevor Wilson, (Canberra, epress.anu, January 2007). <http://epress.anu.edu.au/myanmar/pdf/ch08.pdf>

The Ministry of Electric Power announced in late 2000 that it would oversee the construction of a dam next to the village of Kyaut Nagar, several kilometres outside the town of Shwegyin. Although construction began in 2001, the project has been delayed repeatedly due to heavy seasonal rains and corruption, especially the theft and adulteration of cement. The corruption eventually became so severe that in 2004 that the SPDC replaced state-owned companies working at the site with two privately owned ones: Olympic Co Ltd and Min A Naw Ya Ta. The dam was scheduled for completion in late 2006, but further delays were expected since work on the intake pipe, spillway and power station had yet to begin. Despite these problems, the Shwegyin TPDC announced plans to transform the low-lying plains east of the Sittaung River into vast rubber plantations beginning in late 2006 using water diverted from the dam's reservoir. These plantations will ultimately cover between 50,000 and 100,000 acres by 2009. An unknown number of small landholders who cultivate crops in this area will be displaced as a result. [p 253]

Army units based at the dam site and the construction companies have expropriated large areas of land around Kyaut Nagar since 2001. In most instances, homes were destroyed with bulldozers with little or no advance warning. No compensation has been provided for those displaced by the project. Additionally, to obtain sufficient fill for the dam, which is 1.1 km long and 56m high, Min A Naw Ya Ta and Olympic are using heavy equipment and large teams of day labourers to remove rocks from the bed of the Ka Tee Chong river. The rocks are then transported to the dam site by truck. Some enterprising local businessmen have also hired their own teams of Burman day labourers to find stones closer to the construction site, which typically involves trespassing on private property and causing damage to fields and orchards. The use of forced labour by LIBs 20 and 57 is also common at the dam site and in connection with other infrastructure projects, again in contrast with the mining concessions, where wage labour is the norm. Forced labour is particularly acute where roads are being either upgraded or built anew. This expanding road network has permitted logging companies to extend their operations into more remote areas of the district. The roads have also enabled the Tatmadaw to sustain its supply lines during the rainy season, allowing it to continue a military offensive year-round for the first time. Forced relocations continue to occur as well. In 2005, a total of six

villages were affected; two villages located near the dam site were destroyed, while the residents of another four villages were forced to relocate as punishment for having contact with the KNLA. [p 258]

The dam will eventually displace the goldmining companies, providing them with the opportunity to extend their operations towards Ku Shaw — a move that will likely lead to further armed conflict between the Tatmadaw and the KNU, as well as environmental degradation. Additionally, the dam will enable a massive commercial plantation east of the town of Shwegyin to be created. If this occurs, several thousand more farmers will lose their land and the district's economy, once based on a diverse array of crops, will be replaced by a single, non-edible commodity: rubber. These cascading forms of displacement, which follow those that have already forced most of the Karen population that once lived along Nyaunglebin District's waterways to leave, indicate that the transformation of Shwegyin Township is far from over. [p 264]

NLM, 01/01/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060101.htm>

EPM Tin Htut visits the Shwegyin project site and looks into the construction of the water intake building, the main embankment and emergency spillway.

NLM, 13/03/05. http://www.myanmar.gov.mm/NLM-2005/Mar05/enlm/Mar13_h1.html

Gen Than Shwe and party visit Shwegyin hydel power project and inspect samples of gravel, sand and earth from the site. They are briefed on plans for distribution of power through the grid, generation of power from four turbines that are expected to generate a total of 75 MW, as well as on the cost of the project.
Compiler's Note: A good photo of the project site accompanies the article.

NLM, 16/03/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040316.htm>

Lt-Gen Khin Nyunt and party visit Shwegyin Hydel Power Project site where they view work on the diversion conduit and the main dam. At the construction site of the concrete diaphragm wall they check quality control of soil cement and testing of the percentage of wax in the earth. Officials of High Tech Concrete Co Ltd explain the procedures involved in the construction of the diaphragm including boring, clamshelling and the laying of concrete.

Golden Tri Star Co, Lanmadaw township, Yangon [n.d]. www.gts-geotechnology.com

When the GTS team began geotechnical engineering jobs in 2003, it engaged in construction of the diaphragm wall of the Shwegyin hydropower project. Since then it has followed up with drilling and grouting work on the same project. GTS collaborates with Thailand Siam Tone Co, a branch of the Tone Corp, Japan.

NLM, 10/12/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n031210.htm>

Lt-Gen Khin Maung Than of the MoD checks on construction of the main dam, outlet conduit, spillway and diaphragm wall. The project will distribute 83 megawatts to the State power grid and supply water to 11,500 acres of summer paddy.

EarthRights International with Karen Environmental & Social Action Network, *Capitalizing on Conflict: How Logging and Mining Contribute to Environmental Destruction in Burma*: October 2003.

<http://www.earthrights.org/files/Reports/capitalizing.pdf>

From 1975 to 1982, the area around Shwe Gin Township was targeted by the former Ne Win regime for its infamous "Four Cuts" (Pya Ley Pya) operations, an anti-insurgency technique intended to cut the links between civilians and anti-Rangoon resistance groups by stopping the flow of food, money, intelligence information, and recruits. Entire communities were forced to leave their ancestral lands and relocate to Burma army-controlled relocation sites without any compensation. Shortly after relocation, unharvested crops were destroyed. Existing food stores were confiscated and then re-issued in the form of rations. Homes were burned. "Free-fire" zones were also established which permitted Burma army troops to shoot civilians on sight if they violated the curfew. The violence transformed countless thousands of people into "internally displaced persons" (IDPs), and thousands more into refugees. 43 villages, all within five miles upstream of a site on the Shwe Gin river now being developed as a hydropower dam, were forcibly moved to

a relocation site near the seat of the township during this period. By the mid-1980s, the situation had stabilized somewhat, and most people returned home to resume their lives. A dry-season offensive against the KNU/KNLA in 1988, however, prompted people to flee again and these villages were completely destroyed. Most of these villages are still empty today.

Plans for the hydropower dam near Kyaut Nagar on the Shwe Gin river were announced in 2001 by MEPE. According to local sources, the dam is to be built where two mountains named Mo So Kho and Ter Ther Kho (Se Le Taung) narrow the river channel considerably. They report that the dam is to be built with technical assistance from a Japanese company. Security is being provided by three military battalions. Since surveying and construction activities began, a strategic command headquarters has been established at the base of the Mo So Kho mountain on the east side of the river and military barracks while surveillance posts have been set up on the west side of the river.

Approximately 200 fruit orchards line the Shwe Gin River, and a substantial number of them specialize in growing 'shaut', a popular type of lemon-lime. It is calculated that one-third of Burma's shaut crop comes from this area where an estimated 3,000 acres are under cultivation upstream from the dam site. Each fruit sells for between K 30-50 in Burma's cities, making the crop a key source of income for local villagers. Other valuable cash crops include betel-nut, durian and rubber trees, planted during the British colonial period. When completed in 2005, the catchment area for the dam will not only destroy the fruit orchards which line the banks of the Shwe Gin River, it will also submerge potentially lucrative deposits of gold which have attracted large numbers of Shan and Chinese miners from other parts of the country. In 2003, the military announced all trees would be cut down between Kyaut Nagar and Sumuhte upstream of dam prior to inundating the area. no official plan for regulating how this large-scale clear-cutting is to occur has been announced.

NLM, 15/08/03. <http://mission.itu.ch/MISSIONS/Myanmar/03n1m/n030815.htm>

Officials of the HPD report to Lt-Gen Shwe Mann and party on initial tasks of the Shwegyin project and the amount of electricity to be generated. The project will have two hydroelectric power stations. No 1 station will be installed with four 18.75-MW generators and No 2 station with one 8-MW generator.

NLM, 21/01/03. <http://mission.itu.ch/MISSIONS/Myanmar/03n1m/n030121.htm>

The main Shwegyin dam will be 4,200 feet long and 203 feet high; water storage capacity at full brim will be 2,040,000 acre feet. The spillway is of the gated ogee type and water the level will be 178 feet. Four turbines will generate 83 MW.

NLM, 05/11/02. <http://mission.itu.ch/MISSIONS/Myanmar/02n1m/n021105.htm>

Shwekyin hydel power project is being undertaken near Kyauknaga Village of Shwekyin Township by Construction Group 4 of the HPD. Land preparations and earth work on the embankment are underway. The project is expected to generate 250 million kWh yearly

McLean, Ken and Mahn Nay Myo, Earth Rights International (ERI), 13/09/02.

<http://ftp.metalab.unc.edu/obl/show.php?cat=363&lo=t&sl=0>

ERI has collected credible reports regarding the use of forced labor to construct a new hydroelectric dam on the Shwe Gin River, near Kyaut Nagar. This predominantly Karen area, north of Shwe Gin Township, is home to thousands of 'internally displaced people' who have been repeatedly forced out of their homes by the military junta's activities. According to villagers interviewed by an ERI fact-finding team in May 2002, soldiers routinely force them to work on the construction project. A local man said, "We can only come back after we finished the work in the camp. In the camp, they don't have water and food for the workers. The military orders the villagers to do what they want. The soldiers don't have any sympathy for the workers." Official information on the project, overseen by MEPE, is extremely difficult to obtain. In early 2001, a survey was conducted by four Japanese technicians working for an undisclosed company. Construction began shortly after and is to be completed in 2005. No social or environmental impact assessment was carried out prior to beginning construction. Reconnaissance of the area reveals the construction of roads, military barracks, a helicopter pad, as well as surveillance posts on the west side of the river. The area surrounding the dam site is now heavily militarized.

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FORMATION OF WORK COMMITTEE FOR ELECTRIC POWER DEVELOPMENT

NLM, 01/04/04. <http://www.ibiblio.org/obl/docs/NLM2004-04-01.pdf>

The Work Committee for National Electricity Development held a co-ordination meeting with an address by the chairman Lt-Gen Soe Win. Also present were Vice-Chairman Lt-Gen Thein Sein, members of the committee including Ag & Irrig Minister Nyunt Tin, Energy Minister Lun Thi, Finance & Revenue Minister Hla Tun, Cte Sec'y Electric Power Maj-Gen Tin Htut and others.

In his address, Lt-Gen Soe Win said two committees had been formed: the Leading Cte for National Electricity Development led by General Than Shwe and its counterpart the nine-member Work Cte with responsibility for the supervision and implementation of power projects. The work committee has two tasks: 1) of supervising the power projects and 2) of approving new projects.

By 1988, electricity generating capacity in Myanmar had reached 580 MW, with gas-fired plants contributing 300 MW (51pc); hydropower 38.8pc and steam (10.2pc). Since 1988, 34 new power stations with a total generating capacity of 560 MW had been built. Of these 28 were hydro power plants and six gas-fired power plants. ult. The nation's power generation capacity at present had reached 1,200 MW, a two fold increase when compared with that of 1988.

Due to economic development and the rise in living standards, the generating capacity needed to fill the power requirements of Yangon has reached 450 MW, up from 130 MW in 1988. The Head of State has given guidance to add 2,000 additional megawatts during the period of the third five-year national economic plan and to give priority to hydro power projects. The Ministry of Energy has already laid down a 30-year strategic plan, covering five-year periods, to develop the electricity sector. There are plenty of hydropower projects to be implemented under this plan, but it is impossible for the Ministry of Electric Power alone to implement them because the task is so immense. They are to be undertaken through the combined efforts of the ministries concerned under the supervision of the State, Soe Win said.

For this reason, the government has formed the leading committee and work committees in order to systematically implement electric power development projects. The volume of water flowing in the streams and rivers throughout the country is over 876 million acre feet. According to surveys conducted by experts, there are 268 locations at which nearly 40,000 megawatts can be generated through hydro electric power. At present, however, hydro electric power stations generate only 390 MW. Much remains to be done, he added.

Some projects lie in the power grid area. For example, the 280-MW Paunglaung and the Yeywa project in Mandalay division, both bigger than the Lawpita hydro-electric power station. Other projects such as the Yazagyo electric power project in Sagaing division are for regional development. The work committees are to provide necessary assistance for all projects by assigning the correct priority to each.

Afterwards, EPM Tin Htut, the secretary of the work committee, reported on hydro electric power projects to be completed in 2004 and in the coming four years. He also reported on power grid projects and sub-power stations to be completed in 2004 and over the next four years. Next, A&I Minister Nyunt Tin reported on hydroelectric power projects being undertaken by that ministry and those being carried out in co-operation with the EPM. Lt-Gen Thein Sein said the Head of State had given guidance on the completion of certain projects during the next four years. The two power grid projects on the west and sides of the Yoma are to be carried out systematically.

Additional references

See above: 'Inventory of generation facilities distribution grids and projects' (NLM: 30/07/06)
 'General Than Shwe on [key role of electricity](#) in national development' (NLM: 28/04/04)
 'Government drive to [conserve electricity](#)' (MT: 07-10-02)

NLM, 06/09/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlnm/n030906.htm>

SPDC Secretary No 1 Soe Win and Secretary No 2 Thein Sein meet with Electric Power Minister Tin Htut and are briefed on the work of the ministry. It is co-ordinating with the Ministry of Energy in acquiring gas and fuel for the production of electric power and with the Ministry of Industry No 1 to obtain cement and steel rods for its construction projects. Secretary Soe Win draws attention to the dramatic surge in the use of electricity and the need for the ministry to take systematic measures for the effective use of electricity in the productive sectors of the State. Secretary Thein Sein points out that national productive capacity, now at 1,200 MW, is expected to rise to about 2,000 MW by fiscal 2005-06 as more hydro electric projects come on-line. The ministry should see to the matter of having its engineering personnel boost their qualifications.

THAKYET RIVER HYDROPOWER PROJECT INITIATED

Mergui-Tavoy District Information Unit (KNU), Monthly Human Rights Report, April 2004.

<http://www.ibiblio.org/obl/docs/MT2004-04.htm>

Burma's military government has plans in place for the construction of a new hydroelectric dam on the Thakyet (Taket) river east of Tenasserim [Taninthayi] town in the Mergui district.

On 16/03/04, the Coastal Region Military Commander, Ohn Myint, and Col Soe Thet of the Strategic Command Centre and team arrived to inspect proposed sites for the dam. A week later Col Soe Thet and military engineering dept officials visited the Wablaw Kye rapids on the Thakyet river as the site best suited for construction of the dam. They ordered Thakyet villagers to clear a space 150 yd long and 50 yards wide along both banks of the proposed site. Villagers were paid K1200 daily for their work while a survey was conducted of the surrounding area.

The military demanded that villagers from the Thakyet area, including the villages of Hswe Plaw (G'nan Gwin), Taung Bain, Kala Aik, Kywe Htaing Gone, La Ngu, Hsin Gaung, and Chauk Mile clear an area 150 feet square for a helipad at the top of Wablaw mountain. They also ordered the villagers to construct a new road between Hswe Plaw and the dam construction site. The planned road will be three miles long and will stretch along the existing foot track.

Villagers have learned that before dam construction starts, the military will set up security posts on mountaintops, other high places and along the banks of the Thakyet river. LIBs No 557 and 224 along with the militia unit of Nyaung Bin Gwin village provided security during the survey.

The dam is to be 500 feet high, and extend 300 yards across the river. It is supposed to take three years to complete. The military government will try to persuade Thai investors and the Thai government to invest in the project as a joint-venture. A source said the SPDC plans to borrow 1,500 million baht from the Thai government for the venture. Construction experts from China will be hired to work on the project. Surplus water from the reservoir will be diverted to the Baw Kru Hkee and Tha Baw Leik Hpo areas when the dam is completed.

Villagers along the river are worried about their future if the dam is constructed. They believe their communication systems will face difficulties and that their land and plantations within the reservoir area will be lost. The villagers do not want the dam to be built, but they are fearful of voicing their concerns. Due to the onset of the rainy season construction work has not yet started, but the people are worried about what will happen when the dry season arrives.

Topographic map reference: Thailand 1:250,000: Series L509, U.S. Army Map: ND 47-15: Hua Hin Thakyet dam, 14 mi east of Tenasserim [12° 05' N, 99° 01' E], grid square reference: 13/4, 5/2
http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-nd47-15.jpg

Additional references

Data summary: [Thagyet](#)

NLM, 03/04/10. <http://www.burmalibrary.org/docs08/NLM2010-04-03.pdf>

The Hydropower Administration Department (HAD) of EPM-1 and Yuzana Co Ltd signed an MoU on the implementation of the Thagyet hydropower project through the Build-Operate-Transfer (B.O.T.) system at the meeting hall of the ministry yesterday. Signing for the HAD was D-G Kyee Soe and for Yuzana was company chairman U Htay Myint.

NLM, 31/12/09. http://www.burmalibrary.org/docs08/Electricity_article-NLM2009-12-31.pdf

Thagyet hydropower project will have a generating capacity of 20MW and is estimated to produce about 95 million kWh annually.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf

The Thagyet hydropower project with a planned capacity of 20 MW is expected to generate 95 million kWh annually. It is currently in the planning stage and will be carried out by the HPID.

NLM, 30/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060730.htm>

Plans are under way to implement 15 hydel power projects such as the 20-MW Thagyet hydel power plant in Taninthayi township.

NLM, 28/12/04. <http://www.myanmargeneva.org/04nlm/n041228.htm>

From a report of the meeting of SPIC on 27/12/04: Thagyet hydel power project is located on Thagyet Creek 14 miles east of the town of Taninthayi. A 20-MW generator will generate at least 11 MW.

See above: 'Hydropower planned for [border industrial zones](#)' (MT: 31/05/04)

CONSTRUCTION FUELS [WIRE AND CABLE MARKET](#)

Sandar Linn, Myanmar Times, Electronics Supplement, 29/03/04

(Compiler's note: Issue 210 of MT and accompanying supplement are no longer available on-line)

The cable and wire industry has become increasingly competitive, with local manufacturers gaining bigger market shares than imported products, industry sources said. Industry members estimate that local producers occupy about 70pc of the market as a result of increasing demand from industrial developments and private construction companies over the past five years. Despite gaining ground, however, local products are often overlooked in favor of cheaper and higher quality imports from China, Malaysia and Taiwan.

A dozen wire and cable brands are available on the market, including popular domestic brands Golden Lion, Standard, Hong Pang, ABC and Asia Golden Myanmar. "Locally manufactured brands are mostly used by rural people who make up 60 per cent of local wire buyers," said U Aung Khaing, the marketing manager of Golden Lion Wire Co., Ltd, the first private wire and cable manufacturer in Myanmar.

"But imported brands are used for big projects and national projects such as the development of new hydropower plants and construction of dams," said U Aung Khaing. He said the price of copper, a basic raw material for wire, has increased by 30 per cent internationally as a result of increased demand. "The more the nation's property develops, the more demand there will be for wire and cable," he said.

However, U Aung Khaing said that wire and cable sales levels have not fully recovered in comparison to previous years when the construction industry was more active. He said five years ago development levels were greater, but despite falls in construction, the industry is now able to produce domestic and industrial use wire as well as overhead power cables.

Additional references

See above: [‘Cable factory](#) and foundry opened in Indagaw industrial zone’ (NLM: 04/04/05)
 See below: [‘Wire and cable producers](#) find ready market in Myanmar’ (MT: 25/08/03)

MARKET FOR POWER INVERTERS EXPECTED TO DWINDLE

Myo Theingi Cho, Myanmar Times, 29/03/04.

(Compiler’s note: Issue 210 of the Myanmar Times is no longer available on-line.)

The market for power inverters in Myanmar is expected to dwindle over the next several years as the government works towards its objective of supplying regular electricity to the public, industry sources said. Inverters convert direct current (DC) to alternating current (AC), storing energy for use during blackout periods.

“In the next few years, electricity from MEPE will be available 24 hours a day, so the inverter market will probably diminish,” said U Pe Thein, the owner of the UPT Electric Equipment Manufacturing and Trading Company, which was established in 1980. The firm is therefore focusing on the production of heavy transformers, which will gain a wider market when electric power supplies are expanded.

“We started selling inverters imported from China about seven years ago because there were no local manufacturers in Myanmar,” said U Pe Thein. For the past four years the company has produced its own inverters based on Chinese technology. “Inverters made in China are good, but the workmanship is poor and many fell apart during transportation across the border, so we studied their design and began making our own,” said U Pe Thein.

According to U Pe Thein, 90 per cent of the market was made up of Chinese goods when people started using inverters in Myanmar in 1997. Gradually, however, local entrepreneurs began manufacturing their own inverters and created a more competitive market. U Pe Thein said his company now occupies about 10 per cent of the market share, with other local manufacturers also taking over portions of the market share once dominated by Chinese products.

UPT produces three kinds of inverters – rated at 300, 500 and 1000 voltage amperes (VA) – which range in cost from K23,000 to K35,000. About 40 per cent of households in Yangon use power inverters, U Pe Thein said. UPT experienced its best sales in 1999, when it sold about 200 devices a month.

Dr Aung Thein, the general manager at Shwe Paho Industy, said that the company enjoyed its best inverter sales in 2001. “The market situation depends on the supply of power provided by MEPE,” said Dr Aung Thein. He agreed with U Pe Thein, saying that the inverter market will become unstable in coming years because of the nation’s economic policy of improving electricity supplies. “We intend to begin producing electric appliances, which will be more widely used once a steady power supply is available,” said Dr Aung Thein.

Additional references:

See above: [‘Inverters](#) keep lights and TV sets running’ (MT: 04/07/05)

LOCAL TV MANUFACTURER TAKES ON INTERNATIONAL COMPETITORS

Business Tank, March 2004. [Transcript of the original interview is no longer available on-line]

Adapted from an interview with U Than Win Aung, the managing director of STAR TV.

STAR TV first began producing TV sets and VCDs at its factory in the Hlaingthaya IZ in 1999 with the purpose of providing these goods to customers in Myanmar at prices that were at least 25pc below those of imported electronic products of similar quality. The company also provides after sales service for its products. It has more than 300 employees engaged in the production, distribution and financing of its operations. STAR TV has plans to extend its product line to air conditioners, DVD players and water dispensers.

In its first five years of operation, the company has produced about 50,000 TV sets including 14" and 17" black/white models, and 14", 21", 25", 29" and flat-monitor color TVs, as well as 25,000 VCD players in six different models. Electrical and electronics parts are imported mainly from Korea, Taiwan, Singapore, Hong Kong, China and Thailand.

An fully equipped automatic assembly line was imported from Korea using Korean engineers and technicians who passed on their skills to Myanmar engineers, technicians and workers once the plant was set up. Myanmar engineers and technicians have also attended workshops and training session in Korea, Singapore, Thailand and Malaysia.

Daewoo Electronics was also producing TVs for the local market in a joint-venture operation with the government, but ceased production several years ago. A Toshiba factory stopped production after only a year in operation.

STAR TV uses the same materials as other international brands with Korean technology, so we can assure the quality of our products. One of our main problems is having to rely on imported parts for our products. The parts we use are now classified as luxury goods so we can only qualify for a 25pc import licence. To be able to order the necessary parts, we have to get a thousand at a time.

We provide a two-year warranty for our products and spare parts are always available. These parts are from the same factories that produce for Korean and Japanese brands. Since our prices are about 25pc cheaper than foreign imports, it makes our products affordable by middle class as well as top-income households. All our goods are made using the Korean automatic assembly line that applies ISO standards. For detailed inspection, we have six pattern generators and six transmission systems. We have also replaced the manual system for balancing color TVs with a computerized system.

The competition in this industry is very intense. We have to compete with Japanese and Korean brands that are imported illegally into Myanmar. These much cheaper as they do not have to pay legal fees, custom duties, sales tax and income tax like we do. So these products generally sell for 25pc less than our CIF value.

Some of my acquaintances used to ask me why I invested so much money in an industry that has such a low rate of return, instead of importing TVs from abroad. It is quite true that I could earn instant returns with higher profits. In order to earn foreign income, we have to build factories and machinery for both export and local markets. We also have to invest hard currency for import license applications and for an LC account. Besides the investment for raw material stock as well as finished goods stock and the amounts that have to do with deferred payments to distributors, the total indebtedness has aggregated to about three billion kyats. Sometimes the profit doesn't even match the bank interest rate. But for me, high returns are not important for the time being. What is more important is to be able to operate in the long-run and to build up awareness of the quality of the STAR brand.

The main objective in establishing this factory is in accord with government policy which is being encouraged so much. On the other hand, the costs of the duty we have to pay for assembling a TV here are about the same as those for importing TVs from abroad. I have learned that electronic goods production needs high technology as well as high investment. We have encountered some difficulties in technology and we will have to make a greater capital investment. Nevertheless, we are getting ourselves deeply into this for the sake of globalisation.

Additional references

See also, Ye Lwin, 'Electronics overview for 2007' in the Myanmar Times 'Electronics' supplement (12/03/07). <http://mmtimes.com/feature/electronic/e015.htm>

Televisions were once considered a luxury in Myanmar but have come to be regarded as an essential for providing entertainment and information, said U Than Win Aung, the MD of the STAR TV factory in Hlaingthaya IZ. The growing demand for electrical appliances coincided with the rise in living standards, said U Than Win Aung. Consumers with disposable incomes opted to buy televisions for entertainment, information and education, he said. It is estimated that nearly all households in Yangon and about 60 per cent of those in rural areas have a television.

SHWESAYAY HYDROPOWER PROJECT UNDER DETAILED FEASIBILITY STUDY

NLM, 07/02/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040207.htm>

On the 3rd and 4th of February, General Maung Aye and party went to inspect Shwesayay hydro-power project in Shwesayay defile on the Chindwin River close to where Budalin and Kani townships meet. At the briefing hall of the project, EPM Tin Htut reported that Sagaing Division has 21 sites where hydro-electric power projects capable of generating 2,400 MW could be implemented. Hydro projects already operating include Zee Creek station in Kalay township that can generate 1.26 MW, Lahe station in Lahe township (0.05 MW) and Thaphanseik station in Kyunhla township (30 MW). In various stages of planning are the Htamanthi, Homalin, Mawlaik and Shwesayay projects along the Chinwin. Surveyors estimate that Htamanthi hydro-electric power project will be able to produce over 1,200 MW of electricity. Because of the magnitude of work and vast amount of investment needed, preliminary surveys for the Htamanthi project are being conducted in co-operation with India.

U Win Kyaw, D-G of the HPD reported on four different ways of constructing an embankment on the Chindwin River for the Shwesayay dam. Next, A&IM Nyunt Tin reported on the flow of the Chindwin river and matters related to Htamanthi project and the feasibility study for construction of the Shwesayay dam and its benefits.

In response, Gen Maung Aye said that efforts are under way to develop more than 2,000 megawatts to fulfil the electricity needs of the State during the third five-year short-term. He urged officials to carry out preliminary engineering tasks at the same time as they prepared the detailed surveys needed for Shwesayay project. Later, he inspected stone samples from the site chosen for the project.

The following day General Maung Aye and party returned to Shwesayay village in Budalin township where they heard reports on the preliminary engineering work being carried out at the site, movement of watercraft in the Chindwin and the drifting of timber and bamboo rafts in the river.

The Shwesayay project will be implemented on the Shwesayay riverlet of the Chindwin nearly 20 miles north of Monywa. According to the initial feasibility study, the project will be able to generate over 600 MW. Moreover, it will provide water for irrigating 25pc of two million acres of cultivable land all year round. It will be a joint project of the Irrigation and hydropower departments.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-08: Shwebo Shwesayay dam near Shwezaye village [22° 20' N, 95° 0'0' E], grid square reference: 14/1 24/3 <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-8.jpg>

Additional references

Data summary [Shwesayay](#)

See above: 'Plans for [Htamanthi](#) dam project on Chindwin near finalization' (MT: 28/08/06)

Central Electrical Authority [India], 31/12/10. Condensed and adapted. <http://www.cea.nic.in/hydro/myan.pdf>

NHPC established a site office at Tamanthi in Feb-2010 and investigations relating to geology, seismicity, construction material survey, etc, were taken up. Field investigations for Shwezaye project were to be taken up in Sep-2010 after the end of the monsoon period. Pending preparation of a detailed project report (DPR) an interim report highlighting the updated project parameters and expected cost of the projects was to be prepared so that an MoA for the Tamanthi and Shwezaye projects could be signed by Dec-2010. A high level delegation visited Myanmar in May-2010 and held discussions with Myanmar authorities in this regard. Subsequently, members of the task force visited the project sites of the Tamanthi and Shwezaye projects in Myanmar in Jun-2010. The target dates for submission of an updated DPR were set for Jan-2011 for the Tamanthi project and Jul-2011 for the the Shwezaye project.

Agreement signed during visit of General Than Shwe to India, 29/07/10.

<http://www.burmanet.org/news/2010/07/29/mea-government-of-india-joint-statement-during-the-visit-of-chairman-state-peace-and-development-council-of-myanmar/>

Both India and Myanmar identified the power sector as an area of growing cooperation and agreed "to cooperate in the implementation of the Tamanthi and Shwezaye projects on the Chindwin River Basin in Myanmar. They welcomed the involvement of M/s NHPC in carrying out the much required additional investigations after the signing of the MoU on Cooperation in Hydro-power Development projects in the Chindwin River Basin in September 2008. Subject to the findings of these additional investigations, the two countries will endeavour to conclude the Memorandum of Agreement within a year".

Utpal Bhaskar, LiveMint, 10/05/10 Edited and condensed.

<http://www.livemint.com/2010/05/10210808/Indian-team-to-visit-Myanmar-f.html>

An Indian team will be leaving for Myanmar on Tuesday to discuss building power plants and transmitting some of the electricity to India. The visit is designed to revive the stalled 1,200MW Tamanthi hydroelectric power plant and 642MW Shwezaye project on the Chindwin river. A memorandum of association for these projects is expected to be signed by December. The delegation will comprise officials from state-owned firms NHPC Ltd and Power Grid Corp. of India Ltd (PGCIL), said a government official who did not want to be identified. S.K. Garg, chairman and managing director, NHPC, confirmed the impending visit and said: "Survey and investigation work are yet to be completed. No modalities have been worked out so far. A transmission link for the evacuation of power is expected to be set up. We had submitted a report on the transmission of power around one-and-a-half years back," a PGCIL executive said on condition of anonymity.

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

In a report to the SPIC, Hydropower minister Zaw Min included the Shwesayay project as one of eighteen that are to be implemented with the investment of foreign companies. Name-plate capacity of 660 MW.

NLM, 31/12/09. http://www.burmalibrary.org/docs08/Electricity_article-NLM2009-12-31.pdf

Shwesayay hydropower project will have a generating capacity of 660MW and will produce about 2908 million kWh annually.

Iftikhar Gilani, Daily Times (Pakistan), 24/04/09.

http://www.dailytimes.com.pk/default.asp?page=2009\04\24\story_24-4-2009_pg7_40

Addressing a press conference on Thursday, NHPC Chairman and Managing Director SK Garg said that India's state-run power producer . . . had signed an MoU with Myanmar to study the master plan for hydro power development of the Chindwin River basin that includes a review of detailed project reports (DPRs) for the 1,200MW Tamanthi hydroelectric project (HEP) and the 642MW Shwezaye HEP. "

NLM, 19/09/08. <http://www.burmalibrary.org/docs6/NLM2008-09-19.pdf>

An MoU on the Htamanthi and Shwesayay hydropower projects was signed in Nay Pyi Taw by Chairman S K Gorg (Garg) of the National Hydroelectric Power Corp Ltd (NHPC) of India and the director-general of Myanmar's Hydroelectric Power Dept. Under the MoU, the Hydroelectric Power Department and NHPC will implement the two projects. The Htamanthi project will have a generating capacity of 1200 MW and the Shwesayay project will have genators capable of generating 600 MW. The signing ceremony was preceded by discussions about the two projects by officials of EPM-1 and directors of NHPC and the Ministry of Power of the Republic of India.

The Hindu, 28/06/08. <http://www.thehindu.com/2008/06/28/stories/2008062854731600.htm>

Minister of State for Power, Jairam Ramesh, who returned after a four-day visit to Burma, said that the Burmese leadership had shown keen interest to join hands with the Indian companies to take up construction of the 1,200-MW Tamanthi power project and the 660-MW Shwe Satsay power projects on the Chindwin River in order to tap the huge hydro power potential in Burma.

"Myanmar Country Report on Progress of Power Development Plans and Transmission Interconnection Projects" (17/06/08), p 15.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/PWG5-Appendix4.4.pdf>

The Shwesaye (660 MW) and Mawlaik (515 MW) hydropower projects will be implemented in the near future.

NLM, 30/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060730.htm>

Planning for the 660-megawatt Shwesayay hydel power plant in Budalin township, along with 14 other hydro-electric projects is still underway.

NLM, 15/06/04. <http://www.myanmargeneva.org/04nlm/n040615.htm>

Gen Khin Nyunt and party visit the site of the Shwesaye dam in Budalin township. They are briefed on the speed of the current in the Chindwin, the reliability of the river water for agriculture on both banks and the findings of the feasibility study related to the construction of a dam in the Shwesaye region. Of particular interest are the findings of a geological survey of the chosen site and the arrangements for diversion of the water of the Chindwin to build the dam.

U Zaw, NLM, 09-10/04/04. <http://burmalibrary.org/docs/NLM2004-04-09.pdf>

<http://burmalibrary.org/docs/NLM2004-04-10.pdf>

Work is under way to start construction of the dam and power plant of the Shwesayay hydroelectric power project on the Chindwin river. I was a member of the entourage that accompanied General Maung Aye when he inspected the site near Shwesayay village in Budalin township in Feb 2004. Located 20 miles north of Monywa, Shwesayay is a project with high prospects. Its generation capacity can exceed 600 MW. The experts are taking into account the silting rate of the river and the geographical, geological and climatic conditions of the surrounding area. The Chindwin has an annual volume of 115 million acre-feet or 16.5pc of the nation's fresh water resources. The huge Shwesayay project will challenge the ability of Myanmar engineers and technicians.

NLM, 23/03/04. <http://burmalibrary.org/docs/NLM2004-03-23.pdf>

Lt-Gen Soe Win and party visit the Shwesayay project site. It is part of the Chindwin - Ayeyawady all-round development project. They are briefed on the geological survey of the site and the hydropower and irrigation aspects of the project. A gravel-filled dam, 3,280 feet long and 130 feet high, will be built at the Shwesayay defile of the Chindwin. It is expected to generate 660 MW and benefit 150,000 acres of farmland. A basket of fruit is presented to Mr Yoshizu, assistant GM of the Kansai Co. Other hydro-electric projects in the Chindwin basin include Homalin, Uyu creek, Batvar, Htamanthi, Mawlaik and Nay-risara. [A photo showing earth removal work at the site accompanies the article in the print edition of NLM.]

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Start 04

RURAL AREAS ENCOURAGED TO MAKE GREATER USE OF RENEWABLE ENERGY

Kyaw Naing, Myanmar Times, 05/01/04.

(Compiler's note: Issue 198 of the Myanmar Times is no longer available on-line.)

Renewable energy has the potential to make a significant contribution to socio-economic development in rural areas, says a freelance consultant to Myanmar NGOs involved in environmental activities. U Aung Myint, the team leader of the Renewable Energy Association of Myanmar, said that despite a high initial investment, the use of energy generated by the sun, wind, water and plant matter (biomass), can bring long-term benefits to rural people, who comprise about 70pc of the population.

In cooperation with international donors, REAM is involved in building solar battery charging facilities, wind-power stations and mini-hydro power plants. "We have built nearly thirty solar battery charging facilities, three mini-hydro power plants and three wind farms in rural areas," U Aung Myint said. Most of the projects were funded by the Japanese government, he said.

REAM, which is affiliated with Friends of Rain Forests Myanmar, is active as a project facilitator as well as working to promote the use of renewable energy. U Aung Myint, a retired marine biologist, has presented nine papers on the use of renewable energy since 1992. He said his research has found that generating up to 1.5 kilowatts using solar batteries costs about K6,800 a watt. Solar powered pumps capable of generating up to 1.2 kilowatts can pump 60 gallons of water an hour from artesian wells up to 120-feet deep at a cost of between K9000 to K12,000, U Aung Myint said.

Additional references

MT, 07/11/05. [Issue 291 of the Myanmar Times is no longer available on-line.]

Interview with U Aung Myint, Secretary of Renewable Energy Association Myanmar (REAM)

REAM was formed in 1993 by people interested in renewable energy, including retired public servants and private sector entrepreneurs. Our challenges include building up our funding base and attracting members with appropriate qualifications. Interest in renewable energy is growing, especially among decision-makers and intellectuals because of the high price of fossil fuels. At present, the most important thing we need is proper policy guidelines. Co-operation among government depts, NGOs, the private sector and international organisations is also needed. It is also important to promote awareness among the public. Sometimes, we encounter difficulties getting the co-operation of local village leaders and communities because they lack understanding about renewable energy technology. The use of renewable energy sources is of great benefit because it reduces reliance on fossil fuels, thus helping to conserve the environment. Solar, hydro and biomass energy are the most viable forms of renewable energy for Myanmar. But their effectiveness depends on such factors as where and how they are used. Hydro-power is the most widely used source of renewable energy. There are mini-hydro power stations in Shan, Chin and Kachin states and also in coastal areas and the central dry zone. Biomass energy is popular in rural areas, where agriculture and plant residues are easily available. There is also some limited use of solar electric power.

Myanmar Ministry of Foreign Affairs, News and Views from Myanmar, 18/08/04.

www.mofa.gov.mm/news/aug18_04_wed7.html

Under the BIMSTEC energy co-operation programme, a workshop for sharing experiences on the use biomass gasifier systems by SMIs and on the application gasifier technologies in the BIMSTEC region was held in NyaungU on 16 August 2004. It was attended by government ministry personnel, staff from REAM and NGOs and representatives of BIMSTEC member countries, India, Myanmar, Sri Lanka and Thailand. Workshop participants studied the functions of a biogasifier which was built in March 2004 in Kokke Village, Myingyan township. They discussed the use of biogas produced from animal and vegetable wastes in generating electricity and river-water pump projects.

See above: 'Call for [energy co-operation](#)' (Myanmar Times: 13/02/06)

['Private sector promoting](#) interest in renewable energy' (MT: 12/07/04)

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LOCAL BATTERY BRANDS COMPETE WITH IMPORTS

Ye Lwin, Myanmar Times, 24/11/03.

(Compiler's note: Issue 193 of the Myanmar Times is no longer available on-line.)

The local battery industry plays an important role in Myanmar's developing economy with cars, small businesses and remote villages, relying on the power that batteries supply. The battery industry is divided into equal halves with 50pc of the batteries produced in Myanmar while the other half is imported from overseas. High quality foreign batteries are imported from neighboring countries such as India, South Korea, China and other ASEAN member countries. However, despite import competition, local entrepreneurs are

committed to manufacturing batteries, in order to fill local demand. In urban areas, quality locally-made batteries are produced by private factories in the city's industrial zones. Most of the battery factories are in the Hlaingthaya and Shwepyitha industrial areas.

U Zayar Win, marketing manager of Toyo Battery said local businesses are able to keep up against foreign competition. "We occupy from 15 to 20pc of market share in the Myanmar battery market. Our major competitors are 3K Battery and GS Battery from Thailand and Top from China. Although our products are made in Myanmar, we are able to hold our own against foreign imports," he said.

There are more than 50 local battery manufacturers in Myanmar and local battery businesspeople are doubling their efforts to upgrade their products and manufacture international standard batteries with modern technology. However, the 'home-made' batteries in Myanmar are often not particularly durable. Due to the low quality, the price of these 'home made' batteries is a lot lower. According to U Nyein, who operates a cottage battery industry in South Dagon Myothit township, his batteries are made at home using traditional methods. But he can't manufacture products of a quality suitable for the Myanmar commercial market. "Extending our productivity is out of question because of the introduction of hi-tech batteries from abroad," said U Nyein. But U Nyein said that community members bought home-made batteries from his shop as they cannot afford the expensive foreign batteries. "I produce 2,500 batteries a year, and there are many businesses like mine in my community. We cannot manufacture international quality batteries because foreign products make the market too competitive," he added.

There are many foreign brands available, for example, 3K, GS, Panasonic, FB, Volta, Watta, Tokyo, Energy, National, Star Top and Incoe from Korea, Malaysia, Thailand and Japan. These brands are expensive compared with Myanmar brands and many people believe they are more reliable when it comes to quality and durability. However, since many people find that the foreign brands are out of their price range, local manufacturers will continue to supply a niche in the battery market.

Additional references

See above: 'Rising world lead prices zap Yangon [battery market](#)' (MT: 10/09/07)

NLM, 01/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-01.pdf>

Toyo Battery Factory of Proven Technology Industry Co Ltd is now producing batteries for export. There are plans to increase production.

Aung Kyi, Myanmar Times, 30/06/08. <http://www.mmtimes.com/no425/b003.htm>

GP Battery Industries Ltd plans to double production in coming months to meet domestic demand and boost exports, said Ms Rosie Rao, the company's managing director, last week. "The company is currently producing about 15,000 batteries a month and we plan to double that in coming months," she said, adding that an increase in the number of staff and new machines would cover the higher production. The GP factory, in Hlaing Tharyar IZ No 3, imports the key raw material, lead, from Australia, Malaysia and Thailand and will export one quarter of the batteries produced, she said. "UAE is our biggest customer but we also export our car batteries to Singapore and India," she said. The company's factory makes batteries for emergency lighting, motorcycles and cars. "Our foreign clients are buying as much as we can produce and we've just signed agreements with a number of our existing clients to increase our production," said Daw Lwin Lwin Nyein, the company's director. "If and when we double our production we'll be exporting 50 percent of our batteries," she said, adding that there are plans for even greater expansions. "We plan to gradually expand our production until we're making 60,000 to 80,000 batteries a month," she said. GP has also been making Mega Power Brand YB5L-B batteries for motorcycle factories in upper Myanmar since March and plans to export them in near future, she said. "Motorcycle batteries are usually imported from Thailand but due to higher demand in locally, we decided to produce them ourselves," she said.

NLM: 25/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080225.htm>

Toyo battery factory was built in Shwepyitha IZ in 1995. It manufactures the N-20, N-40ZL, N-50ZL, N-70L, N-70ZL, N-100, N-120, N-150, N-200 batteries as well as the Industry (Stand By) battery for locomotives, coaches, trawlers, elevators and escalators. The product is popular among users as it is of high quality. The

factory is preparing to launch its new tubular battery which is more durable than other kinds of batteries. The new product will be available on the market in 2008.

NLM: 18/07/04 <http://mission.itu.ch/MISSIONS/Myanmar/04nml/n040718.htm>

SPDC Sec'y No 2 Thein Sein and officials of the SPDC office visit the Byanhlwar dry cell factory owned by the Myanmar War Vets Organization where they are welcomed by MWVO V-C Vice-Admiral Kyi Min (ret'd) and Factory Manager Lt-Col Khin Maung Gyi (ret'd). At the factory on Kinwunmingyi Road in Shwepyitha IZ, Lt-Gen Thein Sein inspects a display of production process of D- and AA-size batteries. Afterwards the manager reports on investment, test operation of the factory, production on a commercial scale, the kinds of dry cells being produced, the raw materials used, power supply, distribution of finished products, income, strength of staff and requirements. He is told to conduct technical courses, arrange for substitute parts needed for the factory, market quality products, take fire preventive measures, observe worksite safety, and spend carefully. Secretary No 2 and party then inspect the production process and warehouses. The factory employs 127 staff and produces 7,200 D and AA sizes dry cells per hour which are available on local markets and in the Winthuza Shops of the Ministry of Industry No 1

Toyo Battery Myanmar website information. www.toyobatterymyanmar.com/profile.htm

Proven Technology Industry Co Ltd, (PTI), a private limited company based in Yangon, wholly owned by Myanmar citizens, incorporated in Myanmar in 1996, manufactures and distributes Toyo lead acid automobile batteries, industrial standard batteries and other specialized batteries. The batteries conform to ISO 9001:2000 standard. The factory located in Block-94(A+B), 42nd Qtr, Kha Yae Pin St., Industrial Estate, Shwepyitha township

MYANMAR REPORT TO [MEKONG EXPERTS](#) ON POWER TRADE

Ninth Meeting of the Experts Group on Power Interconnection and Trade (EGP-9): Greater Mekong

Subregion: Summary of Proceedings, (Guanzhou, PRC, 18/11/03)

<http://www.adb.org/Documents/Events/Mekong/Proceedings/egp9.asp>

Section 22. Dr. Thein Tun, Director General, Ministry of Electric Power (EPM), recalled that the EPM was established in November 1997 to promote effective operation of the power sector. He said that MEPE was put under the EPM and that a newly established Dept of Electric Power acted as policy-making body as well as Secretariat to the Ministry. In January 2002, he noted that the DHP had been established to increase capacity for implementing hydropower projects. He gave a quick review of the policy and strategies of the MEP and presented the demand and supply situation of Myanmar's power industry. He gave the demand forecast for the next 10 years. He stressed that to meet future power demand, the MEP had laid down a 5-year short term and a 30-year long-term strategic plan. The first was to meet rapidly rising domestic demand, and consisted of plans to develop 14 hydropower stations and a coal-fired thermal plant, and 28 transmission lines and substations. He enumerated the objectives of the 30-year plan, which is to consider power trade with GMS, ASEAN and the BIMSTEC region.

Section 23. He then briefed the delegates on the estimated investment costs for the generating projects in the first five-year plan and the financing status for these projects. He said that of the estimated costs of \$1,092.52 million, financing had been secured for about \$777.52 million. For the transmission projects, of an estimated total cost of \$423.92 million, \$91.92 million had already been contracted. Financing came mostly from the government's own funds, suppliers' credits, and Chinese and Japanese grants. He noted that little or no direct foreign investment went into the power sector due to heavily subsidized power prices. He showed the current electricity tariffs, which the MEP was tasked to propose but which needed government approval to become effective. He explained that for households, the rate is subsidized up to 200 kWh month, but they are charged 25 kyat/ kWh thereafter, at the same rate as industrial and commercial consumers pay for all their usage. He proceeded to discuss the export oriented projects in which foreign investors had shown interest, since they could get commercial tariffs for the power produced by projects such as the Tasang (7110 MW) and the Hutgyi (400 MW) on the Salween, and the Tamanthi (1,200 MW) on the Chindwin. He concluded by stating that incentives, with regard to electricity tariffs, were required to enable private investors supply power on commercial basis. Further power sector deregulation and

establishment of institutional framework for IPPs were required to attract foreign investment and private participation in the power market.

Section 24. Mr. Chavalit asked about the progress of Myanmar-Thailand power trade. Dr. Thein Tun replied that an MOU was signed between Myanmar and Thailand for the former to supply 1,500 MW to Thailand by 2010. He said the most advanced among the export hydropower projects is Tasang. Mr. Tran Minh Huan asked about the BOOT power projects and the extent of local firms' participation in these. Dr. Thein Tun replied that the lack of foreign exchange limits local firms' involvement in the power sector.

Additional references

See above: 'China - ASEAN Power Co-operation & Development Forum: Notes' (CEC: 29/10/07)
 'Chinese [hydropower investment in Mekong region](#): Perspectives' (LRS: 29/09/07)
 See below: 'Power purchase [deal between Thailand and Burma](#) on the way (Nation: 27/05/97)

SHWELI TRANSMISSION LINE CONTRACT SIGNED

People's Daily Online, 10/10/03. http://english.people.com.cn/200310/10/print20031010_125740.html

A Sichuan company in the PRC and Myanmar electric power authorities signed a contract in Yangon on provision of equipment to the Myanmar side for a double transmission line project. The contract is between the Sichuan Machinery and Equipment (I & E) Co Ltd of China and MEPE.

With a total length of 356 kilometers (km), the 230-kilovolt (kv) double transmission line will extend from the Ruili [Shweli] power plant in northern [Shan state] to Mandalay, Myanmar's second largest city in the [central part of the country]. Besides equipment for the transmission line, the Chinese side will also provide equipment to three other sub-stations covered by the transmission line. Under the contract, the Chinese side is also responsible for supervision of the project site, technical services and personnel training. The US\$34.72-million project will be completed in 22 months.

Construction of the Ruili [Shweli] hydropower plant will start in November this year and be completed over a 42-month period. It is located in northern Shan state, 90 km from the border town of Ruili in the PRC. The installed generating capacity of the plant will be 400 MW and it is expected to produce nearly 3,022 million kWh annually.

Myanmar, which has a serious shortage of electric power, has a total installed generating capacity of 1,165 MW. The country's power transmission lines are outdated and unable to meet the requirements for daily life and economic development. The Shweli line will greatly raise Myanmar's power transmission capacity. On behalf of respective sides, Yao Yuning, president of the Chinese Sichuan company, and Sann Oo, managing-director of MEPE, signed the contract.

Compiler's note: The route of the Shweli-1 – Mansan – Shwesayan power line is sketched out on Map 4 ([ELPG003D](#)) below. The distance covered by the line between the generating station at Shweli-1 and the main power station at Shwesayan is shown as 190 miles (300km). However, news items about the 230-kV transmission line indicate a total distance of 220 miles (350km). Map 4 shows the 230-kV line as further extending from Shwesayan to Belin (about 15 miles = 24km), the proposed main power station for the distribution of power generated by the 790-MW plant at Yeywa. Maximum power available for transmission along the 230-kV, Shweli-1 - Belin line is indicated as being 15% of the total 600-MW capacity of the Shweli-1 generating plant (90 MW). The 45-MVA sub-station at Shweli-1 would distribute power to Namkham and Muse along a 66-kV transmission line. The 60-MVA power station at Mansan would distribute power to Lashio and Kyaukme along separate 66-kV transmissions lines. The power station at Shwesayan is already linked to the nearby sub-station at Kyaukchaw on the 132-kV line between Tagundaing (Mandalay) and Pyin-U-Lwin (NLM: 30/07/08 <http://www.burmalibrary.org/docs5/NLM2008-07-30.pdf>).

Additional references

See above: 'Border towns unhappy with power supply from Shweli-1' (IRROL: 22/07/10)
 'Shweli-1 hydropower plant officially inaugurated' (NLM: 17/05/09)
 'China's first BOT hydropower project in Myanmar revs up' (Mekong News: 30/12/06)
 See below: 'Contract for Shweli hydropower project signed with YMEC' (NLM: 09/08/03)

NLM, 30/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-30.pdf>

EPM No 2 Khin Maung Myint inspects the switch yard that will supply electricity from Shweli hydropower plant to Namkham, Muse and environs. The control building of the 66/11-kV, 5-MVA Namkham sub-power station is 80pc complete, and the switch yard and electrical installations are 100pc complete. Electricity will be supplied to Namkham, Muse and Kyugok (Pansai) through the Shweli-Namkham-Muse 66-kV power grid. The minister also visited the Muse District Electrical Engineers' Office, township Electrical Engineers' Office and 66/11-kV, 10-MVA Muse sub power station.

NLM, 26/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-26.pdf>

Installation of a 66-kV transmission line between Shweli No 1 power station and Namhkam and Muse and construction of a sub-power station continues.

NLM, 24/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-24.pdf>

EPM No 2 Khin Maung Myint checks the control room, battery room and switch yard at Shwesaryan sub-power station. Next, he inspects the Sintat and Letpanphyu banks of the Ayeyawady river where pylons will be built for the 230-kV line across the river through the Ohntaw subpower station. Then he visits the Monywa and Nyaungbingyi banks of the Chindwin where the pylons will be across built across the river for the 230-kV Ohntaw-Nyaungbingyi line.

NLM, 06/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-06.pdf>

At the Mansan power plant in Namtu township, Maj-Gen Min Aung Hlaing of the MoD inspected functions of power supply to townships in Shan state. Hydropower plants in Shan State North are supplying electricity to Lashio, Kyaukme, Namhkam, Hopang, Chinshwehaw and Kaungkha and local diesel power to Lashio, Kyaukse, Muse, Kunlong and Laukkai. [A photo of the switching yard at the main sub-power station in Mansan is included in the print edition of NLM.]

NLM, 06/07/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nml/n080706.htm>

Co-ordination meeting on the implementation of the Mansan-Shwesaryan section of the Shweli – Mansan-Shwesaryan 230-kV power grid project of the Power Supply Project (North) was held on 30 June.

NLM, 28/05/08. <http://www.burmalibrary.org/docs5/NLM2008-05-28.pdf>

Unloading of 2,980 tons of cables to be used in the installation of the 230-KV power grid linking Shweli, Mansan and Shwesaryan. [Photos of unloading on p. 6]

NLM, 13/05/08. <http://burmalibrary.org/docs4/NLM2008-05-13.pdf>

EPM No 2 Khin Maung Myint inspects construction of Mansan-Lashio 66 KV power cables and 230/66/11 KV, 60-MVA Mansan sub-power station and looks into installation of 60-MVA transformer and other electrical equipment as well as construction of the foundation in the switch yard and the control building.

NLM, 21/04/08. <http://www.myanmargeneva.org/08nml/n080421.htm>

Construction of the control room and switch yard of the sub-power station project in Lashio and work on the main sub-power station and transformers at Shwesaryan in Patheingyi township inspected.

NLM, 07/03/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nml/n080307.htm>

Mention of the construction of a 66/33/11 KV (20-MVA) sub-power station in Lashio, and the installation of a transformer at the station. Work continues on the Shweli-Mansan-Shwesaryan power grid project near Sakhantha Village in Kyaukme township and the construction of pylon No 609 near mile post No 19 on PyinOolwin- Mandalay motor road.

NLM, 06/03/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nml/n080306.htm>

Construction work continues on the Shweli-Mansan-Shwesaryan power grid including the No 321 Goakdwin tower in the Kyaukme District and the construction of the the Mansan main sub-power station.

NLM, 25/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080225.htm>

Gen Kyaw Win of the MoD meets officials of the project working on the Shweli-Mansan-Shwesaryan 230-kV power line and power stations construction project in Lashio. Manager Aung Kyaw Oo of the Power Supply Project (North) of MEPE reports on the installation of the power line and power stations.

NLM, 12/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080212.htm>

Arrival of materials for the Shweli-Mansan 230 kV national grid project at the compound of MEPE and Equipment Management Division of EPSE in Ahlon township.

Palaung (Ta'ang) Youth Network Group, *Under the Boot*, December 2007. pp 40 – 41.

<http://www.salweenwatch.org/downloads/UndertheBootEnglish.pdf>

Beginning in Dec 2006, LIB 130 of the Myanmar Army based in Mantong required 30 Palaung villages to rebuild the road from Mantong to Namkham. The road follows a planned transmission line route. The chairmen of all large village councils along the road had to ensure that each household send one person to work on the road for a month at a time. Over 300 villagers have worked on road so far without the help of machinery. In 2006, another line was started from Namtu to Mansan. Since Feb 2007, an estimated 27 villages had had to send one labourer from each household to improve the road from Mantong that will follow the power line route. Each village is responsible for a 5-mile stretch of the road. On May 21, 2007, the Commander of the Myanmar Army's north-east district ordered LIB 130 to commandeer 15 trucks in Mantong to carry electric and materials for building pylons from Lashio to construction sites in Namtu. The owners of the trucks had to provide their own petrol and were not re-imbursed for the use of the vehicles.

NLM, 01/10/07. <http://www.ibiblio.org/obl/docs4/NLM2007-10-01.pdf>

EPM No 2 Khin Maung Myint meets with Wang Tao of Sichuan Machinery & Equipment (I & E) Co Ltd of the PRC at the ministry office in Nay Pyi Taw on 28 September. Among those present are D-G Thein Tun of Electric Power Department, MD Tin Aung of EPSE. The minister explained facts about Shweli-Mansan-Shwesaryan 230-kV power grid. Next, the minister and Wang Tao discussed matters related to the project.

NLM, 14/09/07. <http://www.ibiblio.org/obl/docs4/NLM2007-09-14.pdf>

EPM No 2 Khin Maung Myint and officials inspect the main power station at Mansan, included in the 230-KV Shweli-Mansan-Shwesaryan power-line project, and sub-power stations on 10 September. Project Manager Aung Kyaw Oo briefs the Minister on completion of the approach road along the power line, stockpiling of gravel and sand and 'accomplishment of the towers'. MD Tin Aung of EPSE and Director of Myanma Electric Power Supply Project (North) Tin Shwe also report. The minister gives instructions on the use of quality materials and timely completion of the construction of the main power station. Afterwards they inspect work on the 230-kV Shweli-Mansan-Shwesaryan grid near Sakhantha village between Kyaukme and Nawngkhio which is being carried out by the Original Group Co Ltd.

NLM, 13/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070613.htm>

While in Kunming, EPM No 2 Khin Maung Myint met the chairman of Sichun Machinery and Equipment (I & E) Co Ltd, Yao Yuning, in Kunming and discussed the supply of materials for the Shweli power line and timely completion of the project.

NLM, 04/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070104.htm>

Central China Power Grid International Economic & Trade Co Ltd and MEPE of the EPM-2 sign a contract for the purchase of electrical appliances for the Belin-Monywa-Meiktila-Taungdwingyi 230-KV power line and the Shweli, Mongsan [Mansan] and Shwesaryan sub-power stations on 30 December.

NLM, 25/12/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061225.htm>

At Kyimyindine Station in Yangon materials for building the twin bundle double-circuit towers along the 230-kV Shweli-Mansi power line are loaded onto a train.

Kayan Soe Myint, NLM, 09/08/03. <http://www.burmalibrary.org/docs6/NLM2003-08-09.pdf>

With a view to expanding the scope of power supply to the towns and villages along the Union Highway, including Lashio, Muse and Namkham in Shan State (North), Bhamo and its surrounding areas in Kachin State, and industrial enterprises in Mandalay and Monywa in central Myanmar, the HPD under MEPE is making arrangements for the Shweli hydropower station near Mantet Village, 17 miles south-west of Namkham in Muse District. To distribute the electricity, sub-power stations and nine power lines: the 217-mile Shweli-Mandalay line, the 135-mile Mandalay-Monywa line, the 53-mile Namtu-Hsipaw-Kyaukme line, the 23-mile Namtu-Lashio line, the 47-mile Shweli-Namkham-Muse line, the 50-mile Shweli-Kutkai line, the 46-mile Shweli-Bhamo line, the 12-mile Muse-Kyugok line and the 18-mile Kutkai-Hsenwi line will be constructed. These lines and sub-power stations will also provide power to the copper mine in Monywa, the Namtu mine, a new nickel mine in Thabeikkyin and projects and factories in Upper Myanmar.

LOCALLY-MADE STOVES AND OVENS FIND FAVOUR

Yin Min Tun, Myanmar Times, 06/10/03.

(Compiler's note: Issue 186 of the Myanmar Times is no longer available on-line.)

Locally-assembled cooking appliances that combine the use imported parts with local materials make the end product more affordable and give them a big advantage over fully-imported brands, a Myanmar Times survey found. Duwon Electric, which began making electric stoves in 1987, said it had been enjoying stable sales figures even during slower economic times. "People have come to recognise our Duwon brand which acquired a large market share from 1990 onwards," said U Zayar Min Thu, sales manager for the company. The prices of a Duwon electrical stove range between K3,000 to K6,000, depending on the quality of the coils and switches used, and their cooking capacity.

Models that use a stone frame have lower prices than those that use more expensive raw materials like aluminium. "Stone frame stoves can withstand heavy weights and are more affordable for most Myanmar people," U Zayar Min Thu said. By using raw materials and spare parts from Myanmar, local products can be sold at low prices and gain high sales volume, he added. Duwon distribute their stoves all over the country. Sales in Yangon are only half of the combined sales in other cities. "Our sales numbers have risen three times in the past three years," U Zayar Min Thu said.

Another stove maker, Daw Tin Tin, began assembling her Kabar Kyaw electric stoves just last year when she learned of the success of local manufacturers. The Kabar Kyaw stoves are available with aluminium iron and stone frames, and appeal to a wide range of consumers. "Most of our sales in the Yangon market are in suburban areas like Dagon Myothit and Thaketa townships where products that are affordable are needed," said Daw Tin Tin. The price of a Kabar Kyaw stove ranges from K1,000 for a stove made of iron, to K9,000 for a stove made of aluminium. 70pc of Kabar Kyaw's sales are in Yangon, with the balance coming from Mandalay, Patheingyi, Mawlamyine and other regional cities.

Daw Mya Mya is another entrepreneur in the stove market. Her brand, Aung Myanmar, also comes with iron, aluminium or stone frames. Sales for Aung Myanmar have 'cooled' during the past three years, according to Daw Mya Mya, but rainy season peak sales were keeping the company profitable.

Distributors of imported stoves say the success of local products may be due in part to the fact that local consumers are not acquainted with the new technologies included in their products. "Myanmar people don't like equipment that is a little bit complicated to use," said U Kyaw Kyaw, a supplier of the Khind brand of electrical appliances such as microwaves from Malaysia. "Hotplates and ovens which they are accustomed to are much easier to use," he said. But he believes consumers will become more interested in the newer types of kitchen appliances as time goes on and consumer-spending power increases. "We rely on the quality and reasonable prices of our products and hope that eventually this will lead to greater demand on the part of consumers," he told the Myanmar Times.

Casa Yangon Ltd supplies Italian-made home appliances imported through Singapore. Most of its sales are to construction companies who build them into the kitchens in apartments or housing estates. Casa Yangon's sales manager, U Maung Maung Htun, said that electrical appliance purchases were all about what

people can afford. "The general spending power of most clients excluding construction companies is just over K10,000," he said. "Most imported hotplates and ovens ranged from K12,000 to more than K100,000 for a gas oven and stovetop." He said that many clients liked to have both gas and electrical appliances because of inconsistent electricity supply in some places. He also noted that hotplates, ovens and stovetops are widely used but microwaves are not.

Additional references:

NLM, 23/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070523.htm>

The Minister for Industry No 2 and the D-G of the Directorate of Myanmar Industrial Planning inspect the electrical and electronic appliance factory in Mayangon township. Rice cookers and electric irons are produced in the household workshop of the factory. The minister urges production of appliances with modern marketable designs and distribution to the markets in timely fashion. [Compiler's note: The website of Myanmar Machine Tools and Electrical Industries <http://www.industry2.gov.mm/mtei.htm> indicates that the following household electrical goods are produced at MMTEI's factory in South Dagon: fluorescent lamps & incandescent bulbs, electric rice cookers, electric irons, electric hot plates, dry cell batteries, storage batteries, other electric accessories. It is not clear whether the 'household workshop' at the appliance factory in Mayangon township has been transferred to South Dagon or whether it continues to operate as a branch of the main factory in South Dagon.]

POWER FLUCTUATIONS KEEP ELECTRICAL SUPPLY SHOPS BUSY

Nyi Nyi Aung, Myanmar Times, 06/10/03.

(Compiler's note: Issue 186 of the Myanmar Times is no longer available on-line.)

The market for voltage regulators has slowed over the past five years, as the supply of direct current has become more consistent, according to electronic industry sources. The regulators, which are used to stabilise direct-current voltage were first introduced into the Myanmar market in the early 1980s. Since then, models imported from Japan and China have largely been replaced by locally-made products whose design is more inappropriate to the Myanmar market.

U Pe Thein of UPT Electrical and Electronic Manufacturing Co-op Society Ltd said the different ranges of power fluctuations around the country meant regulators needed to have a wide range of voltage rates. "Increasing power supply is not enough to make voltage regulators completely redundant. Power distribution is much more important." He said UPT regulators had 50pc market share when they were first manufactured but now had only about 10pc as more competitors entered the market. UPT is attempting to diversify, and is now focusing on producing high voltage transformers as the co-op see a better future in this market. "To have good electricity distribution you need high voltage transformers everywhere. This also means that low voltage transmission lines will be replaced by higher ones," U Pe Thein said. Good distribution meant not losing so much power in distribution lines, he said.

So far only two other companies in Yangon are producing high voltage transformers with a capacity up to a thousand kilo-volt-amperes (kVA). U Pe Thein said his voltage regulators' peak season was from October to April in which 85pc of total sales were made. UPT produces manual and auto-voltage regulators having capacities of 5 and 10 kVA with auto-voltage regulators making up about 60pc of total sales.

U Aung Kyi Sein, MD of Duwon Electric, said 60pc of Duwon voltage regulators sold are manual, while manual-plus-auto voltage regulators make up 30pc of sales, and the rest is balanced by the sale of auto voltage regulators. Manual voltage regulators are more robust than auto voltage regulators, which are suitable only for low current-fluctuation areas, he said. Duwon produces 24 varieties of voltage regulators with prices ranging from K24,000 to K260,000. U Aung Kyi Sein said more customers bought Duwon voltage regulators in the hot season because electronic products like air conditioners and fans were used more during that time of the year.

He said Duwon inverters, devices for converting direct current into alternating current that were first produced by the company in 1997, have become their big seller. Inverters make up 70pc of the Duwon's total sales, he said. The company produces five other products including voltage regulators. "Duwon inverters are more robust and have more functions than other inverters in the market, so we enjoy 50pc of the inverter market," U Aung Kyi Sein said. He said though the market for inverters is growing, the future is uncertain as inverters are only temporarily needed before the electricity supply becomes consistent.

Additional references

See below: 'Local transformer manufacturers face [tough competition](#)' (MT: 27-01-03)

See also: 'Voltage regulator sales brisk' (MT: 01/08/05)

www.myanmar.com/myanmartimes/MyanmarTimes14-277/b001.htm

'Power fluctuations – finding the answer with regulators' (MT: 31/07/00)

www.myanmar.gov.mm/myanmartimes/no22/power_fluctuations-finding.htm

SOLAR POWER SEEN AS SOLUTION FOR REMOTE VILLAGES

Kyaw Naing, Myanmar Times, 06/10/03.

(Compiler's note: Issue 186 of the Myanmar Times is no longer available on-line.)

Subsidies, technical support and greater awareness are needed to speed the development of alternative energy sources in Myanmar, an industry spokesman said last week. One of the leaders in the field, U Win Khaing, managing director of Myanmar Solar Energy System, a subsidiary of United Engineering, is enthusiastic about the future of solar power as an alternative power source in this country. "Myanmar has great potential for utilising solar energy which is a free energy source. It could provide an immediate solution for remote villages that are not connected to the national electricity grid".

U Win Khaing said that solar power could help raise socio-economic standards for people living in remote areas, where it is difficult and costly to install overhead power lines. "Of a total population of 52 million, about 70pc of the people in Myanmar live in rural areas. There are nearly 13,000 villages in the country, some of which still need to have access to electricity," he said.

Myanmar's average sunlight-hours range from 5.2 to 7.45 a day – more than sufficient to make effective use of a solar power system. In many cases, a solar power system alone can provide sufficient electricity to meet the requirements of an average rural household. The main reason solar energy is not used more widely at present is that purchase and installation costs are still too high for most of those living in rural areas.

The FISCA Co distributes 12-watt, 50-watt and 75-watt solar panels manufactured in China and India. A complete set including a solar panel, battery, DC/AC current inverter and other accessories ranges in price from US\$650 to \$900. The Sunpower Co which distributes Siemen solar products is another of five companies that promote the use of solar power in Myanmar. Their 75-watt system costs about K550,000. Its 75-watt panel when combined with a 120 ampere battery can power three 20-watt lights and a television set for about four hours, while a 50-watt panel with a 70 ampere battery can power three 10-watt lights and a television set for about three hours.

Solar energy usage in Myanmar is still very low, but it is currently used to charge battery back-up systems for radio telephones, telephone switchboards, television relay stations, water pumping stations and solar freezers for hospitals in rural areas. "Wider use of solar power can be implemented in many ways: from installing a village or community-based solar power generation system funded by contributions from residents; through to individuals installing their own solar power system as an alternative to relying solely on power drawn from the national grid," U Win Khaing said.

Website references:

Border Green Energy Team (BGET) website: http://www.bget.org/index.php?option=com_frontpage&Itemid=1

This website provides an introduction to BGET, a group that provides hands-on appropriate technology training and financial support for low-cost, community-based micro-hydro and solar electricity projects along the Thai-Burma border. The project is based on the team's experience in training and providing solar electric systems for medical clinics in Karen areas of Burma, its experience in helping villagers in Thai-side villages in the border area to build community micro-hydro systems, and its work training Karen Thai villagers to operate, maintain and repair solar electric systems. Of special interest are the on-site documents, manuals, and reference materials that BGET uses for the micro-hydro, solar, bio-gas and hybrid systems of power generation it assists. See also the following for accounts of similar and related activities:

<http://palangthai.blogspot.com/>, Check this blogspot for regular updates on small-scale renewable energy activities in Thailand and Burma.

http://www.palangthai.org/en/bsep/docs/PV_Workshops_HP98.pdf

This article describes two hands-on renewable energy workshops conducted in Myitkyina and Toungoo by Chris Greacen of the Burma Sustainable Energy Project of Palang Thai, a Thailand-based NGO that promotes clean and democratic energy in Southeast Asia. The article provides practical details of the installation of solar - electric panels at two community development centres near Myitkyina and a clinic in the Toungoo area. Excellent photos and diagrams.

<http://www.palangthai.org/docs/HP124pg76Greacen.pdf>

Chris Greacen writes about the installation of a low-head microhydro system in Mae Klang Luang village in northern Thailand.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>

Information presented by the Energy Planning Dept of the Myanmar Ministry of Energy at the second subregional energy forum in Ho Chi Minh city on 22/11/08 indicates that the installed electrification capacity of renewable energy sources at the end of 2008 was as follows: Solar power: 0.1157 MW, Wind power: 0.5194 MW, Mini hydro power: 8.3530 MW, Bio-mass power: 18.1942 MW; Biogas power 1.5993 MW. The same website also notes that the Dept of Alternative Energy Development and Efficiency of the Ministry of Energy of Thailand is sponsoring a study and assessment of solar energy potential in Myanmar.

Academic paper

Thet Thet Han Yee, Su Su Win, and Nyein Nyein Soe, "Solar Energy Potential and Applications in Myanmar" in *Proceedings of World Academy of Science, Engineering and Technology* (Vol 32, Aug 2008). <http://www.waset.org/pwaset/v32/v32-79.pdf>

This paper draws together information and technical data related to the use of solar energy power in Myanmar from a number of sources otherwise difficult to access. Among the applications currently in use are solar powered refrigerators and lightings systems in rural clinics and hospitals under the Ministry of Health and irrigation pumping stations of the Water Resources Utilization Department of the Ministry of Agriculture. A valuable section in the paper draws attention to a community water system in the village of Nantha Myaing in Madaya township, north of Mandalay. Two pump stations have been successfully installed and operated in the village using separate solar photovoltaic supply systems. The first system is configured with thirty-two 75-W Siemens solar modules to run a Grundfos SP 3A 10 submersible pump. Output power capacity is reported to be 2399 watts with water pump-up capacity of 13,254 gallons per day at a 180-foot head. The second system is configured with sixteen 75-W Siemens solar modules to run Grundfos SP 3A 10 submersible pump. Output power capacity of this system is reported to be 1200 watts with water pump-up capacity of 4500 gallons per day at 100-foot head. Water is stored in concrete and metal tanks of varying capacities. The pumps operate for about 8 hours/day. [Thet Thet Han Yee, the principal author of the paper, is currently a Ph.D candidate in the Electrical Power Engineering Dept of Mandalay Technological University.]

Additional references

See above: 'Ywathaya village lighted up by solar power' (NLM: 26/01/11)
'Dealers report strong increase in the [sale of solar power sets](#)' (MZZ: 06/10/09)

'Indian [solar lanterns](#) to light up Myanmar huts' (PTI: 07/02/09)

'Pharma factory nominated for energy award' (MT: 16/06/08)

'Myanmar to build first [storm-resistant model village](#)' (Bernama: 12/06/08)

See the section on solar power in '[Electricity potential](#) of energy sources available in Myanmar (EM: 2001)

NLM, 19/10/10. <http://www.burmalibrary.org/docs09/NLM2010-10-19.pdf>

PTTEP International Ltd which is working in partnership with MOGE in the Mottama offshore oil field has provided Taungle village in Paukkaung township with solar power generation equipment. The donation is aimed at furnishing the high school and station hospital in the village with electricity on a 24-hour basis.

Maung Tway Htet, NLM, 25/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-25.pdf>

Apart from solar-powered equipment, Ministry of Industry-2 is preparing to produce solar panels ranging from 21 watt to 185 watt at its Machine Tool and Electronics Factory (South Dagon) starting in Sept-10.

Aung Maung Myint Swe, NLM, 18/03/10. Edited and condensed.

<http://www.burmalibrary.org/docs08/NLM2010-03-18.pdf>

At its meeting on 05/03/10, the Special Projects Implementation Committee received guidance on a project to produce solar panels that can generate electricity. The Ministry of Industry-2 will soon install machines to produce thin-film solar panels at its plant in Yangon. New methods will be used in the production of the low-cost solar panels will be used. The panels will be available for both military and civil apparatuses. The ministry is aiming at producing enough panels to produce a total of two megawatts annually. Demand for the popular panels is bound to increase and will make it necessary to manufacture them on a commercial scale.

NLM, 06/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-06.pdf>

Minister of Industry No 2 Soe Thein reports to the Special Projects Implementation Committee that the ministry will implement a solar panel project with advanced technologies in Yangon. Based on demand, [the panels produced] will [be able to] generate two megawatts a year.

NLM, 23/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-23.pdf>

Demonstration of the use of solar-power pumps conducted by Grundfos Co of Denmark and MY Associates Ltd of Myanmar. The pumps are intended for use in pumping underground water at hospitals, schools, homes and workshops in rural areas with insufficient supply of electricity.

NLM, 07/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-07.pdf>

In Putao in northern Kachin state, a newly constructed building that houses the Ministry of Industry-2 will implement the Solar Panel Project with advanced technologies in Yangon. Based on the demand, it will generate two megawatts a year. nment Technical Institute and the Government Technical High School (Putao) was officially opened. The learning centre features an internet & video conferencing room with teaching aids, a solar-powered iPstar satellite receiver. A gasifier is used to generate electricity for the school. Altogether 98 students are attending the technical Institute (Putao), and 367 students, the technical high school. Photos of the solar-panels and the iPstar satellite receiver are included in the print edition of NLM.

UN Relief Web, 30/04/09.

<http://www.reliefweb.int/rw/rwb.nsf/db900SID/AMMF-7RLSM2?OpenDocument>

In Myanmar's Ayeyarwady delta, Tearfund has financed an initiative to distribute two rechargeable LED lamps to each of 110 families and the installation of a community solar recharging unit. This natural resource, readily available, is an affordable technology and has the potential to dramatically improve the lives of thousands of people living in isolated communities throughout the delta which have no electricity supply.

NLM, 06/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-06.pdf>

Gen Myint Swe of the MoD Myint visits the MMTEI factory of the Ministry of Industry-2 at the corner of Mindhamma and Parami streets in Hlaing township, Yangon, where he is briefed by the advisor to the section dealing with LED electric bulbs on the production of bulbs, bio-batteries and the generation of solar-power. He checks on the production of LED bulbs. [A photo of the machinery used to produce the bulbs accompanies this news item in the print edition of NLM.]

Xinhua, 12/03/09. (edited)

http://www.macaodailytimesnews.com/index.php?option=com_content&task=view&id=24005&Itemid=32

Myanmar Ministry of Energy and its Thai counterpart have agreed to continue their co-operation in generating electricity from wind in Myanmar's coastal regions during 2009, sources with the Myanmar Hydrology and Meteorology Department said yesterday. The study follows up a similar co-operative endeavour in 2008 when the two parties constructed five solar energy measurement towers in the Yangon, Mandalay, Shwebo, Meikhtila and Pyay regions.

NLM, 28/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-28.pdf>

On a tour of villages in Kyunsu township in Taninthayi division, Industry No 2 Minister Soe Thein visits Mayanchaung, Kapa, Kade Katud, Katan, Tayapine, Wachaung, Migyaung-aw, Lewahbyin, Done-paleaw and Kangyi [on Katan island] where he consults with officials, teachers, health staff, local people and members of NGOs on matters related to the supply of electricity, including the use of hydropower, solar energy and bio-fuel and the building of village-to-village roads. The minister presents 20 sets of solar generators and 20 sets of hydro power turbines for village dispensaries, monasteries and computer rooms.

NLM, 12/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-12.pdf>

During a visit to the Bawlake township hospital in Kayah state, Prime Minister Thein Sein inspects the solar-powered 'generator' of the hospital.

NLM, 23/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-23.pdf>

A joint delegation led by government ministers from Norway and Denmark tours areas in the Ayeyawaddy delta areas hit by Cyclone Nargis. They are taken to Hlaingphone village in Mawlamyinegyun township where they view a housing project, school, dispensary, and a solar energy-using power station sponsored by various international agencies.

NLM, 30/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-30.pdf>

A photo of a solar-powered tube well in the village of Hlaingphone in Mawlamyaing-gyun township is included in the print edition of NLM. In the accompanying article, Hlaingphone is described as a model village reconstructed following Cyclone Nargis. A list of Myanmar companies involved in reconstruction activities is included, but it is not clear which one provided the equipment for the solar-powered pump.

NLM, 19/10/08. <http://www.burmalibrary.org/docs5/NLM2008-10-19.pdf>

A demonstration of the use of solar electricity took place in Lashio on 10/10/08. The three solar panels can produce 358 watts of electricity. Three fluorescent lamps, a rice cooker, an electric iron, an electric fan, a TV set and a DVD set can be used simultaneously using the electricity produced. [A photo of the demonstration accompanies the article.]

Khin Su Wai, Myanmar Times, 02/07/07. www.mmmtimes.com/no373/n019.htm

Sales of solar panels have risen sharply in the past five years, with most buyers coming from rural areas not linked to the national electricity grid. The Myanmar Sustainable Energy System company in the Yadanamon housing estate in Hlaing township, says it sells about nine 50-watt solar panels a month. Sales have more than doubled since the company began selling them in 2003, according to assistant GM Soe Thein Tun. "Fifty per cent of our sales are to individual buyers in rural areas, with the rest going to NGOs and welfare groups," he said. Earth Computer Systems Ltd on Sule Pagoda Road in Kyauktada township, said monthly sales had reached at least 10 solar panels, up from barely one when it began selling the alternative energy devices in 2002. "Most of our customers live in rural areas of Yangon and Mandalay divisions and Shan State," said a spokesperson, adding that its best selling panel generated 40W. Solar panels cost about K10,000 a watt, with the top-selling brands made in India and China. More expensive brands from Japan, Australia, Germany and the U.S. are also available. U Aung Myint of REAM urges potential buyers to consider the long-term advantages. "Solar panels involve a high initial investment but they generate power for 20 to 30 years so they offer considerable savings over the long term compared to running a generator."

NLM: 26/04/06 <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060426.htm>

Under the Ayeyawady-Chao Phraya-Mekong Economic Cooperation Strategy, equipment related to a project for generating solar energy to supply power to the Kyaikhtiyo Pagoda was handed over by D-G of the Dept of Alternative Energy Development and Efficiency of Thailand, Siriporn Sailasutaand, to the Pagoda Board of Trustees. At the auspicious time, the cornerstone laying ceremony for the project was held in the presence of the energy ministers of Thailand and Myanmar. The power generated will be used for the pagoda.

Flower News: 29/03/06 www.ibiblio.org/obl/docs3/Flower2006.htm

Friends of the Rainforest in Myanmar have completed a project to supply solar power electricity to 250 households in Thangyigone village in the Mt Popa area. The project began in December 2006 in collaboration with REAM. The project cost more than K100 million; it was funded by the British Embassy.

Refocus Volume 6, Issue 1, Jan-Feb 2005, pp 46-48. www.globalgiving.com/pfil/1721/projdoc.pdf

The Karen Health and Welfare Dept manages 26 remote clinics, scattered across 600 miles, to serve the needs of internally displaced people who have been forced to flee their villages, but remain within Burma. Seventy-five medics work at these clinics, roaming the forests as "backpack medics" and attending to the medical needs of thousands of people. The clinics did not have electricity due to their remote location, far from the national electrical grid and without easy access to fuel for generators. Solar photovoltaic (PV) power proved to be the perfect solution to electrify these remote clinics because it can be transported, owned, and operated at the clinic level. To make sure that the clinics have reliable lighting, we selected and designed special PV systems, and held intensive training for system operators. The systems were designed for 1) high reliability, even during rainy season and 2) mobility so that they could be carried, by foot, to the clinics and moved when the security situation demanded. Each system consists of a 110 watt solar PV panel, a 12-volt 125 ampere-hour deep cycle battery specially designed for solar home systems, two 12-volt, 20-watt, fluorescent lights, and a 1-watt LED that is used as a night light. The charge controller, switches, and strain-relief terminal strips are housed within a rugged cabinet so that the system is durable and relatively 'plug and play'. The system powers the lights and a DC receptacle for charging the batteries of two-way radios, lap-top computers, and other devices. For the project, two medics from each of the clinics crossed into Thailand, where solar training was held. Instructors from Green Empowerment and Palang Thai taught them the practical aspects of solar power. The trainings combined classroom instruction with hands-on construction of the systems. The class covered the ins and outs of basic electricity (volts, amps, watts, and watt hours) and photovoltaic systems (how to maximize solar panel output, the importance of thick wires and good contacts, maintenance of lead acid batteries and optimal load management). Participants then built the systems from scratch, learning to assemble and disassemble them, and fix technical problems that could arise. The participants carried the systems through the jungle back to the hidden clinics and installed the systems themselves. The word has spread among medics and patients about the advantages of solar power and now there are five more at clinics in areas where the risk of army attacks is low enough for them to be safely installed. [Photos illustrate an installed system]

Maw Maw San, Myanmar Times, 09/02/04. [Issue 203 of MT is no longer available on-line.]

U Win Khaing, MD of the Myanmar Solar Energy System, said solar energy was attractive to consumers because it was cheap and reliable. Its potential was huge for remote areas not yet connected to the national electricity grid. Myanmar Solar Energy System became involved in promoting solar energy use because of its growing popularity in some other Asian countries, including Japan. Sun Power started its solar energy business in 1997. GM Ni Ni Than, said consumers were initially reluctant to use solar energy because they were not familiar with it and due to installation costs as high as K500,000 for a system capable of producing 50 watts of power. "After installing the systems, people do not need to spend any more money and there are no fees for the power. We guarantee that our systems will last for 25 years," she said. Solar power is also attracting increasing interest among urban residents and was promoted during the recent ICT Week in Yangon.

"4. Solar and Wind Power", pp 23 – 30. Part of an unnumbered volume entitled, *Visual Guide for Planning Village RE Schemes*, of the series, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar* (Sept 2003).

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159767&volno=000000000&filename=11734050_02.pdf&seqno=2](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159767&volno=000000000&filename=11734050_02.pdf&seqno=2)

This is background material designed for a non-technical manual for field workers to use in presenting basic information about solar and wind power generation at the village and private home level. The advantages and disadvantages of each system are compared. The possibilities of a hybrid generating system are explored and the basics of a solar battery charging station are explained. The uses of solar panels in schools, rural health centres, and water pump stations are touched on.

United Engineering website information [n.d.]. <http://www.united-engineering.net/MSEStuff/remote1.htm>

In Yan Myo Aung, an isolated village [near] the India-Myanmar border, 500 [people] are beginning to enjoy the benefits of power and light thanks to solar energy. Home solar units have been installed for the entire village. Every home involved in the project is equipped with a fluorescent light switch, wires and connectors and a discharge protector. The important thing in remote villages is to keep the power system simple and dependable. In this program each of the homes, as well as the street lighting and communal buildings, is supplied with its own self-contained solar power system. The program was selected because the remote location of the village makes it difficult to obtain fuel needed for other electrical generations systems and the high cost of connecting the area to the transmission grid.

Note also: <http://publishedforscholar.wordpress.com/2006/12/18/india-myanmar-relations/>

As part of an S&T co-operation programme, solar electrification of a village in upper Myanmar was completed in October 2002 by Central Electronics Limited (CEL).

See also above the paper by Thet Thet Han Yee, "Solar Energy Potential and Applications in Myanmar", <http://www.waset.org/pwaset/v32/v32-79.pdf> in which the solar-powered system in Yan Myo Aung is reported to be installed in 110 homes in the village and to have a total capacity of 40 kW. There is also a brief reference to the establishment of the SPV system in Yan Myo Aung in a paper on applications of renewable energy sources in rural Myanmar presented by U Win Khaing of the Myanmar Engineering Society at an ASPAC conference in Seoul (April 2008)

www.mes.org.mm/.../RE%20&%20Rural%20%20Development23April%2008.%20Seoul.pdf

See also: www.mnre.gov.in/annualreport/2002_2003_English/ch10_pg2.htm

See below: 'Alternative energy project uses [three power sources](#)' (MT: 06/01/03)

See also the section on solar energy in '[Electricity potential](#) of energy sources available in Myanmar'.

See also: 'Solar power systems' www.myanmaryellowpages.biz/indexes/s/s036.htm

MULTI-PURPOSE KHABAUNG PROJECT LONG OVERDUE

Khin Maung Than, NLM, 13/09/03. <http://www.burmalibrary.org/docs6/NLM2003-09-13.pdf>

Khabaung multipurpose dam project under construction in Ottwin township is included in the Sittoung Valley Development Project. The project site is located in the middle of thick forest in the Bago yoma, in a region once under the control of Burma Communist Party. The Khabaung creek across which the dam is being built, is a tributary of the Sittoung river and has a strong current. The project is expected to contribute not only to agriculture in the area but also to flood prevention. It will also generate electric power.

The Sittoung valley, stretching from Myohla to the Gulf of Mottama, is blessed with good soil. Paddy, sugarcane, sesamum, groundnut, maize, chili, beans and pulses, vegetables, bananas, fruits, coconut, tobacco, nipa palm (*Nipa fruticans*), jute and rubber, are all grown in the region.

The multipurpose dam is about one and a quarter miles downstream of the confluence of Khabaung creek and Praing creek. A diversion weir is located five miles downstream from the dam which will irrigate 135,000 acres of paddy fields in Toungoo and Ottwin townships. The dam -- with a length of 920 feet and height of 200 feet -- will have a maximum water storage capacity of 878,570 acre feet at full brim. Its spillway is 900 feet long and 100 feet wide. Maximum area of the lake is 14,657 acres. The power facility connected with the dam will generate 20 MW of electricity and is expected to produce 65.4 million kWh of electricity annually.

A feasibility study for the dam was jointly carried out by experts of the UNDP and Myanmar engineers as long ago as 1963. Actual construction only got started in the open season of 2000-2001. Work on the diversion tunnel started in December 2001. By April 2002, 54 steel ribs had been installed. The project is targeted for completion in December 2003.

Personnel at the dam site are discharging their duties with perseverance in the face of extreme hardship caused by the weather and geographical conditions. They include 47 civil personnel, 34 mechanical staffers, eight geological personnel, four quality control staff and 120 skilled workers. They receive an extra bonus of K 1,000 per month. Rice is also provided to them. [Two photos of the site of the Khabaung dam are included in the print edition of NLM.]

Map references

Topographical map reference: Burma 1:250,000: Series U542, U.S. Army Map: NE 47-05: Toungoo Khabaung, 15 mi north-west of Oktwin [18° 49' N, 96° 26' E], grid square reference: 9\9, 25\6
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-5.jpg>

A map showing the location of the Khabaung dam and reservoir and the irrigation weir and proposed canal system can be found along with a description of the project proposal for OPEC funding on the website of the A&IM: <http://www.irrigation.gov.mm/ofid/default.html>

Additional references

Data summary [Khabaung](#)

See above: '[Khabaung reservoir and hydel station inaugurated](#) in Ottwin township' (NLM: 24/03/08)

NLM, 24/04/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040424.htm>

Gen Soe Win and party visit the Khabaung project and inspect work on the main embankment, the inlet and outlet portals of the diversion tunnel and the site chosen for the power station. It will be constructed by Construction Gp 3 of the HPD. The dam will irrigate 100,000 acres of arable land and generate 30 MW.

NLM, 08/11/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n021108.htm>

EPM Tin Htut is briefed on the construction of the horseshoe-shaped [diversion] tunnel, 1,200 feet long and 13.12 feet wide, as well as plans for the saddle dyke and regulating dam.

NLM, 18/01/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010118.htm>

Gen Than Shwe and party visit site of the main dam on Khabaung creek, 2 km west of the confluence of Khabaung and Praing Creeks. The earth barrier will be 700 feet long and 172 feet high. It will irrigate 198,100 acres of crops on 135,000 acres of land and will generate 30 MW.

NLM, 27/12/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n001227.htm>

D-G Kyaw San Win of the Irrig Dept briefs Ag & Irrig Minister on arrangements for construction of the Khabaung multi-purpose dam and the building of the embankment, conduit and spillway.

HYDROPOWER PLANTS IN MYANMAR WITH CAPACITIES UP TO 10 MW

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Appendix A*: pp 27-31 (September 2003).

<http://lvzopac.jica.go.jp/external/library?>

http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5

A team of Japanese field researchers conducted a survey of small and mini hydropower facilities in Myanmar in 2001-02. The results of their survey are included in chart form on pp 29-31 of Appendix A of their report. Besides basic data including the name, location, generating capacity, commissioning date, and hydrological

data, the charts provide a summary of the recommendations made concerning work needed at each of the sites visited. Fourteen of the stations with generating capacities between 1,000 and 10,000 kW are listed below together with whatever information is currently available about them or with a link to a key article in the compendium. A few other small (1 – 10MW) hydropower facilities which have been commissioned since the Japanese survey have also been included.¹ Information about the 29 mini hydropower facilities (100 – 1000 kW) also included in the Japanese report can be found under the key articles '[Mini hydropower plants planned for rural areas](#)' (MT: 08/08/05) and 'Hydropower station commissioned in [Kaungkha](#)' (NLM: 26/07/05). Responsibility for the maintenance of these small hydropower stations appears to be in the hands of the township electrical engineer's offices and the Electric Supply Enterprise of the EPM-2. A few, such as the Malikha and Sonphu stations, are owned and operated by independent power producers.

¹The additional information provided below is current as of April 2011 when the 3rd edition of the Compendium was made available online.

Hopin lies on the highway and railroad leading north to Myitkyina in Kachin State. It is also the entrance/exit point for the circle road leading around Indawgyi lake. The **1260-kW (2x630) hydropower station** is located at a high falls on Galaing creek about six miles northeast of the town. The generating plant installed with equipment supplied by YMEC was opened in Sept 1991. It was originally set up to serve the large town of Mohnyin and Namma, as well as Hopin. In 2010-11, work on a 66-KV transmission line leading north from Indaw (near Katha) through Mohnyin and Hopin to Mogaung was underway. Further information is available at <http://gkmyanmar.com/references.php?show=2&details=94> and <http://www.urec.com.cn/en/> and www.mrtv3.net.mm/open7/170810for.html

Mogaung is a large town with with road, rail and river connections leading east to Myitkyina and the Irrawaddy, south to Sagaing and Mandalay, west to the jade mines at Hpakant, and north to the border with India. The **6000-kW (4x1250) hydropower station** (apparently RoR) is located on Namkham creek about 14 miles east of Mogaung in the highlands between the Irrawaddy and Mogaung rivers. It was constructed with equipment supplied by YMEC and commissioned in Sept 1996. Photos of the turbine-generator set in the Namkham station are shown on p28 of Japanese report. In 2010-11, work on a 66-KV transmission line leading north from Indaw (near Katha) through Mohnyin and Hopin to Mogaung was underway. Further information is available at <http://gkmyanmar.com/references.php?show=2&details=94> and <http://www.urec.com.cn/en/> and www.mrtv3.net.mm/open7/170810for.html

The **Chimkrankha** (Kyeinkran Hka) dam and **hydropower station, 2520 kW (4x630)**, about 12 miles north of Myitkyina in Kachin state, with equipment supplied by YMEC, was constructed in the early nineties and commissioned in 1991. The dam was washed away and the power station destroyed beyond repair after five weeks of heavy rain in July 2006. The power plant served mainly to supply Myitkyina with electricity. Villagers interviewed by the authors of *Damming the Irrawaddy* recalled that thousands of local people were recruited to work without pay building roads, cutting timber, clearing the dam site and acting as general labourers during the construction period. The local communities had high expectations for the electricity that the dam and power house were intended to provide but in the end the villagers who had provided the labour only received electricity once every four days. For further information, see Kachin Development Networking Group, *Damming the Irrawaddy*, October 2007, pp 40-42: <http://www.burmariversnetwork.org/images/stories/publications/english/dammingtheirrawaddy.pdf> , DVB, 11/07/06: <http://six.pairlist.net/pipermail/burmanet/20060712/000989.html> , and YMEC: http://www.ymec.com.cn/en/about_vj_2.htm. A photo of the turbine-generator sets inside the station is preserved at http://www.ymec.com.cn/en/hpp/Project_jcc.htm

The **24-MW (3x8000 kW) hydropower project** on the **Nan Dabak (Nam Tabat)**, 17 miles southeast of Waingmaw in Kachin state, mentioned in the Japanese report, was originally assigned to the Kachin Independence Organization (KIO) and the Buga company affiliated to it, but was left in abeyance while work proceeded on their other project on the Malikha. At the beginning of 2011, it was announced that China Guodian Corp and Tun Thwin Mining Co would undertake two hydropower projects on the Nam Tabat, the first with a generating capacity of 96 MW, and the second with a capacity of 104 MW ([ELEP033](#)).

The 6000-kW project on the Tumpang Chaung (Dunban creek) listed in the Japanese report as being under construction 24 miles northeast of Waingmaw appears to have been the **10500-kW (3x3500) Malikha** (aka Tumpang chaung or Dunban creek) hydropower project completed in 2008 by the Buga company near the village of Dumbaiyang about 40 miles southeast of Waingmaw ([ELHS007](#)). Dunban creek flows north and west from Dumbaiyang and empties into the Irrawaddy near the village of Talawgyi.

The **Ngasitvar** (Ngalsip) hydropower station (RoR), **1000 kW (2x500)**, 12 miles north of Falam in Chin State, is still in operation and supplying power to Falam and nine nearby villages ([ELPG013](#) and [ELSF054](#)). The Ngalsip is a tributary of the Manipur river.

The **Zichaung** hydropower station (RoR), **1260 kW (2x630)**, 12 miles west of Kalaymyo in Sagaing Region, is just over the border in Chin State. It is the main supplier of electricity to Kalaymyo, a large regional centre in northwest Myanmar. The station was built in the mid-nineties and uses equipment supplied by YMEC. It was visited on at least three occasions in 2002-03 by the Japanese study team that produced the report on renewable sources of electricity in rural Myanmar. They monitored the civil works structure of the project and made recommendations to improve the intake and several features of the headrace canal. The photos that they took and their written observations provide some revealing insights into the conditions prevailing at small hydro electric stations in rural Myanmar. They can be found in Appendix 14 of Volume 4, 'Manuals for Sustainable Small Hydro'.

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159775&volno=000000000&filename=11734134_01.pdf&seqno=1](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159775&volno=000000000&filename=11734134_01.pdf&seqno=1)

A large dam, which will supply water for crop irrigation, has been constructed on Nayyinsara creek just to the north of **Yazagyo** [23° 30' N, 94° 06' E] in Kalay township near the border with India. Two Kaplan-type turbine generators, **4000 kW (2X2000)**, are scheduled to be installed in 2011-12. They will supply additional power to Kalaymyo about 35 miles to the south. Work on this project started in 2004. It is not mentioned in the Japanese study. ([ELSF047](#))

Mogok is hard to come by. The Mogok area is the centre for the mining of rubies, sapphires, spinels and other precious stones in the northern part of Mandalay Region, and the valley in which it is located is said to have a population upwards of 200,000. Austrian-made Voest-Alpine machines, **4000 KW (2x2000)**, were installed in the Mogok plant when it was originally set up in the late eighties. As indicated by information provided by the Japanese study team, it was still operating in 2001, though with very high silting problems due to mining operations upstream of the station. In the late nineties a transmission line connecting Mogok with the Letpanhla sub-station on the 132-KV northern grid was brought into operation ([ELPG003B](#)). On a map slide shown at the ADB consultation on transmission in 2008, this is shown as a 33-KV line ([ELPG003G](#)).

The hydropower plant identified as **Kong Nyaung-1, (6800 kW)**, was put into service in 1985 to serve as a power source for the Namtu silver and lead mines and has been, until recently, operated by the state-owned No 1 Mining Enterprise. It is reported to be 24 miles [west] of Lashio, probably close to Mansam. The other small hydropower plant in the area, known as **Kong Nyaung-2, 4000 kW (2X2000)**, is located on the Namyaw (Namyao) creek about 14 miles southwest of Lashio. It was completed in 1994 with equipment supplied by YMEC. Up until recently the Namyaw plant was the main source of electricity for the large regional and military command centre of Lashio, while the Kong Nyaung-1 plant has served the mines and townsites at Namtu and Bawdwin through an 11-KV line. In 2009, a 66-KV transmission line was set up between Lashio and the now completed **230/66/11-KV, 60-MVA main power station at Mansam** (Manhsan) (22° 55' N, 97° 25' E) on the 230-KV line leading south from Shweli-1 hydropower station to the Mandalay area ([ELPG001](#)). Another 66-KV line now runs south from Mansam to the market town of Hsipaw. A 33-KV transmission line is currently under construction between Namtu and the Palaung town of Manton to the west. The NLM publishes occasional reports of inspection visits to all three power stations in the area: 23/04/94, 13/01/98, 12/09/02, 28/02/05, 03/03/07, 14/09/07, 06/03/08, 21/11/10.

Machinery at the **Kyaukme** hydropower plant, **4000 kW (2X2000)**, on Namhsaungnaung creek, six miles east of Kyaukme, was supplied and installed by YMEC. It was commissioned in 1996 and the few published reports since then indicate that it continues to operate, though the Japanese team which visited the plant reported silting problems. Kyaukme is a township and military centre about halfway between Pyinoolwin and Lashio. Photos of the Kyaukme dam site are available in the Japanese report.

The **Tatkyi Falls** hydropower station (RoR), **1200 kW (2X600)**, about six miles east of Yaksauk (Lawksawk) in Shan State South, began operations in July 1987. It continues to function even though two larger hydropower stations, Zawgyi-1 and Zawgyi-2 ([ELHS029](#)), have since been built farther north in the same township. Tatkyi Falls station provides backup electrical service to the Bahtoo Combat Training School for Tatmadaw officers which is located just a mile north of Lawksawk.

Repairs at the **Nam Wop** (Nam Wat, Namwok) hydropower station, **3000 kW (3X1000)**, in eastern Shan State were carried out in 2004-05 and it is currently serving the Kengtung area. See the key article 'Namwok hydropower plant re-opened' ([ELSF027](#)) for further information on Nam Wop and on the smaller Namlat station which also provides electricity to Kengtung.

The **Meipan Creek** hydropower station, which was under construction at the time the Japan study was carried out, eventually housed two generators, **1200 kW (2X600)** supplied by YMEC. It continues to supply electricity to Monghsat, a township and military operations centre close to the border with Thailand in eastern Shan State. ([ELSF026](#))

The **Pathi Creek** hydropower station is located at an irrigation dam that was completed in 1997. But it was not until ten years later that two turbine-generators with a capacity of **2000 kW (2X1000)** were installed. The plant supplies power to New Thandaung and Thandaungyi in northern Karen State. It is connected to the national grid at Toungoo. It is not included in the Japanese study report. For further details, see [ELSF029](#).

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SMALL HYDRO PLANT PROPOSED FOR [ZAHAW CREEK](#) IN GANGAW

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, The *Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Appendix A: Project Sheet*. Summary, pp 14, 15. September 2003

[http://lvzopac.jica.go.jp/external/library?](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5)

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5)

Among the various projects considered by Japanese field researchers¹ who participated in rural electrification study in Myanmar between 2001 and 2003 was a proposal to develop a small run-of-the-river hydropower plant on Zahaw creek in Gangaw township in the northwest part of Magwe division. The proposed plant was to be located about 10 km upstream from the confluence of the Zahaw with the Myiththa river. The Zahaw runs down from the Chin state highlands and enters the Myiththa across from the town of Gangaw.

According to the description provided by the researchers, the plant was to have an installed capacity of 1200 kW with 24-hour operation during the rainy season from June to October and a maximum cap of 400 - 600 kW during operation in the dry season in the remainder of the year. The project was to be located on the left bank of the Zahaw, with the millrace leading to the powerhouse downstream from the waterfalls on the Zahaw [probably close to the Chin state border]. It was to consist of the following structures: intake weir with sediment flushing facilities, intake facilities with de-silting basin, open channel waterway, head tank, penstock, powerhouse, outdoor switchyard with main transformers, and a 10km-long 11-kV transmission line.

The length of the transmission line indicates that the power was to be made available to the town of Gangaw on the east bank of Myiththa, as well as to the village of Zahaw on the west bank. The researchers describe Gangaw and four surrounding villages as having 4,300 hundred households and a population of approximately 24,000. At the time, electricity was being supplied to about 660 households in the town from

18:00 to 21:00 every second day by diesel generators of 424 kW. The area was described as having a high potential for local industries requiring power supply for development, such as a sawmill, an edible oil mill, furniture making, weaving, a municipal water supply system and irrigation water supply for paddy and bean fields. A local hydroelectric committee was already in existence to promote the project which was estimated to have a total cost of US\$4,800,000 [US\$4,000 per installed kW]. The estimated time from completing the project was put at two to three years.

Photos of the waterfalls, the intake site, the penstock channel area, the powerhouse site and the existing sawmill in Gangaw accompany the project description.

¹**Appendix A** of this study also provides detailed information and proposals for a number of other small-scale hydro electric power projects in rural areas of Myanmar including 1) a run-of-the-river hydropower plant with an installed capacity of eight megawatts on Negyiya creek near Heho in southern Shan State which would electrify villages along the shore of Inle Lake in Yawngshwe (Nyaungshwe) township; 2) a run-of-the-river hydropower plant with an installed capacity of 300 kW on Ho Sant creek in northern Shan State which would provide electricity to the village tract centre of Nam Lan and five satellite villages in Hsipaw township; 3) a run-of-the-river hydropower plant with an installed capacity of about 340 kW at Parhe falls in northern Shan State which would provide electricity to nine un-electrified villages with 2,000 households in Nawngkhio township; 4) a run-of-the river hydropower plant with an installed capacity of about 400 kW on Nam Kone creek in northern Shan State which would provide electricity to 197 households in un-electrified villages in Manton township; 5) a run-of-the river hydropower plant with an installed capacity of about 530-800 kW on the Nam Uon creek in eastern Shan State which would provide electricity to households in several villages in Mong Pying township; 6) the Zahaw creek project; 7) the Anyapya dam power plant in Dawei township ([ELHS048](#)). A series of photos showing key aspects of the proposed projects accompanies each of the project descriptions.

Additional references

NLM, 10/06/10. <http://www.burmalibrary.org/docs09/NLM2010-06-10.pdf> Edited and condensed.

During a recent visit to the Yaw region in Gangaw district, I heard the sound of a pump being driven by electric power supplied from batteries which were recharged by a [mini?] hydropower [station] on Zahaw creek. The pumps were being used to irrigate thriving chilli and tomato plantations and Maymyo asters at the time of my visit. I learned that the same fields were pump-irrigated during the cold season when groundnut and water melon were grown. Zahaw village also enjoys potable water supplied from the clean, cold water from the creek. [Compiler's note: Although the project to supply hydropower to the town of Gangaw does not appear to have materialized, the brief and somewhat garbled references to a pump driven by hydropower in this item from the New Light of Myanmar seems to indicate that a smaller micro-hydropower facility has been installed on Zahaw creek, probably on a self-reliant basis.

VILLAGE ELECTRIFICATION COMMITTEES

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Final Report: Volume 1: Summary*, pp 27, 28, 30, 31, September 2003
http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1

Village Electrification Committees (VECs) play a role in developing, operating, managing and maintaining small isolated rural electrification schemes. Existing committees have usually been set up on an ad hoc basis with some external assistance, e.g., from MEPE, an NGO, the Co-op Ministry or an equipment/technology supplier. Operation and maintenance of existing isolated electrification systems in rural areas of Myanmar (i.e. all systems outside the grid) is generally carried out by either MEPE or VECs. The isolated systems operated and maintained by MEPE are either small hydropower schemes or diesel generator plants. The systems operated and maintained by VECs cover a wider range of types, e.g., micro

hydro, solar power (battery charging or village water supply), and biomass (rice husk) schemes. Common problems currently affecting the operation and maintenance of both government and village rural electrification have been identified and demonstrate that there is a need for guidance, training and technical support from outside the village. But the initial investment cost, which is several times larger than the amount one household can afford at a single harvest-time, is the bottleneck of most village rural electrification schemes. Financial resources for villagers are very limited — self-funding, suppliers' credit, co-operative bank loan, donation, and Myanmar Agriculture Development Bank loan — and most villages have to rely on self-funding. In fact, according to examples of village hydro, the typical construction cost is about US\$130 per household, which is too large for one household to pay in a year, and they need to be able to make several payments over two to three years. A financing system such as a rural electrification fund for small-scale short-term loans would greatly improve the prospects of village rural electrification schemes. For their part, local experts and contractors worry about the ability and willingness of the villagers to pay for the power plant once constructed. Because there is no competitive market for rural electrification, the price and quality of these schemes are a matter of mutual trust between the villagers and the expert/contractor. In this regard, it is proposed that a completion guarantee system be established to support villagers in making the final decision for implementing electrification schemes.

Additional references

See above: ['Interest growing in rice-husk generation'](#) (MT: 10/07/06)

['Village electrification technology on display'](#) (MT: 14/11/05)

See below: ['Co-op Department assisting villages with power supply'](#) (MT: 04/08/03)

NLM, 17/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-17.pdf>

Information Minister Kyaw Hsan met with people from twelve villages in three village-tracts at Watkya village in Pale township and was briefed by officials on rural development work being carried out in the region. The minister gave instructions on using a generator to supply electric power at the basic education high school in Watkya, on school-related matters in the primary schools in other villages, on raising trust funds for the station hospital in Watkya village-tract and on self-reliant libraries. He presented various amounts of money for village school and dispensary projects including K50,000 (US\$44) to supply electric power with the use of a generator for the school children of Watkya village BEHS.

NLM, 24/09/05. <http://burmalibrary.org/docs2/NLM2005-09-24.pdf>

Transport Minister Thein Swe attended a ceremony to launch a paddy husk-fired generator at Apaukwa [model] village in Kyauktaw township on 19 September. Member of the Organizing Committee for Village Power Supply U Ba Sein said that the Power Supply Committee was formed according to the instructions of the Western Commander in Rakhine state and that the committee had organized the local people to use the generator in a systematic manner. Next, farmer U Oo Tha Phyu thanked officials for their services in facilitating the supply of power which would be so essential for the economic and social development of the village. Chairman of Apaukwa Village PDC U Tun Shwe Maung and U Ba Sein formally opened the generator. [A photo of the generator is included in the print edition of NLM.]

Myanmar Times, 13/09/04. [Issue 233 of MT is not available on-line.]

The first power plant in Bago division to generate electricity from rice husks was officially opened in Bine-dar village, Nyaunglaypin township, on August 9. The plant is capable of producing 50 kilowatts of energy for 426 households. It was established by the village electrification committee with the support of the township USDA. Before the plant was set up, some villagers relied on small and expensive diesel generators for electricity. Because of the cost, many households had no electricity. The plant cost K10.5 million to build, about K 6 million of which was paid with a loan from the Co-operative Bank. The village electrification committee raised the balance of the funds.

Myanmar Times, 10/12/01. [Issue 93 of MT is not available on-line.]

Two villages near Hsipaw in northern Shan State will be supplied with electricity as a result of an US\$83,000 grant approved by the Japanese government last week. The funding, for building a micro hydro-electricity plant, is the latest to be provided under Japan's grassroots grant aid scheme. The plant will generate electricity for Sampai and Naun-An villages, which have a total population of about 500, and are about 10

kilometres east of Hsipaw. The villages are not connected to the national grid and rely on generators, which are expensive to run and often break down. The contract for the project was signed by the Japanese ambassador, Mr Shigeru Tsumori, and village electrification committee chairman, U San Pwint, in Mandalay late last month.

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MANUFACTURE OF SMALL HYDRO TURBINES IN MYANMAR

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Final Report: Volume 1: Summary*, pp 16-17, September 2003

[http://lvzopac.jica.go.jp/external/library?](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1)

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1)

In Myanmar, equipment for small hydros is manufactured in MEPE's workshops as well as in private workshops as shown below:

Table 4 Workshops Manufacturing Small Hydros Inspected by the Study Team

Workshops	Installations	Remarks
1. MEPE workstation in Yangon	30	A total output at 13,548 kW, average station output at 450 kW, including imported equipment
2. U Khun Kyaw, Rural Development Group, Taunggyi	33	Has manufactured and installed small hydros & Hydroelectric Implementation of 5-75kW since 1988, and accumulated adequate technology which can be the model for proposed village RE schemes
3. U Kyaw Kyaw, U Taing Kyaw workshops, Sein Pann Industrial Co-op Ltd, Mandalay	9	Manufactured and installed five Pelton turbines each in Kachin State in 1983; Manufactured two Crossflow turbines of 5-10 kW in 1987; Manufacturing Francis and propeller turbines in 2002
4. U Paung Kyaw workshops, Sein Pann Industrial Co-op Ltd & Hydroelectric Implementation Group, Mandalay	30	Has manufactured Pelton turbines of 5-50 kW since 1983 for Northern Shan State
5. U Chit Hla and Sons, Ayethaya Industrial Zone, Shan State	56	Has manufactured pico turbines of 5-20 kW since 1989

In addition, there are many workshops manufacturing 2-kW generators, casting foundry, steel products, in IZs in Yangon. Among others, Triangle Link Engineering Co., Ltd., Yangon has good experience in producing penstock pipes, gates, and screens for small to medium hydros. They also have the capacity to manufacture turbines of 100 kW class if provided with a design.

There are also contractors for building small hydros including transmission and distribution lines. These include Rural Development & Hydroelectric Implementation Group (RDHIG), Taunggyi, Shan State, and Aung Pyi Tun (APT), Yangon.

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Supporting Report Volume 8: Interviews/Field Surveys in Villages for Rural Electrification: Feb 2001-Nov 2002*, pp 75-77. http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3

This memo is the record of an interview conducted by two Japanese field researchers with U Khun Kyaw, an electrical engineer who owns and operates a workshop that produces turbines for use in rural areas of Shan

state. The workshop is located in the industrial area of Nyaung Shwe (Yawngghwe) near Inle lake. U Khun Kyaw is a specialist with twenty years experience in producing and installing Pelton, cross-flow and propeller turbines up to 100 kW. Details of the parts produced in the workshop are provided. Generators are imported from two companies in China that have dealerships in nearby Taunggyi. Planning and design of the turbines, as well as production and installation, are carried out by U Khun Kyaw, including discharge measurement, head measurement, cost estimate for the project and drawings, at a commission of 5% of the capital cost. Cost in 2001 when the interview was conducted were estimated at about K 300,000 per kW. Photos accompanying the memo show Kaplan and cross-flow turbines, casing for a Pelton turbine and installation of a rural hydro system.

See also Volume 4 of *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Manuals for Sustainable Small Hydro*. This well-illustrated guide provides a good introduction to the similarities and differences between the Pelton, the Francis and the cross-flow turbines used in a small rural hydropower stations in Myanmar and elsewhere.

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159775&volno=000000000&filename=11734134_01.pdf&seqno=1](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159775&volno=000000000&filename=11734134_01.pdf&seqno=1)

Additional References

See Section [B](#) of key article '[Padaung factories](#) begin production of generators and meters' (NLM: 17/10/06)

NLM: 28/11/08. <http://www.burmalibrary.org/docs6/NLM2008-11-28.pdf>

Kalay IZ has four functioning sectors: automobile manufacture, production and distribution of agricultural equipment, production of electric power generating equipment and the manufacture of general industrial products. In the 2008-2009 financial year, . . . a total of 120 pieces have been manufactured against the target of 424 [needed for] 10 power generation items.

NLM: 16/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-16.pdf>

A&IMin Htay Oo checks on production of import-substitute machinery parts and repair of machinery at the workshops of Irrigation Dept in Hmawby. Parts are needed for agricultural machinery and machinery to be used in hydropower plants. In the Hmawby workshop spare parts for machinery, sluice gates valves of and machinery parts for generators are being produced. The Irrigation Dept has nine workshops across the country where parts are produced and machinery is repaired.

Khin Hninn Phyu, Myanmar Times, 12/07/04. [Issue 224 of MT is not available on-line]

In Myanmar, technologies based on the sun, wind, water and even farm-waste are being developed and marketed by entrepreneurs whose interest in renewable energy is motivated partly by a concern for the environment. "If we don't use renewable resources instead of conventional energy sources, the environment will be affected," said U Kyaw Soe Win, who makes mini-hydro systems at the Ayethaya IZ near Taunggyi. "I became interested in this technology because it can be used efficiently for the benefit of the people and the environment," said U Kyaw Soe Win whose company designs and makes mini-hydro systems capable of generating from five to 50 kilowatts. Apart from being sustainable, he said the advantages of hydro-power systems included lower maintenance and operational costs than those using fossil fuels.

NLM, 14/06/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nln/n040614.htm>

PM Khin Nyunt and party arrived Kalay Industrial Zone where they heard reports on the assembly of automobiles and the manufacture of hydro electric turbines and agricultural equipment by U Aung Min, V-C of the zone supervisory committee.

NLM, 21/05/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nln/n030521.htm>

Lt-Gen Soe Win arrived at Kyaw Soe Win hydro-electric power engine factory [in Ayethaya Industrial Zone in Taunggyi] and inspected the generators ranging from 50 to 150 kilowatts.

See above: '[Natchaung model village](#) well supplied with electric power' (NLM: 15/09/08)

'[Turbine factory](#) planned for Thagara industrial region' (NLM: 25/02/07)

'[Mini hydropower plants](#) planned for rural areas' (MT: 08/08/05)

[PYU MULTI-PURPOSE DAM PROJECT IN THE OFFING](#)

Khin Maung Than, NLM, 29/08/03. <http://www.burmalibrary.org/docs6/NLM2003-08-29.pdf>

The Pyu multi-purpose dam project in Pyu township was launched in 2001-2002 for the development of the Sittoung Valley. The project is 11 miles west of MP No 145 on the Yangon-Mandalay highway. It was started in the open season of 2001-2002 and will be completed in four years.

The stone-filled embankment of the dam across the swift-running Pyu creek is 1,020 feet long and 245 feet high. The 115-foot long, 20-foot high diversion weir of the dam is of the ogee type. The 2,520-foot long diversion tunnel is also of the ogee type. The maximum storage capacity of the dam is 632,533 acre feet. The project will benefit 120,000 acres of paddy and other crops in Oktwin and Zeyawady townships, Bago Division. The main canal of the dam is 41.2 miles long and the tributary canal 19.6 miles long. The region where the project is being implemented has an annual average rainfall of 100 inches.

Pyu creek flows down through the central *Yoma* and its current is swift. It is for sure that the creek will be able to generate full hydel-power supply and contribute to the development of the village-tracts nearby. The power station at the dam will be able to generate 32 megawatts. [Photos of the dam site are included in the print edition of NLM.]

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NE 47-05: Toungoo
Pyu creek dam, 15 mi north-west of Pyu [18° 29' N, 96° 26' E], grid square reference: 9\5, 25\6
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-5.jpg>

Additional references

Data summary [Pyu](#) Creek

NLM, 22/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-22.pdf>

A gaggle of generals headed by Shwe Mann of the MoD visits the Pyu multipurpose dam project. A&I Minister Htay Oo reports that efforts are being made for the timely completion of the preliminary construction works, building of the water diversion tunnel and the spillway. The whole project is about 30pc complete. Col Zaw Min of EPM No 1 informs the visiting generals that the hydropower structures of the project are 52pc complete. [A good aerial photo of the Pyu project site is included in the print edition of NLM.]

NLM, 27/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-27.pdf>

Construction of the dam gates, building of the water intake tunnel and revetment in the tunnel continues. Work on an outfall channel and the diversion channel is ongoing. The A&I Ministry is in charge of construction of the dam, while the EPM No 1 is responsible for the hydro-power section of the project. So far, 43.7pc of the hydro-power section has been completed.

NLM, 10/09/08. <http://myanmargeneva.org/NLM2008/eng/9Sep/n080910.pdf>

EPM No 1 Zaw Min inspects the boring of the entrance and exit to the water intake tunnel and the construction of the sluice gate of the Pyuchaung hydropower project. He is briefed by Project Director Maw Tha Htway of Construction Group No 3 of HPID. The Pyuchaung dam and irrigation network is being carried out by A&IM but work on the water intake tunnel and the power station is under EPM No 1. [A photo of work on the tunnel is included in the print edition of NLM.]

NLM, 22/06/08. <http://myanmargeneva.org/NLM2008/eng/6June/n080622.pdf>

A&I Minister Htay Oo inspects Pyu creek dam project undertaken by the ID in Pyu township. It will irrigate about 100,000 acres of farmland and produce electricity. The spillway and diversion tunnel are being completed.

NLM, 26/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071126.htm>

EPM No 1 checks on drilling of underground water tunnel (exit) at Pyuchaung hydropower project, site chosen for power plant and work on power intake building, as well as drilling of the tunnel and the water sluice gate.

China Gezhouba Group Corp (CGGC) website info, [n.d.] http://www.gzbgj.com/english_n/news08.htm

A contract for the design and supply of electrical and mechanical equipment for Phyu hydropower project was signed on 31/07/07. Chen Bangfeng, V-P of China Gezhouba attended the signing. The project is located 180 km south of Nay Pyi Taw. CGGC is responsible for the design and supply of two hydraulic generating units with a capacity of 20 MW each. Supply time is 21 months.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%202/Tin%20-%20Myanmar%20-%20Presentation.pdf

The Pyu dam and power station with a planned capacity of 40 MW is under implementation by the ID and HPID. It will generate 120 million kWh annually when it comes on line in Dec 2008.

NLM, 20/02/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070220.htm>

EPM-1 Zaw Min and project director U Maw Tha Htwe look into the building of the water intake structure and intake tunnel. The earth work on the intake tunnel is practically complete. Over a third of the concrete tasks on the water intake structure are finished. Work on the sluice gate is 70pc complete. Generators in the power plant will have a capacity of 40 MW and will produce 121 million kWh yearly.

NLM, 03/02/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070203.htm>

A contract was signed for the purchase of electrical and mechanical equipment and the hydraulic steel structures to be used at Pyu creek project between the HPD and China Gezhouba at EPM-1 on 31 January. D-G U Aung Koe Shwe of HPD and Chief Engineer Wang Yimin of CGGC signed. The project is seven miles west of Pyu. The power station will be equipped with two 20-MW generators.

NLM, 08/11/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061108.htm>

Laying of concrete on the inner surface of the diversion tunnel is underway. It is 13 feet in diameter and 2,477 feet long. Preparatory tasks are being carried out to build the earth dam. The spillway is under construction. Director U Tint Lwin of Construction Gp No 3 of the HPD reports on the intake structure.

Yangon Times, 02/03/06. [not available on-line]

The Phyu-chaung multipurpose dam project is built on a fault line. Japanese experts will collaborate in building the dam to ensure that it is able to withstand earthquakes.

NLM, 20/07/05. http://groups.yahoo.com/group/myanmar_information/message/12285

Reports on the digging of the 2,477-foot-long diversion tunnel and arrangements for construction of the spillway by the Irrig Dept and construction of the power intake structure by the HPD. The Pyuchaung multi-purpose dam project will irrigate 100,000 acres and is expected to generate 121 million kWh a year.

NLM, 24/04/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040424.htm>

At the site of the Pyu creek multi-purpose dam project Lt-Gen Soe Win hears about the construction of a 755-metre-long diversion tunnel, an intake tunnel and hydropower buildings. It is expected to generate 40 MW.

NLM, 18/01/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010118.htm>

Gen Than Shwe is briefed on plans for the dam and the generation of hydro-electric power. The project is located on Phyu Creek 15 miles west of the town of Phyu. The dam barrier will be 1,000 feet long and 180 feet high. The project will irrigate 270,000 acres of crops on 147,000 acres. The power plant will and generate 65 MW.

NLM: 27/12/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n001227.htm>

Land preparations are underway at the site of the Phyu creek multi-purpose dam project.

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WIRE AND CABLE PRODUCERS FIND READY MARKET IN MYANMAR

Kyaw Naing, Myanmar Times, 25/08/03

(Compiler's note: Issue 180 of the Myanmar Times is no longer available on-line.)

Myanmar is a country of dreams and potential prosperity for those companies who are selling electric cable. The truth is upgrading of the telecommunications and electrical network was virtually ignored until the government gave the signal to move towards a free market system sometime in the 90s. Then it became obvious that movement towards a more modern nation would require drastic attention particularly to energy systems. Naturally, these manufacturers and suppliers are optimistic about the future primarily because there has been an explosion in the creation of industrial zones and large scale real estate development -- plus a population that increasingly demands to be "hooked up" to power.

The raw material for cabling is mostly sourced from China and other Asian countries, notably Thailand. But, with the establishment of industrial complexes in the outer suburbs of Yangon local production has increased. Manufactured wires and cables now make up the majority of the market in recent years due to lower price and competitive quality against imported goods.

Who are the players in the market? According to Myanmar Times research there are about 10 brands of wires are available in the market including Pirelli (Italy), Hong Pang (local), Golden Lion (local), Waisin (Taiwan), Myanmar Cable (local), Sigma (local), Golden Stenship, A, Standard and Ka-Sa-La (State-owned). Local manufacturers generally produce low voltage power cables, copper wires and communication cables. They continue to rely on imported raw materials.

Hong Pang Company, a local outfit, is producing cable and wire for households and industrial use from its base in Sagaing, Mandalay Division. "Distribution started in 1998. We are producing PVC house wiring cables, PVC single core and multi-core cables and communication cables. We have branch offices and sales centres in Yangon, Mandalay, Taung-gyi, Magway, Myitkyina and Kengtung. Sales of our cables have increased for three years running," said a spokesperson for the company, who declined to be named."

Golden Lion company is another player. Sales Manager U Aung Khaing said his company has been producing 36 types of wire and cable from their factory in Hlaing Thaya Industrial Zone-4 since 1996. "We are also producing millimeter gauge wires under the brand name of Universe. The best selling wires are low voltage wires for household use such as 3/029, 3/036, 7/029 and 7/036. We distribute our products through agents all over the country.

Sales manager Daw Win Wa Hlaing of Pyan Hlwa electrical appliance shop said her company had been engaged in wire business since 1985. "The retail price for a 100-foot coil of 3/029 single cover wire is nearly K3000. A coil of larger size 7/044 single cover wire is priced around K13,000."

See above: '[Cable factory](#) and foundry opened in Indagaw industrial zone' (NLM: 04/04/05)
'Construction fuels [wire and cable market](#)' (MT: 29/03/04)

See also: 'Asian Golden Myanmar cable wire factory in Shwepyitha IZ' (NLM: 30/05/07)
<http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070530.htm>
'New factory of Golden Lion Wire opens' (NLM: 05-03-07)
<http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070305.htm>
'Boom predicted for local wire and cable', Myanmar Times: 06/10/03
www.myanmar.gov.mm/myanmartimes/no186/MyanmarTimes10-186/e06.htm
'Texcel producing import-substitute electrical goods' (NLM: 24/09/03)
<http://mission.itu.ch/MISSIONS/Myanmar/03nml/n030924.htm>
'Hong Pang Electronic to produce wide variety of electrical goods' (NLM: 20/05/01)
[http://mission.itu.ch/MISSIONS/Myanmar/01nml/n010520.htm#\(3\)](http://mission.itu.ch/MISSIONS/Myanmar/01nml/n010520.htm#(3))

'Electrical wire makers seek standard taxes' (MT: 11/12/00)
 [Issue 41 of the Myanmar Times is no longer available on-line.]
 'Sigma Cable factory to increase exports' (Myabuzz: 09/11/99)
www.ibiblio.org/obl/reg.burma/archives/199911/msg00679.html

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CONTRACT FOR SHWELI HYDROPOWER PROJECT SIGNED WITH YMEC

NLM, 09/08/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlnm/n030809.htm>

The Hydro-electric Power Department of the EPM entered into a contract with the Yunnan Machinery and Equipment (I&E) Corp (YMEC) of the PRC to implement the Shweli hydel power project on the Shweli river in Namhkam township. Present at the signing ceremony were ministers, deputy ministers responsible personnel of the SPDC office, dept heads, Vice-Governor of Yunnan Province Shao Qiwei, provincial representatives, YMEC Chairman Feng Ke, officials, and guests.

EPM Tin Htut said Myanmar and the PRC have enjoyed perpetual friendship and been good neighbours for so many years. Likewise, MEPE and the YMEC have been working together since 1991 when the construction project of the Kyein Khayankha power station started. Among the other small and medium power projects in which YMEC had taken part were the construction of the Namhmyaw, Namwok, Zawgyi No 1 and Zaungtu power stations. It is also cooperating in the construction of the 280-MW Paunglaung hydel power station. In keeping with the guidance of the Head of State, the EPM keeps hammering away continually on projects to generate electricity, the much-needed linchpin for the development of the economic, productive and social sectors. The Shweli hydel power station would always represent a milestone of co-operation between Myanmar and China and would also serve as a monument to the friendship between the countries, he said.

Next, Vice-governor Shao Qiwei spoke and D-G of the HPD Win Kyaw and Chairman Feng Ke signed the contract and exchanged documents. Under the contract, the Chinese side will undertake the construction of a concrete diversion weir, an underground tunnel and high-pressured steel pipelines and the installation of turbine-generators, transformers and electrical appliances within a period of three years. The contract is worth US\$150 million, and prompt payment will be made in respect of the accomplishment of the task. The digging of the diversion tunnel and the construction of the power station and subpower station will be undertaken by the HPD at a cost of some US\$ 26 million, based on mutual friendship and cooperation.

Preliminary engineering work for the Shweli hydel power station project is underway on the Shweli river, 15 miles south-west of Namhkam town in northern Shan State. The hydel power station will generate 3,042 million units of electricity every year which it will distribute all over Myanmar. A 217-mile-long double 230 kV cable line will carry power to Namtu, Hsipaw, Kyaukme and Pyin U Lwin towns where it will be distributed using 66-kV cables; Separate 66-kV cable lines will be constructed from Shweli to and Muse, Nanhkam and Kutkai in northern Shan State and Bhamo in Kachin State. Thanks to the Shweli power station, industries and copper mining work around Mandalay and Monywa will have an abundance of electricity. Now that designs necessary for the Shweli power station project have been drawn, the construction of an approach road and project preparatory work are under way.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-01: Mong Mit Shweli no 1 hydropower project near Man Tat village [23° 41' N, 97° 29' E], grid square reference: 12\1, 23\3 Upper Buywa dam near Thukaungkyin village [co-ordinates n.a.], grid square reference: 7\4, 38\3
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-1.jpg>
 See also maps in *Under the Boot*, published by the Palaung (Ta'ang) Youth Network Group, Dec 2007, pp 11, 14, <http://www.salweenwatch.org/downloads/UndertheBootEnglish.pdf>

Website reference

<http://www.urec.com.cn/en/project/power.htm>

Union Resources and Engineering Co Ltd (UREC) has been active in engineering contracting since the 1980s. It provides project management including preliminary study, financing, design, construction,

manufacture, purchase, installation, commissioning and operation management, etc. It has good contacts with domestic and foreign financial institutes, consultation institutes, construction enterprises and equipment manufacturers. In Myanmar it has been involved with the building of 22 hydropower projects including the Paunglaung and Shweli projects. **[Compiler's note:** UREC was previously known as the Yunnan Machinery and Equipment Import & Export Corp (YMEC). The old name still appears as one of the PRC partners involved in the Shweli hydropower contracts. The YMEC website is still maintained online. <http://www.ymec.com.cn/en/>]

Additional references

See above: 'Shweli-1 hydropower plant officially inaugurated' (NLM: 17/05/09)
 'China's first BOT hydropower project in Myanmar revs up' (Mekong News: 30/12/06)
 'Shweli Transmission Line Contract Signed (People's Daily Online: 10/10/03)

Hydropowering the Regime, Irrawaddy, June 2004. <http://www.irrawaddy.org/aviewer.asp?a=3757&z=102>
 In 2000-2001, Tokyo Electric Power Services Company, a subsidiary of Japan's largest private electricity firm, the Tokyo Electric Power Company, conducted a feasibility study of the Shweli hydro-power project in Shan State.

Kayan Soe Myint, NLM, 09/08/03. <http://www.myanmar.gov.mm/Article/Article2003/aug/Aug09b.htm>
 Arrangements are being made for the construction of the Shweli hydel-power station near Mantet village, 17 miles southwest of Namkham. It will be able to generate 3,042 million kWh a year. The Shweli river rises in Yunnan province and passes through Muse and Namkham before emptying into the Ayeyawady river in Myanmar. At a place, 15 miles southwest of Namkham, there is a 1,000-foot high waterfall. The hydel power station will be built using these resources. The HPD has hired the consulting engineering group of YMEC of the PRC for US\$1.15 million. An MoU for the project was signed on 26/02/02.

NLM, 01/08/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nml/n020801.htm>
 A feasibility study for the the Shweli hydel power project has been carried out jointly by engineers of EPM, Kunming Hydro-electric Investigation Design and Research Institute, Daewoo Co Ltd, YMEC and Tokyo Electric Power Co of Japan. 200 MW will be produced in the first phase and 200 MW in the second phase. Electrical power generated will be distributed to Mandalay, Monywa, Muse, Namkham, Kyugok, Lashio and Bhamo.

NLM, 23/02/02. www.myanmar.gov.mm/NLM-2002/enlm/Feb23.htm
 EPM Tin Htut visited the Shweli hydro-electric power project that will implemented on the Shweli River in Nankham township on 19 February. Construction of a 28-mile-long earth road linking Nankham and the project site is underway and arrangements are being to surface it with gravel. The minister gave instructions on the building of roads and bridges to convey materials and machinery for the project and called for implementation of the project in the open season. He also inspected the sites chosen for construction of the power plant, a diversion tunnel and an embankment and condition of the route along which power lines will be installed.

NLM, 11/05/01. www.myanmar.gov.mm/NLM-2001/enlm/May11.htm
 EPM Tin Htut visits the the Shweli hydel power project 29 miles from Hinlon village in Namkham township on 06/05/01 and inspects sites for the construction of a power plant and a diversion weir. In the briefing hall, officials of MEPE report on arrangements and preparations for project tasks.

Palaung (Ta'ang) Youth Network Group, *Under the Boot*, December 2007. pp 18, 24, 30, 32.
<http://www.salweenwatch.org/downloads/UndertheBootEnglish.pdf>

As soon as the military base was finished in Mantet, the Asia World Co set up a work camp near the village and began construction of the main road to the project area. Mantet villagers were required to work on the road construction project undertaken by Asia World Co beginning in 2001. They were promised the going daily wage rate of K1,500 (US\$ 1.25) but in the end they were paid K800 (US\$ 0.66) by LIB 144. One person from each household in the village was also forced to build a road from the village to the first project camp in 2002. Groups of 20-25 were sent in turn. Although the villagers had to work on the road, they could

get jobs at the project site itself. These were reserved for Chinese workers. . . . In 2002, Asia World Co built a road connecting the dam site to the military base through local residents' tea and paddy farms. Roads were also built over irrigation canals, effectively ruining crop production. Some farm lands have become a dumping ground in the process of excavating tunnels for the project. In all approximately half of the entire village has been impacted by land loss or construction since the commencement of the project. . . . In addition to the damage to the farmlands, the deforestation at the dam site and the dynamiting along the tunnel route have cause many wild to disappear. Soldiers and others have also killed and captured wild animals.

Palaung (Ta'ang) Youth Network Group, *Under the Boot*, December 2007. pp 13, 18 – 23.

<http://www.salweenwatch.org/downloads/UndertheBootEnglish.pdf>

Towards the of the year 2000, soldiers of the Myanmar Army's LIB 144 arrived in Mantet village in the project area and began to set up a base adjacent to the village gate. The soldiers immediately seized local lands and ordered local farmers to clear the area and build a camp. According to one local farmer interview by PYNG, "they treated us like slaves: we had to what they ordered. . . . The village headman could only breathe easily when the villagers complied with the orders, otherwise he would be punched and beaten" Inside the camp a backhoe ws used to rip open a swath in the hill to set up a target practice area for the soldiers. . . . "All the bamboo near the village was cut down and used to cover the barracks." Afterwards, the battalion took over fertile farmlands for its own crop production. They rooted out seedlings planted by local farmers and put in their own. Once the military camp was finished and the farm was set up, roads to and from the base camp were built and checkpoints erected. Since then villagers have had to inform authorities if they wish to go outside the village either to market in Namkhm or even to their fields. . . . Every day columns of troops line up and conduct drills, marching through the village. People are anxious and agraid to go to their tea farms, paddy frarms or hunting and fishing areas outside the village. . . . Soldiers use their positions of power the to extract money, assets and materials from the villagers. . . . Women and girls are particularly frightened and reluctant to go far from their houses. Parents fear letting their daughters go out and are constantly worrying about them.

CO-OP DEPARTMENT ASSISTING VILLAGES WITH POWER SUPPLY

Yin Min Tun, Myanmar Times, 04/08/03.

(Compiler's note: Issue 177 of the Myanmar Times is no longer available on-line.)

Nearly 120 villages throughout Myanmar have been supplied with electricity during the past 18 months as part of a rural development project involving the Dept of Co-operatives. The department's deputy-director, U Htain Win, said the project had benefitted more than 12,000 households in 12 states and divisions. U Htain Win said power was also being supplied to small enterprises and cottage industries, such as rice mills and battery charging businesses.

The project to increase the supply of electricity in rural areas has been intensified since early last year under the instructions of the Ministry of Cooperatives.

U Htain Win said the extra 100,000 kilowatt hours provided over the past 18 months was produced by 128 generators. Of these, 105 were diesel-powered, 20 hydro-generated and three used gas from burning paddy husks. "About 122 co-op associations organised villagers to take part," he said. "The associations determine the needs of each community and choose the method of generating power which best suits each area," U Htain Win said.

U Htain Win said the electricity produced could only be used for lighting, televisions and video players. Usage cost depends on how the power was generated. The cheapest monthly fee for using electricity generated from burning paddy husks was K500 and K150 for hydro-electricity. The cost of using electricity from diesel-powered generators depended on the price and availability of the fuel used.

Additional references

See above: [‘Village electrification committees’](#) (JICA: Sept 2003)

NLM, 30/05/02. [\(http://mission.itu.ch/MISSIONS/Myanmar/02nml/n020530.htm#\(%205%20\)\)](http://mission.itu.ch/MISSIONS/Myanmar/02nml/n020530.htm#(%205%20))

Minister for Co-operatives Tin Ngwe and party attended the launch of a generator arranged by Manawayama Village Agricultural and General Services Co-operative at Pehlawpho model village in the Manawayama village-tract in Patheingyi township.

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[KYEE-OHN KYEE-WA MULTI-PURPOSE DAM ON MON CREEK UNDERWAY](#)

NLM, 01/0703. [\(http://mission.itu.ch/MISSIONS/Myanmar/03nml/n030701.htm\)](http://mission.itu.ch/MISSIONS/Myanmar/03nml/n030701.htm)

The Kyee-ohn kyee-wa multi-purpose dam project is being implemented in Pwintbyu township. The dam will be across Mone creek near Wunlo village about five miles above Mezali diversion weir in Pwintbyu township and about 15 miles below the Mone creek multi-purpose dam in Sedoktara township. It will be 164 feet high and 3,280 feet long.

The Kyee-ohn kyee-wa dam will be able to utilize the water that flows into Mon creek in the area below the dam in Sedoktara township with the flow of water from Sedoktara dam and supply the water in a controlled way through the canals that are fed by the Mezali diversion weir. A power plant at the Kyee-ohn kyee-wa dam will be able to generate 60 MW of electricity.

Kyee-ohn kyee-wa multi-purpose dam project is being built at an estimated cost of over K6,000 million and US\$ 56 million.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-15: Myohaung Kyee-ohn kyee-wa dam is near Wunlo village [20° 20' N, 94° 25' E], grid square reference: 11\7, 23\6 <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-15.jpg>

Additional references

Project data [Kyee-ohn Kyee-wa](#)

See above: [‘Buywa and Upper Buywa power projects take shape’](#) (NLM: 18/12/07)
[‘Mon creek multi-purpose dam and power station opened’](#) (NLM: 30/12/04)

Khin Maung Than, NLM, 10/01/11. Condensed. <http://www.burmalibrary.org/docs11/NLM2011-01-10.pdf>

To reach Kyee-Ohn Kyee-Wa project, journalist was driven 55 miles along Minbu-An road, then west eight miles along Patheingyi-Monywa road. Catchment area of the dam is 1959 square miles, the annual average inflow water is estimated at 4,600,000 acre feet, the full tank area of the reservoir will be 463,000 acre feet, the dead storage area, 35,350 acre feet, and the water surface area 10,860 acres. Two 37-MW generators will be able to produce 370 million kwh of electricity a year. The project, scheduled to be finished in 2011, is currently 80pc complete. Earth work for the spillway has is 91.35pc complete and concrete work, 51.08pc. [Photos showing dump trucks near partially completed power house. No water appears behind embankment.]

Zaw Moe Thauk, NLM, 21/11/10. Edited and condensed.

<http://www.burmalibrary.org/docs09/NLM2010-11-21.pdf>

The project is about 8.5 miles west of the Patheingyi-Monywa Road near Wunlo in Pwintbyu township, five miles upstream of the Mezali diversion weir on Mone creek. Looking downstream from the embankment, one can glimpse construction of the spillway to on the left side and the power station and the intake structure on the right side. The region gets about 45 inches rainfall annually, but Mone creek which originates in the mountain ranges to the west, flows year round. It is expected to irrigate 96,777 acres of monsoon paddy and 74,007 acres of summer paddy yearly. At the end of October 2010, earthwork on the ogee-type spillway was over 90pc complete and and concrete work, 52pc. It is 1100 feet long and 326 feet wide. Staff from Industrial Workshop-A of the Irrigation Dept in Hmawby are responsible for construction of the power intake

structure, the penstock and the power house. The concrete work there is 76.6pc complete. Installation of the generators is ongoing. Current plans call for the completion of the project in 2011-12. [Photos by Khin Maung Win (Kyemon) show the temporary water course of Mone Creek, the main embankment and partially completed power house, the spillway and the worksite of the power intake structure.]

Kyaw Sein, NLM, 11/08/10. <http://www.burmalibrary.org/docs09/NLM2010-08-11.pdf>

Staff Officer Than Tun, in-charge of the dam construction: "The dam is of zonal type. River bed material was used in the construction of the upper and lower parts of the embankment. The central part of the embankment was built using a core zone plan. River bed [material] was obtained from the floor of Mone creek. The intake penstock and power house are being built right at the dam itself instead of having a water control tower. Two 18-foot-diameter steel penstocks for the water to generate hydropower and a 10-foot-diameter steel pipe to be used in supplying irrigation water are being laid. When hydropower is not being generated, the dam will supply water to farmlands through the irrigation pipeline. The dam part of the project is currently 71pc complete." [Photos of the diversion canal, dam embankment, penstocks and the partially completed power house taken by Aung Than accompany the article in the print edition of NLM.]

NLM, 15/06/10. <http://www.burmalibrary.org/docs09/NLM2010-06-15.pdf>

PM Thein Sein visits the Kyeeohn-Kyeewa multi-purpose dam project on Mone creek near Wunlo village in Pwintbyu township. He is briefed by A&IMin Htay Oo on work being carried out on the concrete diaphragm wall and water outlet channel, the main dam, spillway, intake, penstock and power house and the 74-MW-capacity hydropower generating structures. EPM-2 Khin Maung Myint reports on the installation of power lines to the project site and arrangements for connection of the power lines to the main grid. He is also briefed by EPM-1 Zaw Min on prospects for generating hydropower in Magway and the surrounding areas. U Htay Oo then reports on other dam projects on Mone creek and the supply of irrigation water from Salin supporting dam, Yebokeyi dam and Kyaukchat dam. In reply, the PM stresses the need to complete the remaining work, saying that the government will provide the necessary fuel and construction materials such as cement and steel rods. He also calls for parallel completion of the dam and water intake canals. It is required to carry out the necessary arrangements for supply of electricity from the Kyeeohn-Kyeewa dam project, the Thahtay creek hydropower project and the Saidin hydropower project, he adds. The PM then presents a fruit basket to the technicians of Guangdong New Technology I&E Corp from the PRC who are working at the site and inspects the construction of the spillway and hydro-power-related buildings. The dam will be able to store 463,000 acre feet of water, to irrigate about 100,000 acres of land, to prevent flooding, to extend the acreage of mixed cropping and to generate 74 megawatts of electricity. [Photos of what appears to be the penstocks are included in the print edition of NLM.]

NLM, 04/06/09. <http://www.burmalibrary.org/docs07/NLM2009-06-04.pdf>

Chairman Huang Yixiang and party of Guangdong New Technology (I & E) Zhuhai Corp called on A&IM Htay Oo at the Irrigation Dept in Yangon on 02/06/09.

NLM, 29/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-29.pdf>

A photo of the foundation of the generating station is included in the print edition of NLM.

Khin Maung Than (Sethmu), NLM, 26/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-26.pdf>

Mone creek originates in the mountain ranges of Chin state and flows into the Ayeyawady at Kyaungdawya of Lekaing in Pwintbyu township. The Kyee-ohn Kyee-wa dam site is located about eight miles west of MP 133 on the Pathein-Monywa road. It will be able to store 463,000 acre feet of water, generate 370 million kilowatt hours yearly and irrigate 96,777 acres of land when it is finished. [A good panoramic view of the construction site is included in the print edition of NLM.]

NLM, 17/12/08. <http://www.burmalibrary.org/docs6/NLM2008-12-17.pdf>

Kyee-ohn Kyee-wa dam on Mone creek is 3280 feet long and 164 feet high and has a water storage capacity of 463,000 acre feet. It will be able to generate 370 million kilowatt hours a year and benefit about 100,000 acres of farmlands. Together all four hydropower stations on Mone creek will be able to produce over 1200 million kilowatt hours a year. [Aerial photos of the downriver side of the dam and developments at the hydropower station is included in the print edition of NLM.]

Kyaw Sein, NLM, 11/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-11.pdf>

[This is a translation of a feature article originally published in Myanma Ahlin on 03/11/08. The print edition of NLM includes several pictures by photo journalist Aung Than. One of the photos shows a finished section of the dam embankment. Another shows excavators and dump trucks clearing earth from the site of the spillway, while a third is of cement work on the spillway. A fourth shows a shed where lengths of pipe, presumably for use in the penstock, are produced. The article is mainly about construction of the dam, although it does mention that Group 3 of the Irrigation Dept, which is responsible for the project, is co-operating with Chinese technicians in the installation of the hydropower generating side of the project.]

The dam will supply water to the Mezali irrigation area [originally developed under the British colonial administration in 1910]. The water will be used to irrigate 96,777 acres of monsoon paddy 74,007 acres of summer paddy. Two 37-MW generators will be installed at a power plant near the dam. Work at the dam site started in 2002. A concrete diaphragm wall, 885 feet long, 51 feet deep and two feet thick was built near the creek in 2002. Dredging of a 4300-foot long canal to divert the water of Mone Creek was started in Sept 2002 and completed in April 2005. Construction of the main embankment was started in Jan 2005, and the earth work was completed in Dec 2006. Work on the spillway which will be 326 feet by 1100 feet is currently underway. Earth work is 87pc complete and concrete work is 47pc complete. The dam embankment is 3,280 feet long and 164 feet high. The reservoir will be able to store 463,000 acre-feet of water at full brim and 35,350 acre-feet of water at minimum level. Its watershed area will be 1,959 square miles. Concerted efforts are being made to finish the project during the 2009-10 financial year.

NLM, 09/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-09.pdf>

Work with heavy machinery continues at the Kyee-Ohn Kyee-Wa multi-purpose dam site near Winlo village in Pwintbyu township. [The print edition of NLM includes a photo showing land cleared along the sides of what will eventually be the reservoir basin of the dam.]

NLM, 21/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080821.htm>

Maj-Gen Khin Zaw of the MoD visits the Kyeeohn-kyeewa multi-purpose dam project and is briefed by Director (Adviser) Tun Aung Lwin of Construction Group 3 of the ID. Chinese technicians are on-site. The project is 63pc complete. Director Tin Win of Construction Group 8 of the ID briefs him on developments at the Buywa, Upper Buywa and Myittha dam projects. The Kyeeohn-kyeewa, Mone, Buywa and Upper Buywa hydropower projects on Mone creek together will be able to generate 250 MW, while the Myittha dam project, also under Construction Group 8 of the ID in Gangaw township will have a generating capacity of 40 MW.

NLM, 18/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071218.htm>

Gen Than Shwe and party visit Kyee-ohn Kyee-wa multipurpose dam project. He wants the project completed as soon as possible. Heavy machinery is to be used extensively to speed the work on the main embankment and spillway. The visitors inspect the sites chosen for construction of the water intake building and the hydel power plant. Upon completion, the dam will be able to generate 74 megawatts and together with the other three dams along Mone Creek it should be possible to generate 341 MW in total.

NLM, 07/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071207.htm>

A&IM Htay Oo visits Kyee-ohn Kyee-wa multi-purpose dam project near Wunlo village in Pwintbyu township. Work continues on the concrete spillway measuring 1,100 feet by 326 feet. Preparations are underway for the installation of the pre-stressed steel pipelines and construction of the power plant. The main embankment is 3,280 feet long and 164 feet high. Besides generating electricity, the dam will supply water to 96,777 acres of farmland through Mezali dam, five miles downstream and will irrigate over 70,000 acres of summer paddy.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%202/Country%20Report%20Tin%20-%20Myanmar%20-%20Presentation.pdf

The Kyee-ohn Kyee-wa dam and power station with a planned capacity of 70 MW is under implementation by the ID. It will generate 130 million kWh annually when it comes on line in 2008.

NLM, 24/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070524.htm>

Construction of the spillway of the Kyee-ohn Kyee-wa dam, the diversion canal and the separation wall near the site for the power station is proceeding. The hydropower plant will be installed with two 37-MW generators.

NLM, 19/03/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070319.htm>

Kyee-ohn Kyee-wa multi-purpose dam project is 50% complete. Arrangements have been made for installation of power lines from the Monechaung project and for the supply of cement to the project. Kyee-ohn Kyee-wa Dam will irrigate over 96,000 acres of farmlands and generate 74 MW.

Economic & Commercial Counsellor's Office of PRC Embassy in Myanmar, 28/12/06.

<http://mm.mofcom.gov.cn/aarticle/jmxw/200612/20061204169209.html>

On 27 December 2006, a contract for the supply and delivery of machinery and equipment for the Kyee-ohn Kyee-wa hydropower project was signed at the Irrigation Dept in Yangon. The contract was signed by U Kyaw San Win for the Irrig Dept and President Huang Yixiang of Guangdong New Technology (I&E) Corp. It took four year to negotiate the contract which is valued at EU\$13.8 million. The generating plant will have an installed capacity of 75 MW.

NLM, 17/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nml/n060617.htm>

Lt-Gen Ye Myint of the MoD checks on construction of Kyee-ohn Kyee-wa dam in Pwintbyu township. The multi-purpose dam will have a storage capacity of 463,000 acre feet. The power plant is expected to produce 330 million kilowatts per year. It will irrigate over 96,777 acres.

MT, 12/07/04. [Issue 224 of the Myanmar Times is no longer available on-line.]

A loan worth US\$ 20 million from the China Guangdong New Technology (I&E) Zhuhai Corp will fund the purchase of machinery for the Kyee-ohn Kyee-wa hydro-power project. The loan agreement was signed at the Irrigation Department on July 7th. The department's D-G, U Kyaw San Win, said the loan, repayable in seven years, would be used to buy turbines, switching equipment, sluice gates and other machinery from the corporation. U Kyaw San Win said the corporation would supply the machinery within three months and be responsible for its installation, which is expected to begin in November and take 20 months to complete. The ID has begun engineering work at the project site. Three turbines capable of producing 60 MW will be installed. The director of the procurement branch of the dept, U Myo Nyunt, said China Guangdong New Technology was one of four companies which tendered to supply the machinery. He said 15 international companies were invited to tender for the project: six each from China and Japan and one each from India, Germany and South Korea.

MT, 28/06/04. [Issue 222 of the Myanmar Times is no longer available on-line.]

D-G Kyaw San Win of the Irrig Dept said work had begun in 2003 on the Kyee-ohn Kyee-wa dam in Magwe division. It is due to begin generating power by the monsoon season of 2006.

NLM, 11/01/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nml/n020111.htm>

The A&IM inspects the site of a dam on Mone Creek about 15 miles downstream from the Mone creek multipurpose dam. He is briefed on water storage capacity, location of the main embankment, design, possibility of power generation, availability of water for cultivable land and the construction work plan. According to the feasibility study, about 300 million kWh will be generated annually and about 0.108 million acres of land will be irrigated.

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POTENTIAL IMPACTS OF THE WEIGYI AND DAGWIN HYDROPOWER DAMS

Foundation for Ecological Recovery: *Briefing Paper: Salween Hydropower Project (Thai–Burma border)*, June 2003. <http://www.terraper.org/articles/BriefingSalweenThai-BurmaJune03.pdf>

EGAT together with the Burmese gov't is currently reviewing two hydropower dams and plants on the Salween river along the stretch where the river forms the joint boundary between the Thailand and Burma.

They are jointly referred to as the 'Salween Hydropower Project'. EGAT, on behalf of the Thai Government, is proposing itself as the sole investor. It will share half of the profits with Burma.

According to information provided by EGAT to the Thai Senate Commission on Foreign Affairs on 12 Feb 2003, the proposed Upper Salween dam [i.e. Weigyi:] would be located at 18°19' N, 97°33' E, above the O Loh checkpoint of the Salween sanctuary and 14 km upstream from Sob Ngae in the Mae Sariang district. The dam would tap have a catchment area of 293,200 sq km. Annual inflow into the dam is estimated at 118,627 million cu metres. The high water level of the reservoir would be 220 m above sea level and its gross storage capacity would be 21,000 million cu m. The height of the dam barrier would be 168 m and its length, 570 m. The installed capacity of the power plant at the dam would be 4,540 MW, with firm power estimated at 2,139.75 MW and annual energy production at 29,217 GWh, and a firm energy commitment of 18,744 GWh.

The Lower Salween Dam [i.e. Dagwin] would be located at 18° 04' N, 97° 41' E, near Ban Tha Ta Fang, 15 km upstream from Ban Mae Sam Lab in Mae Sariang district of Mae Hong Son province in Thailand. It would have a catchment area of 294,500 sq. km with an annual inflow of 118,627 million cu m. Its high water level would be 86 m above sea level, and it would have gross storage capacity of 245 million cu m. The height of the dam would be 49 m, its length, 379.5 m. The power plant at the dam would have an installed capacity of 792 MW, with firm power estimated at 476.61 MW. Annual energy production could reach 5,422.49 GWh and the firm energy commitment would be 4,175.12 GWh. The Dagwin dam would serve mainly as a regulating facility, trapping large amounts of water released by the Weigyi dam during peak hours which would be pumped back to the upper dam in off-peak hours.

The presentation made to the Thai Senate committee appears to reflect the results of preliminary studies made by EGAT in 1981, by Japan's Electric Power Development Co (EPDC) in 1992 and Norconsult in 1994. EGAT has also disclosed that about 10,000 million baht are to be spent on a feasibility study, a social and environmental impact assessment and measures to mitigate project impacts. Another contingency budget of about 100,000 million baht is to be set aside for an Environmental Fund. EGAT has also included the planned electricity generation from the Salween Dams in its draft Power Development Plan (PDP) for 2003-2016. According to the plan the two dams would be able to supply electricity by 2013 with total generating capacity of 5,400 MW to be reached by 2016. The construction costs of the combined Weigyi and Dagwin dams and power plants is estimated at 277 billion baht (US\$ 6,150 million).

Impacts [as outlined by the briefing paper] [abridged]

The reservoir of the upper Salween (Weigyi) Dam will be about 380 km long, of which 56 km will be in Thailand. The reservoir will flood about 960 sq. km (600,000 rai). Construction will affect the ecosystem of the Salween watershed, one of the most fertile and ecologically unique areas of the world. This area is regarded as an ecological transition zone between the Indo-Chinese subregion and the Sino-Himalayan or Indian subregion. Construction of the upper Salween Dam will also flood about 20,000 rai of the Salween wildlife sanctuary, where plant and animal species from the Himalayas and high mountains along the Salween and Mekong Rivers are found. This flooding will threaten the habitats of at least 235 wild animal species. The project will also threaten numerous fish species found in the Salween River, including several migratory species.

In Thailand the project will affect the livelihoods of people residing in several villages within the wildlife sanctuary as well as communities on a number of tributaries that run into the Salween River. The Lower Salween dam will flood over 3,540 rai and directly impact the Salween National Park and the livelihoods of people residing in three villages there. In Burma, the reservoir created by the Upper Salween dam will flood Sa Luang town in Kayah state, land occupied by Karenni communities and parts of Shan state which is the home of the Shan/Tai people. Presently, these areas are vacant because of serious conflicts. Meanwhile, Burmese soldiers are forcing people out of the planned reservoir area. Most people have fled the violent suppression to refugee camps in Thailand. However, once the dam is built refugees' land will be permanently flooded so they will have no home to return to.

Although Thailand would reportedly save about 31,000 million baht annually in electricity costs through construction of the dams and power plants, it is debatable whether these savings would outweigh the loss of natural forest and human habitat on about 600,000 rai of land. Similar impacts were found in the case of the Yadana gas pipeline project. The Thai Government had to support refugees evicted from the construction area who suffered from rape, violent suppression, and violation of civil rights. Inevitably, Thailand has been accused of supporting the civil right violations in Burma.

EGAT's initial study of the impact of the dams was carried out on the Thai side only. According to the study, the Upper and Lower Salween Dams would flood only about 19,000 and 4,000 rai in Thailand. This can only be interpreted as a distortion of information since EGAT once mentioned that the Upper Salween dam would flood as much as 51,700 rai on the Thai side. Details about flooding in Burma and the Pai River basin which will affect almost 20 communities have not been revealed. It must be doubted that EGAT will take the impact assessment seriously or put any effort into seeking potential solutions, especially on the Burma side, both in the reservoir area and in the lower reaches of the Salween.

Topographic map references: Thailand 1:250,000: Series L509, U.S. Army Map: NE 47-06: Chiang Mai Weigyi dam, just west of Hokki [18° 18' 49" N, 97° 34' 49" E], grid square reference: 20\2, 3\4
Dagwin dam, near Dagwin [18° 04' 07" N, 97° 40' 55" E], grid square reference: 19\9, 3\6
http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-ne47-6.jpg

Additional references

Data summary: [Weigyi](#) [Dagwin](#)

See above: 'Tribe's home to be a valley of the dammed' (London Times: 22/03/06)

'The [Weigyi](#) dam: A great barrier and a way to safety' (KDRG: March 2006)

See below: 'Myanmar's tremendous [potential for energy export](#)' (MT: 12/06/00)

'Power purchase [deal between Thailand and Burma](#) on the way' (Nation: 27/05/97)

'[Lawpita](#) power plants and associated dams' (Various: Appendix 1)

Watcharaphong Thongrung, The Nation (Bangkok), 27/10/03.

www.burmanet.org/bnn_archives/2003/20031027.txt

The Thai Energy Ministry (TEM) has ordered EGAT to indefinitely suspend talks on its investment in the controversial Salween hydropower project in Burma, after EGAT distributed information about the project at recent meetings of the Asia-Pacific Economic Conference (APEC). The project is a sensitive issue that requires a more detailed study of its potential social, economic and environmental impacts, said the permanent secretary of TEM, Cherdpong Sirivith. The Salween project is a massive power-generation programme, originally designed to generate 500 MW. It will need an investment of about Bt200 billion. EGAT would be the main investor in the joint venture with the Burmese government and it is seeking support from foreign partners. EGAT governor Sithiporn Ratanophas said it was vital to push for the Salween project because it would provide relatively cheap power to the region. The Exim Bank of China and the China National Machinery Electric Corp have expressed interest in participating in the Salween project and have held preliminary talks with EGAT.

World Rainforest Movement Bulletin, February 2003. www.wrm.org.uy/bulletin/67/Burma.html

Recently, plans by EGAT to build the Weigyi dam on the Salween river between Thailand's Maehongson Province and Burma's Karen State have been revived. Weigyi ('Great Whirlpool') will be 168 meters high, with a generating capacity of 4,540 MW at an estimated cost of US\$ 6 billion. TERRA (Towards Ecological Recovery and Regional Alliance), a Thailand based NGO, says the reservoir, with a normal high water level of 220 m will backflood as far as 380-400 km to the north and will inundate an estimated 15,000 - 20,000 acres. Thousands of Karenni people in Kayah state in Burma will be displaced. The extent of the damage remains to be investigated, although an EGAT report to the Thai Senate Foreign Relations Committee indicated probable destruction of thousands of acres of forest areas on both sides of the Salween. Besides the hydropower potential of the dam, Thailand plans to divert water from it towards the Bhumipol dam and power plant which have never operated at full capacity since completion in 1994. Shans, Karens and Karennis have voiced their condemnation of Thailand's dam projects along the Salween since 1993. "This is a life and death issue," says a Karenni representative. "The Weigyi Dam would split the Karenni in two. It

would be the final nail in our coffin. Damming the Salween affects us in so many ways: economically, socially, culturally, environmentally. It will break the Karennis' rice pot." The Weigyi dam still requires official approval from Rangoon.

Images Asia - TERRA Report, November 1999.

<http://www.angelfire.com/rock3/shanyouth/body/status-of-salween-dam-plans.html>

Two sites identified for construction of large dams on the Salween are the 792-MW Dagwin hydropower and water diversion dam and the 4540-MW Weigyi hydropower dam, respectively 30 km and 60 km north of the Salween - Moei confluence. In February 1999, the Thai government approved Bt185 million in funding for studies of the feasibility of diverting water from the Salween River Basin to the Chaophraya River Basin. The Dagwin site is one of these. However most of the studies have focussed on the Moei and its tributaries.

SITTWAY POWER COMPANY PLAGUED BY DIESEL DEFICIT

Narinjara News, 25/03/03. <http://www.ibiblio.org/obl/docs/NN2003-03-03.htm>

The power sector in Rakhine State, . . . is in utter jeopardy due to the inability on part of the ruling SPDC junta to run the power houses, reports our correspondent from Sittwe, the state capital. Though the junta made a formal agreement to privatise the power house and the entire power distribution network with the privately owned Innbaukwa Co starting in January, the junta's plan fell flat on its face for a number of reasons, said a source in the State Electricity Department.

After getting the monopoly to run the powerhouse the private company announced that it would distribute power by charging each of its customers K60,000. "The plan was very high-sounding from the very beginning," said the official. "Where for the lack of necessary fuel oil the diesel power houses in the state could not be run more than three hours a day, the commitment by the private company to supply electricity round the clock seemed to be far-fetched. First the supply of fuel oil: where a number of government offices are not getting adequate fuel to run their vehicles, how could the company overnight ensure the smooth supply of fuel oil?" he said.

In the absence of a viable power source, the well-to-do residents of Sittwe are making a brisk business by making use of small and portable generators. From the neighbours many of the owners charge as much as K 300 for each of the bare bulbs, K 700 for two feet long fluorescent tubes in a month, while the power supply is maintained for barely three and a half hours a day between six and nine thirty in the evening.

The absence of power has wreaked havoc in the industrial sector forcing some small workshops to go out of business. In the State General Hospital the patients have had to buy fuel oil for surgeries, the official said. Students who lack electricity to carry on their studies are among the most affected.

A well-known businessman commented: "The SPDC junta boasts about the development they have brought to the border areas, but it's easy to see how ineffectual they are when it comes the absence of something as basic as electric power. Though there is a vast potential for natural gas in the coastal waters of Rakhine state, the Burmese junta doesn't take that into consideration when it talks about development in this state.

Additional references

See above: `Rice husks used to power [urban wards](#)` (Myanmar Times: 23/08/10)

Myanmar Times, 23/08/10. <http://mmtimes.com/2010/timeout/537/med.html>

Rice husk-powered power plants will be used to provide 24-hour electricity to some wards in Sittwe, The Yangon Times reported on 19/08/10. The report said the project was about 60 percent finished but did not give an expected completion date. The generators will be used to provide electricity to police stations, government offices, the telegraph office, Sittwe General Hospital and residential areas in some wards. The report did not say how many megawatts the new plants will be able to generate. The Sittwe Department of

Electricity is not able to provide electricity to all areas of the city and many wards rely on small generators, the report said.

NLM, 23/10/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n081023.htm>

A 300-ton cold storage plant and a 50-ton ice factory owned by the Minzarni Company in Sittwe are operated on power supplied by a generator fuelled by rice-husk gas and diesel.

NLM, 14/03/08. <http://myanmargeneva.org/NLM2008/eng/3mar/n080314.pdf>

EPM-2 Khin Maung Myint checks into the maintenance of the generators as well as the transformers and linkages at the diesel-fired power station in Sittway. Lamp-posts are being installed along the 11-mile power line on the Lanmagyi, Pyidaungsu, and Mayyu roads and the road to the airport. A site has been chosen to build quarters for the electrical staff on Lammagyi Road. The minister instructs officials to emphasize the supply of electricity. Afterwards, he supervises the arrival of a 100-KVA, Duetz-brand generator and two 315-KVA transformers at the Rakhine state electrical engineer's office.

NLM, 25/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080225.htm>

At the MEPE compound in Ahlon township, EPM-2 inspects the Cummins-brand 1000-KVA power machine to be used in Sittway.

NLM, 23/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071223.htm>

EPM-2 Khin Maung Myint meets with State/District/Township level service personnel at the office of the Rakhine state electrical engineer in Sittway where he hears reports on the distribution of electricity from department-owned generators and privately-owned paddy husk-fired power stations. The minister gives instructions on producing more electricity in Rakhine state.

Narinjara, 11/07/07. <http://www.narinjara.com/details.asp?id=1340>

Municipal authorities in Akyab (Sittway) are collecting K300 per kWh for power, plus a levy of K500 for the power meter box. Townspeople resent the meter box charge because they feel it is being used to pay for power used by the gov't and the army. But they pay it because they are afraid the authorities will cut off their electricity, if they don't. The electricity supply in the city is irregular and people often set up small power plants themselves using paddy husks as fuel instead of petrol. Despite the constant interruptions in power supply the meter levy is collected without fail.

Aung Hla Tun, Reuters, 09/04/07. <http://www.burmanet.org/news/2007/04/09/>

Residents of Sittwe, the capital of the northwestern state of Rakhine which is home to Myanmar's vast off-shore natural gas reserves, say they have not received any state electricity for a decade. Private companies sell power at K 300 (\$0.24 at black market rates) a unit, compared with K 25 in Yangon, and even then the lights are only on from 7 p.m. to 10 p.m. -- just long enough for the junta's propaganda blitz on state-run MRTV. "As soon as MRTV's evening news ends, the blackout starts," Sittwe resident Ko Aung Khine told Reuters.

Narinjara, 11/10/06. <http://www.narinjara.com/details.asp?id=963>

Burmese military authorities are expected to invite Bangladeshi entrepreneurs to invest in a 'special industrial zone' to be set up in Arakan State. The zone which is intended to foster business ties with Bangladesh has been in the planning stage for a long time. A few years ago an area was set aside for an IZ near the banks of Satrakya creek in Akyab (Sittway). However, it never got off the ground due to many obstacles, not the least of which is a lack of electric power. Akyab, despite being the capital of the state, receives electricity for only two hours during the evening, and many small industries have had to close due to the shortage of power.

Narinjara, 24/07/03. <http://www.ibiblio.org/obl/docs/NN2003-07-24.htm>

A newly formed local Electricity Committee headed by the Western Commander has been entrusted with the responsibility of 'lighting up' Sittwe. But so far the only power the people are getting is for three hours in the evenings every other day. The monthly charge has been fixed at a rate between K3,000 and K4,000, about the same as the monthly salary of an ordinary state employee. Last year the military regime handed over the power generation and marketing to Innbaukwa, a private company, Inn-bauk-wa, which started out by

collecting a connection fee of K 7,000 from all households. But they couldn't run the system properly because the government cancelled the company's licence to market fuel oils in the state and gave the diesel marketing licence to Ubaing Ltd, a company owned by the military. "The marketing of fuel oils by the Ubaing goes through a channel of corruption, making diesel and gasoline fuels including lubricants many times more costly than the actual price, and rendering the supply chain miserable," said the owner of a transport company. As a result, Innbaukwa was forced to return all the money it had collected as power connection fees to the depositors. "Even under colonial rule, we used to get 24-hour electricity in Sittway. Without electricity, the education of our children and the growth of business and industry are suffering. Our computers are idle and many householders are using their fridges as cupboards! Our life is so miserable that we cannot even use the basic household appliances," said a doctor in the State hospital. He said that when the hospital generator is needed for an emergency operation they have to collect the money from the patient to buy the diesel to operate the generator. The patients call the doctors 'extortionists'. "We have no other option," he said.

Narinjara News, 24/10/2001. [not available on-line]

Privately run rice mills, ice factories, printing presses, cold drink industries and machine shops throughout Rakhine State have been forced to shut down one by one due to a power shortage. The usual timetable for supply of power in Sittwe is from 7 to 9:30 p.m. every third day. Only on days when top-ranking SPDC officials come on a visit is the power left on all night. Though the diesel fuel supply to Rakhine State has dwindled during the last couple of years the theft of diesel fuel has increased in government institutions, including the power department.

MANDALAY MARKET FAVOURS LOCAL [SATELLITE DISHES](#)

Kyaw Naing, Myanmar Times, 03/02/03.

(Compiler's note: Issue 152 of the Myanmar Times is no longer available on-line.)

Sattelite dishes made in Mandalay have taken a big share of the market in upper Myanmar, say market sources. They said eight-foot models are the most popular. The best selling brands in upper Myanmar are Infostar, Johnsa, Zarni, Master, and Standard.

Infostar has the biggest share of the market, says U Soe Tint, owner of Mandalay's Wave Electronic Shop. "There are four or five antenna producers in Mandalay, and Infostar, Style and Zarni brands sell well. The dishes are also produced in Yangon, but those made in Mandalay are better quality and sell in Yangon where demand is higher," Ko Thein Win, owner of Shwe Rasu Electronic Shop, told the Myanmar Times last week.

"In the past, eight-foot dish antennas came from Thailand but those dishes are about twice the price. They cost over K100,000, while the locally made versions sell at about K50,000. "Hence, Myanmar brands are widely used. There were some difficulties in tuning them in the past, but now the quality is the same," U Soe Tint said. A dish together with a digital or analog receiver and other equipment is needed to receive television broadcasts from satellites. An analog receiver is priced at about K25,000, and a digital receiver costs K60,000.

Digital receiver brands available include Cheita, Prosat, Innovia, and Nextway. "Innovia is widely used. Cheita has also won popularity for its ease of tuning. It can be used along with Japanese domestic televisions," Ko A Nge Lay, an electrician who installs the dishes, told MT. "It takes about four hours to install a satellite dish. We charge K10,000 for installation in Mandalay, more elsewhere," "A complete antenna set costs about K190, 000, and it can tune in to nearly 200 free channels from 13 to 16 satellites. Most of the channels are Indian and Chinese."

Indonesia's TV7 channel is the most popular because it broadcasts football matches, but only some dishes can receive it, " added U Soe Tint. "People are interested in football matches, and antennas sell like hot cakes during the World Cup. But sales have decreased recently to about four or five units a month. Sales will increase if installation licenses are issued," an electronics store owner told MT. "Two-foot satellite

dishes are imported from Thailand, but are too expensive for most people. Installation costs about K700,000, and cards which can be bought in Yangon cost about K400,000 a year. Channels can be difficult to tune during bad weather," he added.

LOCAL TRANSFORMER MANUFACTURERS FACE TOUGH COMPETITION

Win Nyunt Lwin, Myanmar Times, 27-01-03.

(Compiler's note: Issue 151 of the Myanmar Times is no longer available on-line.)

Government endeavours to reduce transformer imports have resulted in a call for increased domestic production. Locally made transformers ranging from 50 KVA to 10 MVA have the capacity to fulfill all Myanmar's needs. There are two manufacturers of transformers: Myanmar Ekarat Transformer Co Ltd, a J-V between the Ministry of Industry No 2 and Ekarat Engineering plc of Thailand, and the locally-owned Soe Electric and Machinery Co Ltd.

U Saw Myaing, MD of Soe Electric said they had developed a 5 MVA 33/6.6 kV transformer in 2000, a 10 MVA 33/11 kV transformer in 2001 and planned to produce 20 to 47 MVA giant transformers in 2002. Their current production averages 30 transformers a month. He said 50pc of the materials needed are imported through Thailand and Singapore from the USA, Italy and Japan. The rest of the components are produced domestically. Current production levels represent US\$500,000 in import replacements.

Ekarat produces an average of 20 transformers a month using 90pc imported materials from Germany and Japan. Both domestic transformer manufacturers are working below optimal production capacity and are ready to satisfy greater demand. According to U Myin Maung Htun, GM of Ekarat, more transformers will be necessary with the increase in power usage as new hydro-electric power projects come on line. The importation of transformers has been banned except when a trading company wins a tender issued by a government ministry.

Because of the imposition of a 20pc commercial tax on the local manufacturing sector, domestic producers often find it difficult to compete with import trading companies when tenders are called by government ministries. For an import and trading company, imported goods only attract a customs duty at the rate of one per cent calculated in kyat at an official exchange rate of K100 to the US dollar. They must also pay a further commercial tax of two per cent on the total price. But according to U Maung Maung Khun, Managing Director of KKA Export and Import Company, the domestic products are effective, easily serviced and competitively priced.

Additional references

See above: 'Myanmar exports first domestic transformer' (MT: 30/05/05)

'Power fluctuations keep electrical supply shops busy' (MT: 06/10/03)

For Soe Electric and Machine Tools Co Ltd (aka Soe Electronics) see the company's well-developed, up-to-date website <http://www.soeelectric.com/>. Although the company profile is in Burmese, most of the rest of the information is in English. Soe Electric has ISO 9001 certification. Also, the following:

NLM, 03/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-03.pdf>

A photo in the print edition of NLM shows the interior of an unidentified factory where electrical transformers are being manufactured in Industrial Ward No 1 in South Dagon township in Yangon. This would appear to be the factory of Soe Electric, since it is very doubtful that the Ekarat factory, also in the same industrial ward, still produces transformers (see below).

NLM, 11/07/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080711.htm>

Lt-Gen Myint Swe of the MoD visits the transformer manufacturing factory of Soe Electrical and Machine Tools Co Ltd in No.1 Industrial Zone of Dagon South where he looks into the production of new transformers and the repair of old transformers. MD Soe Tint briefs him and his party on the manufacture and distribution

of import-substitute transformers ranging from 50 KVA to 30,000 KVA. The factory manufactures 120 to 150 transformers and 30 units of MV-12-OI outdoor isolators per month. They are sold to industrial zones, construction companies and agriculture and livestock breeding companies throughout Myanmar and are also exported. .

NLM, 25/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080225.htm>

Deputy EPM No 2 Win Myint inspects transformers and electrical appliances at the factory of Soe Electrical and Machinery in Dagon South where he is briefed by MD Kyaw Min Tun on production of the transformers. He goes on to the factory of Yangon Transformer and Electrical in Shwepyitha IZ where MD Tun Lin Thauung presents a report on the production and distribution of transformers and electrical appliances.

NLM, 07/07/07. <http://myanmargeneva.org/NLM2007/eng/7Jul/n070707.pdf>

Transformers and accessories produced by Soe Electric and Machine Tools Co Ltd are to be used at new government facilities at Nay Pyi Taw and Tatkon. Installation and production of 5000 kVA 33/11 KV transformers is underway.

NLM, 14/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060614.htm>

During a visit to the Soe Electronics factory by the newly appointed EPM No 2, MD Soe Tint reports that the factory was established in 1983-84 and started assembling transformers in 1989. It now has a staff of 250 and is one the lead players in the industrial sector in Myanmar. New and standardized models are being introduced; some parts are domestically produced. The minister checks 47-MVA generators and corrugated radiator fins that are under production. He urges increased production of transformers.

NLM, 29/08/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020829.htm>

Soe Electric and Machinery Co Ltd is currently manufacturing transformers with capacities ranging from 50 kVA to 20 MVA. It also repairs older power and distribution transformers made in various countries.

NLM, 30/06/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/N010630.htm>

The factory of Soe Electric and Machinery Co Ltd in Industrial Zone 1 of South Dagon township is producing transformers ranging from 50 kVA to 500 kVA.

For **Myanmar Ekarat Transformer** see the following:

<http://www.industry2.gov.mm/mtei.htm>

The updated (2007) MMTEI section of the Industry-2 Ministry website states that Myanmar Ekarat Transformer Co Ltd, a joint venture between MMTEI and Ekarat Engineering Public Co Ltd of Thailand, is operating in Industrial Zone-1 in Dagon Myothit South in Yangon. Yellow Pages online directory also lists Myanmar Ekarat Transformer Co Ltd as operating at a plant on Mogok St in South Dagon and a showroom on Shin Saw Pu St in downtown Yangon. It is not clear whether this factory is now solely owned and operated as a subsidiary of the state-owned MMTEI or whether another partner has taken up the interest previously held by Ekarat Engineering Plc.

NLM, 22/12/10. <http://www.burmalibrary.org/docs09/NLM2010-12-22.pdf>

Myanmar Akarat Transformer factory, located at No 476, Mogok road, IZ-1, South Dagon township, is producing international-standard transformers. Yangon. The industry, established in year 2000, applies German technology to produce its transformers using raw and related materials from Italy, Japan and Sweden and Thailand. The transformers are guaranteed for five years. More information is available at No.86/B, Shin Saw Pu road, Sangyoung Township, Yangon.

<http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070905.htm>

Myanmar Ekarat Transformer Co Ltd produces from 30 to 100 high-quality transformers monthly.

Chatrudee Theparat, Bangkok Post, 13/03/06.

http://www.redorbit.com/news/technology/426190/firm_sees_future_in_solar_cells_ekarat_plc_divests_foreign/index.html

Ekarat Engineering Plc, a manufacturer of distribution transformers, has divested its foreign investments to focus on the alternative energy business, particularly on supplying solar cells to the European and Asian

markets. Chairman Kietphong Noichaiboon said Ekarat Engineering had sold its Bt60million-joint investment Ekarat Transformer Co (Myanmar), in Burma. The company has also sold a holding worth about 50 million baht in Nepal and cancelled a Bt200million investment in manufacturing transformers in Bahrain, which it announced last year. Mr Kietphong said the divestment was a part of a plan to raise 1.5 billion baht, primarily for the construction of south-east Asia's first solar-cell factory operated by Ekarat Solar Co.

Myanmar Ministry of Industry-2 website information.

<http://www.myanmargeneva.org/e-com/MOI-2/MOI-2/myanmar.com/Ministry/moi2/JV.htm>

Myanmar Ekarat Transformer Co Ltd was established in 1999 under a joint venture agreement between Myanma Machine Tools & Electrical Industries (MMTEI) of the Ministry of Industry No 2 and Ekarat Engineering Public Co Ltd of Thailand. The equity ratio is: MMTEI: 40%, Ekarat Engineering: 60%. The factory in South Dagon Industrial Zone No 1 manufactures distribution transformers. [This information still available on the Geneva legation website has now been updated by the Industry-2 website listing dating from 2007, See <http://www.industry2.gov.mm/mtei.htm>

NLM, 02/12/00. [http://mission.itu.ch/MISSIONS/Myanmar/00nIm/n001202.htm#\(5\)](http://mission.itu.ch/MISSIONS/Myanmar/00nIm/n001202.htm#(5))

Opening ceremonies of joint-venture factories and workshops were held in Dagon South IZ on 01/12/00. The MD of Myanmar Ekarat Transformer Co Ltd, Viltthep Vachirabhahu extended greetings. The Minister for Industry No 2, Maj-Gen Saw Lwin unveiled the signboard of the factory.

MIC, 03/12/98. [not available on-line]

Myanmar Machine Tool and Electrical Industry of the Ministry of Industry No 2 and Ekarat Engineering Public Co Ltd of Thailand agreed to set up Myanmar Ekarat Transformer Co Ltd [aka A Caret] on 02 December at the Sedona Hotel. The Minister for Industry No 2 and the chairman of the Thai company, Mr Kietphong Noichaiboon spoke on the occasion. The Managing Director of MMTEI and the Managing Director of the company Dr Wiwat Sangtian signed the contract. The Secretary of the Myanmar Investment Commission presented a permit to Mr Kietphong Noichaiboon.

For the manufacture of transformers at **No 1 Machine Tools Factory in Nyaungchidauk** in Padaung township see the following:

<http://www.industry2.gov.mm/mtei.htm>

The updated (2007) MMTEI section of the Industry-2 Ministry website states that distribution transformers of the following six classes are being produced at the Machine Tools factory of MMTEI in Nyaungchidauk in Padaung township: (6.6/0.4KVA) 300KVA, 100KVA, 50KVA and (11/0.4KV) 300KVA, 100KVA, 50KVA.

NLM, 05/09/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nIm/n050905.htm>

Minister for Industry-2 Maj-Gen Saw Lwin on 2 September went to No 1 Machine Tools Factory (Nyaungchedauk) in Padaung in Bago Division (West) and inspected machinery and transformers manufactured by the factory.

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Start 03

CHAUNGTHA RENEWABLE ENERGY PROJECT USES THREE POWER SOURCES

Myo Lwin, Myanmar Times, 06/01/03.

(Compiler's note: Issue 148 of the Myanmar Times is no longer available on-line.)

An electricity generation project that combines the use of wind and solar power with diesel generators is being developed at Chaungtha, a popular beach resort in Ayeyarwaddy division. The Dept of Electric Power said the project would benefit more than 100 households when it goes on stream in March. The department is working jointly with the Tokyo-based New Energy and Industrial Technology Development Organisation (NEDO) on the project, which is aimed at demonstrating the effectiveness of using the three power sources in combination.

The solar system and diesel generator have already been installed and work is continuing on the 22-metre-high wind turbine, according to Chaungtha township electrical engineer U Soe Moe. Completion of the installation of the turbine is expected in March when a trial of the system will begin, U Soe Moe told Myanmar Times. He said that when the hybrid power supply system is fully operational it will provide power to 130 households for 17 hours a day, up from the current four hours daily. The installed capacity of the system would be 180 kW, still short of the power needed by the resort town's 13 hotels, which use generators of up to 100 kW, U Soe Moe said.

He said even though the project would improve the living conditions of the townspeople, the main purpose of the project was for research. "NEDO is keen to do research on how the power supply from three sources with different frequencies and different voltages will work and how improvements can be made," U Soe Moe said, adding that Myanmar technicians working on the project were gaining valuable experience in the use of alternative power sources. After carrying out a one-year feasibility study, NEDO installed the diesel generator in late 2000 and completed the solar system last November. U Soe Moe quoted Japanese experts working on the project as saying it was the first of its kind in south-east Asia. Sources in Chaungtha said the project would cost about K700 million. Chaungtha, with a population of about 6,000, has become an increasingly popular beach holiday destination in recent years.

Additional references

See above: 'Solar power seen as solution for remote villages' (MT: 06/10/03)
'Wind power [system ideal](#) for villages, says engineer' (MT: 05/12/05)

Win Khaing, *Renewable Energy and Rural Development in Myanmar*, pp 18-20. Presentation made at TCDPAP & FIDIC/ASPAC) Conference (22-25/04/08) in Seoul. Edited.

www.mes.org.mm/.../RE%20&%20Rural%20%20Development23April%2008.%20Seoul.pdf

Photos and basic information about the Chaungtha project are included in this slide set. Installment of the system cost a total of about \$US 5 million. Street lighting, more than 1300 households, the town high school, two monasteries, two community halls, a 16-bed hospital, the police station, and the town postal and telecommunication office are benefited. Use of renewable sources of energy means that 98.8 tons less of carbon dioxide are emitted into the environment annually.

See also the proposal for combining the use of a rice-husk gas-fired system with a battery charging system in the model village Hsamalauk in the additional references to '[Interest growing](#) in rice-husk generation' (MT: 10/07/06).

PROMISING POWER SECTOR [ATTRACTS PRIVATE INVESTMENT](#)

Win Kyaw Oo, Myanmar Times, 23/12/02.

This article was published in Year End Review of Issue 147 of the Myanmar Times which is not available online. For other articles on this subject, see the section 'Independent Producers and Projects' ([IP](#)) in the topical index.

[MAWLAMYAING POWER STATION OPERATING AT REDUCED CAPACITY](#)

NLM, 27/10/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlnm/n021027.htm>

Chief of Armed Forces Training Lt-Gen Kyaw Win and party discussed efficient use of electricity and fuel in meeting with South-east Commander Myint Aung, at the guest house of the command [in Mawlamyaing] on 22 October. Thura Myint Aung said power was supplied to 19 wards in [Mawlamyaing] township around the clock with 9.5 MW instead of 12 MW. The power was supplied to the IZs in the afternoon and to the residential quarters in the evening. Arrangements have been made for supply of power to the IZs late in the evening. Fuel was sold to trucks transporting commodities, he said.

Lt-Gen Kyaw Win said the project for the efficient use of power and fuel is being implemented nationwide in accord with the guidance of the Head of State. He spoke about the switching of security lights, use of one switch for one fluorescent lamp system, taking actions against those who sold fuel oil illegally and submitting a report on use of electricity to the Office of Armed Forces Training.

Additional references

Data summary: [Mawlamyaing](#)

NLM, 05/12/10. Edited. <http://www.burmalibrary.org/docs09/NLM2010-12-05.pdf>

Equipment needed for the maintenance and repair of the main power stations of MEPE at Thaton and Mawlamyaing will be provided by a three Myanmar and PRC companies. The equipment includes a power transformer, capacitor bank and substation materials for the two stations. It will be purchased from Chint Electric Co Ltd, Gunkul Engineering Public Co Ltd and Central China Power Grid International Economic & Trade Co Ltd. D-G Aung Than Oo of MEPE and the managing directors of the three companies signed the contracts in Nay Pyi Taw on 02/12/10. [Notice of the contract signing in NLM did not specify who would be responsible for the installation of the various pieces of equipment or which station they were intended for.]

NLM, 16/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-16.pdf>

110 million cf/d of natural gas is transported from the Yadana off-shore field to the 4000-ton Myaingale Cement Plant, the Thaton cement plant, the old and new Thaton gas power plants and the Mawlamyaing (Ngantay) power plant.

IMNA, 06/02/08. <http://www.monnews-imna.com/newsupdate.php?ID=1313>

Pipeline workers released gas at mains along the 20-inch-diameter natural gas pipeline that connects Kanbauk and Myaingalay following a leak that occurred last week in Kamawet village, Mudon township. The mains were shut down above and below the leak in Waekali village, Thanbyuzayat township, and the Taung Waing quarter of Moulmein. A senior monk in Myaingthaya quarter of Moulmein, said that his area has not received any electricity since the gas was released.

IMNA, 05/02/09. <http://www.monnews-imna.com/newsupdate.php?ID=1311>

In Moulmein, residents have been complaining about the decreasing power wattage they receive. Last week, Mon State officials extended electricity to villages in nearby Mudon township but, apparently, they did so without increasing the power output from the Ngante station in Moulmein.

IMNA, 31/08/07. <http://www.monnews-imna.com/2007/augupdate.php?ID=736>

The 'Weekly Eleven' journal recently reported that the Moulmein and Thaton electric power stations and other factories in Mon State are operating on natural gas to cut expenses in half.

MIC, 30/07/06. www.myanmar-information.net/infosheet/2006/060730.htm

Steam-powered stations are Ahlon, Hlawga, Ywama, Thakayta, Tikyit and Mawlamyaing. These power stations are currently generating 285 MW.

NLM, 27/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060727.htm>

During his inspection tour of Mawlamyaing power station near Ngantay Village on the Mawlamyaing-Kyaikmaraw road, the Minister for EP No.2 underscored the need for maintenance of the machines.

Salween Watch, November 1999. www.ibiblio.org/obl/docs/SW03.htm

Mawlamyaing Thermal Power Plant, 12 MW, in operation since 1980.

BurmaNet News, 28/08/94. www.ibiblio.org/obl/reg.burma/archives/199408/msg00067.html

China will supply spare parts for the electric power station in the Mon state capital of Moulmein.

WPD, 16/02/92 <http://www.ibiblio.org/obl/docs3/BPS92-02.pdf> [doc p. 2]

China and Myanmar signed an agreement under which China will send two teams to study the construction of a satellite ground station and need for spare parts for the steam-powered generating plant in Mawlamyine. Costs will be covered by an interest-free Yuan 50 million loan.

Tin Maung Maung Than, "Burma's Energy Use: Perils and Promises" in *Southeast Asian Affairs 1986*, Institute of Southeast Asian Studies, 1986, p. 84. [not available on-line]

The thermal power station in Moulmein was constructed with part of a PRC loan covering various industrial projects.

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GOVERNMENT DRIVE TO CONSERVE ELECTRICITY

Win Kyaw Oo, Myanmar Times, 07/10/02.

(Compiler's note: Issue 136 of the Myanmar Times is not available on-line.)

All government departments in Yangon have launched a campaign to conserve electricity in their work places. The campaign has resulted from instructions issued by government leaders for the efficient use of electricity. It follows the supply of 24-hour electricity to most of the 33 townships in the Yangon municipal area since late last month.

Government work places have been directed to rely on natural light as much as possible. Production and service enterprises are to use the minimum amount of power needed for their operations while all work places are to take steps to prevent power from being wasted. One aim of the measures is to make more power available for those who need a constant supply.

As part of the campaign to conserve electricity, MEPE has begun checking on usage by the public. "We've found that some residents and businesses, such as restaurants, use unauthorised connections so we have temporarily cut off the power supply to their buildings," a departmental official said.

In another move to conserve electricity, low-voltage lamps have been fitted to most street lamps throughout the city. The public is also being urged to conserve fuel.

The Myanma Petroleum Product Enterprise said if the owners of the country's 450,000 vehicles reduced fuel consumption by a gallon a month it would result in monthly foreign exchange savings of US\$5.5 million. "That is enough to build a 1300-metre-long bridge," the agency said.

Compiler's Note: The campaign to conserve electricity referred to in this article seems to have been driven mainly by rising world prices for crude oil and the consequent crisis created by heavy subsidization of prices for diesel and other fuels in Myanmar. The Supervisory Committee for Utilization of Power and Fuel chaired by the SPDC's Lt-Gen Kyaw Win was the body formed to direct the campaign. References to the committee disappear after June 2006.

Additional references

NLM, 07/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060607.htm>

Lt-Gen Kyaw Win of the Ministry of Defence, accompanied by senior military officers and officials of the SPDC office met with responsible personnel at the Mandalay DPDC hall and discussed the use of electricity and fuel. In his address, Lt-Gen Kyaw Win said EPM No 2 was taking steps to increase the generation of electricity. As a strategic region for the nation, Mandalay division was to make efforts to minimize loss and wastage of electricity and to give priority to supplying power to industrial zones. Manager Kyaw Thuang of MEPE for Mandalay reported on distribution of electricity in the division and on steps being taken to prevent the loss and wastage of power. Later, GM Tun Myint Oo of MOGE for Upper Myanmar reported on obtaining and distribution of fuel in the division while other officials reported on the sale of CNG to CNG-used vehicles. In response, Lt-Gen Kyaw Win called on officials to co-operate with local authorities in the inspection of fuel tanks and to make relentless efforts in discharging their duties to the State.

NLM, 22/05/03. <http://www.myanmargeneva.org/03nfm/n030522.htm>

The Supervisory Committee for Use of Electricity and Fuel holds a work coordination meeting at the Ministry of Electric Power in Ahlon township. It is attended by the Ministers for Home Affairs and Electric Power and Energy, as well as deputy ministers, the vice-mayor of Yangon and dept officials. Chairman Kyaw Win delivers a speech, saying that "though measures could be taken for more supply of electricity to industrial zones, efforts were needed to fulfil the public consumption of electricity". He calls for ways and means to generate and distribute more electricity. EPM Tin Htut reports on prospects for increased generation of electricity at the hydro-electric power stations, as well as at natural gas power stations under repair, and on the installation of machinery at the hydel-power and coal-fired stations. The stations, which will come on stream in the current fiscal year (03-04), will add an additional generating capacity of 335 MW to the system. Energy Minister Lun Thi reports on increased production of natural gas and fuel. MEPE MD San Oo speaks about the temporary interruption of electricity due to the shifting of lamp-posts and the severing of underground cables when road were under construction. MEPE Director Myo Naing reports on an increase in revenues due to exposing cases of the illegal use of electricity in the 2003-2004 financial year.

NLM, 27/02/03. <http://www.myanmargeneva.org/03nfm/n030227.htm>

At a work coordination meeting of the Supervisory Committee for the Efficient Use of Electricity and Fuel, Lt-Gen Kyaw Win says that electric power plants need to generate at full capacity in order to supply enough electricity; it is necessary to coordinate with respective depts to ensure supply of gas and fuel. Supervisory measures were to be taken for minimizing loss and wastage. Energy Minister Lun Thi reports on the production and distribution of gas and fuel and on arrangements to boost production. Kyaw Win gives instructions on co-operation among depts to boost production of electricity.

NLM: 21/12/02. <http://www.myanmargeneva.org/02nfm/n021221.htm>

The Electricity and Fuel Utilization Supervisory Cte meets at the EPM offices. Chairman Kyaw Win says that efficient use of electricity and fuel, has saved the nation over K 551.8 million in the three-month period [since the formation of the committee]. Arrangements have been made to minimize power and fuel wastage and to use them more effectively in the production and public sectors. Other ministries besides the EP and Energy ministries are required to render assistance to the cte. MEPE officials report on the capacity of the gas-fired power stations and the hydel power stations to generate and supply electricity, on the supply of natural gas and power distribution and on efforts to realize the targets of the EPM. Deputy EPM Thein Aung explains production and distribution of fuel and natural gas and supply of fuel and gas to the EPM. .

See above: 'Formation of work committee for electric power development' (NLM: 01/04/04)

'Mawlamyaing power station operating at reduced capacity' (NLM: 27/10/02)

See below: 'Pipeline to solve electricity shortages' (MT: 16/09/02)

'Yadana gas will fire electric power plants in Myanmar' (MP: Sept 1995)

'Use of Yadana gas for power generation and industry: Chronology' (Appendix 6)

PIPELINE TO SOLVE ELECTRICITY SHORTAGES

Thet Khaing, Myanmar Times, 16/09/02.

(Compiler's note: Issue 133 of the Myanmar Times is not available on-line.)

Work has begun on a natural gas pipeline which the government says is expected to ease an electricity supply shortage in Yangon within about two months. A media conference in Yangon last Thursday was told the pipeline would overcome supply shortages at two gas-powered electricity generating stations on the outskirts of the capital.

The deputy chief of Military Intelligence, Maj Gen Kyaw Win, said the shortages were the cause of disruptions to the electricity network in some parts of Yangon.

An official from the EPM said the project involved extending a pipeline to Yangon from Thaton, where gas from the Yadana offshore field is used as an energy source at a cement factory. U Aung Koe Shwe, said the extension would be linked to gas-fired generators at Hlawga, north of Yangon, and the Ahlone power station

in the south-west part of the city. He said the two power stations needed another 60 million cf/d of gas to operate at capacity. He said the gas would be bought from the French energy giant, TotalFinaElf, which operates the Yadana field jointly with MOGE. U Aung Koe Shwe said the generators supplying electricity for Yangon were producing about 285 MW per hour, about 100 MW short of the city's needs.

The media conference was also told that the national supply was expected to improve in the next two years when three new power stations come on stream. Kyaw Win said the total national output of 580 MW an hour was about 220 MW short of system needs. He said the three stations, one each in Mandalay and Magwe divisions and another in Shan state, would generate 475 MW when completed in 2004.

The government is also upgrading a hydro-electric plant at Lawpita in Kayah State with a US\$28 million grant from Japan. The plant was built in the 1950s using war reparation funds from Japan.

Additional references

- See above: 'Power [supply improves](#) in Rangoon' (Mizzima: 28/07/09)
 'Gas [turbine failure](#) restricts electricity supply in Yangon' (Xinhua: 01/02/09)
 'More [gas to be diverted](#) from Yadana for national use' (MT: 14/01/08)
 'Gas in [short supply](#) to meet demand for electricity (MT: 17/09/07)
 'More [gas needed](#) for 24/7 power in Yangon (MT: 02/07/07)
 'Ywama power station dependent on gas distribution system' (NLM, 01/02/07)
 'Electricity supplies get boost from [YESB plan](#)' (MT: 24/07/06)
 See below: 'Yadana [gas](#) will fire electric power plants in Myanmar' (MP: Sept 1995)
 'Use of [Yadana gas for power generation](#) and industry: Chronology (Appendix 6)

See also the list of all the articles in the index: Major Thermal Stations and Supply Networks. [TS](#)

Monthly Eleven, June 2010. Excerpt.

http://eversion.elevenmediagroup.net/index.php?option=com_content&view=article&id=621%3Aburst-of-offshore-natural-gas-pipeline-causes-decline-in-electricity-distribution-to-yangon-&Itemid=109

The offshore gas pipeline [through Myaingalay] to Yangon burst at 10am on 02/06/10, so there was not enough gas available to generate electricity. Because the Tanintharyi-Yangon natural gas pipeline bursts frequently, a 24-inch diameter pipeline is being constructed [through Daw Nyein village in Ayeyawady division to the Ywama gas plant] to solve the shortage of electricity available for distribution in Yangon. A YESB official said the new pipeline from the offshore Yadana field was nearly completed, but was not yet ready to convey the natural gas. The extended facilities at the gas control and distribution station at Ywama were ready, the official said, and as soon as the pipeline was operational, natural gas conveyed by the new 24-inch line would be distributed to the turbine engines.

NLM, 01/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-01.pdf>

The gas pipelines of the Yadana natural gas project have been under maintenance since 24 January. So, production [of electricity at natural-gas fired plants] has fallen to some extent. In the meantime, power supply was increased from hydroelectric sources to cover demand. But on 26 January, some KNU and KNPP terrorists blasted towers 220 and 222 of the Lawpita-Toungoo grid near Thaukyaykhat creek, so the supply of electricity available is limited and the regions concerned will have to share. Efforts are being made to restore regular power supply as soon as possible.

Kyaw Thu, Myanmar Times, 27/08/07. <http://www.mmtimes.com/no381/n009.htm>

Two towers used to transmit power to the national grid were destroyed and a third damaged in an attack by anti-government insurgents [in Thandaung township?] in Kayin (Karen) state on August 14. The explosives destroyed towers 206 and 208, and nearly pulled down tower 205, so Yangon lost 90 MW due to the destruction of power lines that carry electricity to the city, a YESB official said. Some of the electricity shortfall has been overcome by increasing the supply of natural gas to city's gas turbines. "We have been getting an additional 6.1 million cf/d from the Energy Ministry so we have been able to increase the electricity output from the gas turbines to partially compensate for the power lost by the explosion," he said. He said it would take "at least one week" to repair the towers because they were located in a remote, mountainous

region where heavy rain and mudslides can hinder work. Meanwhile, the reduction in power supplies has forced YESB to supply power to townships according to a rotating system. The townships have been divided into three groups, with two groups receiving 18 hours of electricity and one group getting 12 hours on any given day.

Kyaw Thu, MT, 02/10/06. [Issue 336 of the Myanmar Times is not available on-line.]

Repairs have been completed on a pipeline that supplies natural gas to four power plants in Yangon, said an official from the Ministry of Energy on Sept 25. Problems with the pipeline, which was shut down Sept 23 for repairs, were blamed for blackouts in Yangon. The 320-km (199-mile) pipeline carries 3.1 million cu m (110 million cu ft) of gas per day to Yangon's Ywama gas control station from the Yadana gas project in Tanintharyi division.

Xinhua, 18/09/02. www.gasandoil.com/GOC/news/nts24231.htm

Myanmar's installed electric power generating capacity has reached 1,149 MW, according to figures released by the EPM. Of this total, 588.3 MW were in place before the present government took power in 1988, while 560.9 MW have been added since. Of the electricity produced in the country, natural gas fuels 698.7 MW (60.8pc), followed by hydropower which generates 390.6 MW (34pc), while the rest is produced by steam power. There are 42 hydropower plants, 14 natural gas plants and three steam plants. The government has laid down a five-year plan (2001-02 to 2005-06) to build nine hydropower plants which will have a generating capacity of 5,862.4 MW. It is estimated that by 2005-06 when all the targeted plants are completed, the country will have a total generating capacity of 8,981.67 MW. There is currently a serious shortage of electric power. Even foreign embassies and organizations do not receive normal power supply and frequently have to depend on their own power generators to carry out normal functions. The power shortage has had a major negative impact on the country's economic development and ability to attract foreign investment.

NLM, 13/09/02. http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020913.htm#2_

At the regular press conference with local and foreign correspondents at the Tatmadaw Guest House in Yangon, Vice-Chief of Military Intelligence Kyaw Win explained matters related to the electric power projects of the EPM already completed, under construction and in the planing stage. He said the Government is aware of the difficulties relating to the power supply system. Only about 60 MW of electricity was produced before 1988, but by relying on its own resources, the government had added over 450 MW since. Furthermore, large and medium hydel power stations are under construction that will produce over 3,000 MW by 2006. Some of these will be completed in 2003-04, when over 500 MW will be added to the system.

AFP, 12/09/02. www.burmalibrary.org/TinKyri/archives/2002-09/msg00012.html

Myanmar's military junta said Thursday it planned to build more gas turbines and purchase gas from France's TotalFinaElf in a bid to end the country's chronic electricity shortages. Authorities were now constructing new generators, which would be brought on stream by 2006, deputy chief of military intelligence Major General Kyaw Win told reporters. "We estimate that by then our generators will be providing over 1,900 megawatts of electricity, far more than enough for our needs," he said. Electricity supply currently available to the entire country is now less than 560 MW, well below demand of 800 MW, he said. "Production has not been able to keep up with consumption, as demand, especially by the industrial sector, increased dramatically." The capital started experiencing acute power shortages when two of the three main gas turbines providing electricity shut down due to a depletion in offshore gas reserves, an energy ministry official said. Supply from the reserves should be resumed by November or December, he added.

Xinhua, 03/09/02. www.burmalibrary.org/TinKyri/archives/2002-09/msg00002.html

Myanmar produced 8,787.4 million cu m of natural gas in fiscal 2001-02, of which 6,713.4 million cu m (76.3pc) were exported to earn hard currency, with the being reserved for domestic use, including for electricity generation. Electricity yielded by natural gas represents 54pc of the total produced in the country. In 2001-02, 3,072.69 million kWh were generated by gas of a total of 5,671.78 million kWh generated by MEPE.

U Kyaw Nyein, "Union of Myanmar: Ministry of Energy" in *Petromin*, Jan-Feb 2002, p. 10

[http://www.petronas.com.my/intranet/ascope/ascope.nsf/3b269571c10e71e5482568960033edc8/d9b2645688f00ced48256b05001451f1/\\$FILE/Myanmar.pdf](http://www.petronas.com.my/intranet/ascope/ascope.nsf/3b269571c10e71e5482568960033edc8/d9b2645688f00ced48256b05001451f1/$FILE/Myanmar.pdf)

A total of about 1200 miles land pipeline has been laid by MOGE's own pipe laying fleet for domestic gas transmission. The pipeline size varies from 6" up to 20". Recently 180 miles of 20" pipeline was successfully constructed by MOGE's national team, from Kanbauk to Myaingale where a new cement factory has just been completed. The gas is being transmitted from the offshore Yadana field through the Kanbauk pipeline centre. The current inland gas production is being supplied to gas turbines (65%), urea plants (16%), while the rest goes to cement factories, refineries and other industries.

NLM, 17/10/93. <http://www.ibiblio.org/obl/docs3/BPS93-10.pdf> [document p. 38]

Minister for Energy U Khin Maung Thein inspected laying of gas pipelines along the Sittaung-Thaton-Myaingalay natural gas pipelines project in Kyaikhto township. Natural gas from the Aphyauk wells will be sent to a power station and tyre factory in Thaton, and a cement factory in Myaingalay.

BAWGATA CREEK WILL BE DAMMED TO PRODUCE ELECTRIC POWER

NLM, 10/09/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nml/n020910.htm>

On 9 September morning, Maj-Gen Khin Maung Than of the Defence Dept and A&IM Nyunt Tin and party oversaw the site for construction of the Bawgata dam project near Muthe village in Kyaukkyi township. Director-General U Kyaw San Win of ID reported on location of the project and aims and facts of the project. The dam will be located on Bawgata Creek, 11 miles [east of] Kyaukkyi. The project will be implemented with the aims of storing water from Bawgata Creek behind an 1,800-foot long, 230-foot high dam and of generating 500 million kWh annually. On completion of the project, the dam will contribute towards development of the region.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NE 47-05: Toungoo Bawgata creek dam, 11 miles east of Kyaukkyi [18° 19' N, 96° 46' E], grid square reference: 9I2, 26I4 [?] <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-5.jpg>

See also the map of the Nyaunglebin (Kler Lweh Htoo) District on the KHRG website where the Karen name of the Bawgata creek is given as 'Theh Loh'. http://www.khrg.org/maps/2007maps/nyaunglebin_72dpi.jpg

Additional references

Data summary: [Bawgata creek](#)

NLM, 06/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-06.pdf>

EPM-1 Zaw Min reports to the Special Projects Committee (SPIC) that permission is being sought from SPIC [to proceed with?] the Bawgata hydropower project which the HPID is going to implement about 10 miles north-east of Kyaukkyi town. The power plant at the dam will have a planned capacity of 168 megawatts and will generate 500 million kWh yearly.

NLM, 22/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-22.pdf>

EPM-1 Zaw Min reports to a high-level delegation of generals and ministers visiting hydropower development projects in Bago East about ongoing plans to implement the Thaukyekhat-1 and Bawgata hydropower projects.

NLM, 30/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nml/n060730.htm>

Plans are under way to implement 15 hydel power projects such as 160-megawatt Kawgata [sic] hydel power plant in Kyaukkyi township of Bago division.

KHRG, Toungoo District: Update on the Dam on the Day Loh River, 30/05/06.

<http://www.khrg.org/khrg2006/khrg06b5.html>

In the Nyaunglebin district, the SPDC plans to build two more hydropower plants, officially referred to as the Bawgata (Baw Ka Hta) hydropower project and the Shwe Kyin (Shwegyin) hydropower project. According to

the website of the Ministry of Electric Power both of these projects are commissioned to begin construction later this year and are reported to be presently "under feasibility study and design by Kansai Electric Power Co. Japan".

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MALAYSIAN COMPANY TO BUILD MINI-HYDRO POWER PLANTS

Myo Lwin, Myanmar Times, 02/09/02.

(Compiler's note: Issue 131 of the Myanmar Times is not available on-line.)

The Myanmar government and an engineering giant from Malaysia on August 19 signed an MoU for the construction of two mini-hydroelectric power plants in Yangon Division, according to a senior government official. The MoU was signed between Tepat Teknik and the Irrigation Dept of the Ag & Irrig Ministry. The sites planned for the plants are at Phaunggyi village in Hlegu township and Konpawso village in Taikkyi township at irrigation dams built across the Ngamoeyeik and Tabuhla creeks respectively.

Director U Lun Maung of the Irrigation Dept said the two power plants would produce up to 5.4 MW of electricity. "At the moment, they are making surveys for the Ngamoeyeik project where the power plant is estimated to cost about US\$2 million," he told the Myanmar Times last week.

Under the plan, the Tepat Teknik would supply the necessary machinery and be responsible for installation and commissioning while the Irrig Dept would handle the civil works. "This would be a first for Tepat Teknik which would implement the project together with its local partner, Fortune International," said U Lun Maung.

"Currently the Malaysian engineers are making surveys to prepare a design proposal which will include the estimated cost. The project will then be submitted to the government," U Lun Maung said. He said the plant could be expected to start in about six months while the Tabuhla creek project would be considered later by the Malaysians.

Compiler's note: Apparently, the Ngamoeyeik project never got beyond the planning stage.

Additional references

Myanmar Times: 16/09/02 [Issue 133 of MT is not available on-line.]

Discussions are continuing with the Malaysian firm Tepat Teknik on a proposal to generate up to two MW of electricity from the Ngamoeyeik dam.

Myanmar Times: 10/12/01 [Issue 93 of MT is not available on-line.]

Malaysian engineering giant Tepat Teknik has reached a technical collaboration agreement with Fortune International whose core business is the importation and installation of elevators. The Yangon company is also involved in sugar plantations and general trading. The two companies will work together in high technology metal fabrication, factory upgrades and construction projects in the electricity and oil and gas industries. There are also plans to enter the property sector and both sides are also interested in the food processing industry. For the time being, Tepat Teknik will focus on human resource development in its relationship with the Yangon company, but according to Fortune International's managing director, U Mya Han, the two sides also see opportunities in engineering projects related to the agriculture sector. Other plans include building a factory in the Hlaingthayar IZ to jointly produce machinery for agro-industries and the energy sector.

NLM: 10/04/01 <http://mission.itu.ch/MISSIONS/Myanmar/01n1m/n010410.htm>

Yangon Commander Khin Maung Than arrived at the agricultural site of Fortune International Ltd in Magari and Tabuhla regions of Taikkyi township where officials of Fortune International Ltd reported on progress of land reclamation in the Magari region and cultivation matters. Factory Manager of Okkan Sugar Mill U Tun Aung Kyaw reported on sugar production and construction of the road running from sugar-cane plantations to the mill. Fortune International Ltd has planned to reclaim 11,481 acres of land in Magari and Chaungsauk Tabuhla regions. Of a targeted 8,030 acres, 1,200 acres have been put under monsoon paddy and 6,530

acres under other crops. During the current sugarcane season, Fortune International has sent over 5,000 tons of sugarcane to the sugar mill.

Irrigation Dept, Myanmar Ministry of Agriculture and Irrigation website information, [n.d.].

www.irrigation.gov.mm/works/majorirrigationworksconstructed.html

Ngamoeyeik Dam in Hlegu township straddles Ngamoeyeik Chaung. It is 6,100 ft long and 75 ft high. With a storage capacity of 180,000 acre-feet of water, it has an irrigation potential of 70,000 acres of command area and 126,000 acres of cropping area. It also provides 90 million gallons of water daily to the city of Yangon. It was inaugurated in March 1995. Tabuhla Dam in Taikkyi township spans 1,305 feet on Okkan Chaung and has a height of 95 feet. At full capacity it can hold 194,600 acre-feet of water, with feasibilities of irrigating a command area of 52,000 acres and 104,000 acres of cropping area. The dam came into operation in May 1995.

REVIEW OF ELECTRIC POWER DEVELOPMENTS UP TO 2000

Business Tank, July 2002. http://mission.itu.ch/MISSIONS/Myanmar/t&b/electric_hm.html

Electricity usage in Myanmar started in 1908 when the British colonial authorities allowed private operators to supply electricity to urban areas. Some local businesses were able to generate and supply electricity to towns and cities due to very small population in those times. Rural electrification was almost unknown.

After Myanmar attained independence in 1948, the government established an 'Electricity Supply Board' in 1951, which held a monopoly in the electric power sector. A major electrification scheme was the construction of hydroelectric facilities in Kayah state, then an isolated outpost in the far reaches of Myanmar. This Lawpita project was a massive undertaking, financed in part by war reparation funds provided by the Japanese government. The project was implemented under very difficult conditions.

At the time Myanmar was self-sufficient in electricity. But the doubling of the population from 16.8 million in pre-war years to 35.3 million by 1983 meant that demand outstripped supply. The Electricity Supply Board was re-organized as the 'Electric Power Corporation' (EPC) in 1972 by the Revolutionary Council Government. The Ministry of Energy, formed in 1985, was responsible for exploration of oil and gas as well as electricity generation and distribution throughout the country. Finally, an independent entity was created by the State Law and Order Restoration Council government on the 15th November 1997 to deal more effectively with the electric power sector. Since then, the EPM and the state-owned MEPE under the ministry are responsible for the generation, transmission and distribution of electricity.

The objective of the ministry is to supply electricity from hydro power sources but by gas turbines are still provide the greater of the installed generating capacity, (46.37pc). Of the total 4,508.29 million kWh generated in fiscal 1999-2000, gas turbines produced 2,840.07 million kWh, while only 959.46 million kWh was generated by hydropower. Most of the gas turbines and combined cycle plants are located in and around Yangon.

Installed Capacity (MW) for the year 1999-2000

	Grid System	Isolated	Total	Per cent
Installed Capacity	1032.57	140.73	1173.30	100
Hydroelectric	327.00	33.32	360.32	30.71
Gas Turbines	508.10	35.89	543.99	46.37
Steam Turbines	172.50	31.10	203.60	17.35
Diesel	24.97	40.42	65.39	5.57
	(standby)			

Myanmar is topographically endowed with abundant hydropower resources due to numerous river systems that occurred throughout the country. The World Bank estimates that more than 100,000 MW could be produced. MEPE has identified 267 sites with a generating capacity of 39,624 MW for development. Existing

hydropower stations contribute only 320 MW, a mere one per cent of MEPE's projected total. Available hydro resources in each state and division are as follows:

No.	State / Division	No of Locations	Potential Installed capacity (MW)
1.	Kachin	39	2,061
2.	Kayah	7	3,909
3.	Kayin	21	17,021
4.	Chin	22	1,312
5.	Sagaing	21	2,399
6.	Tanintharyi	14	692
7.	Bago	11	387
8.	Magwe	8	123
9.	Mandalay	17	3,482
10.	Mon	10	292
11.	Rakhine	14	247
12.	Shan	83	7,699
	Totals	267	39,624

About 27 medium and small scale hydroelectricity stations have been constructed since 1988 during the tenure of the SLORC and SPDC governments. The generating capacity of these projects is 131.14 MW. The most noteworthy ones were Sedawgyi in Madaya township (25 MW), Baluchaung No.1 in Loikaw township (28 MW), Zawgyi No 1 in Shan state (18 MW) and Zaungtu in Bago division (20 MW). Feasibility studies for these projects were carried out during the time of the Socialist government but actual implementation began years later. The power sector comprise only 1.074pc of the GDP in 1999-2000 calculated at 1985-86 constant prices. The state sector investment in electricity projects comprised a paltry 4.31pc of the total budget in 1998-99, because of the priority given to the development of the agriculture sector and transportation infrastructure within the country.

Huge economic losses resulted in 1998 when water levels at major hydroelectric dams dropped due to the impact of the El Nino weather phenomenon. To meet power needs of the growing population of more than 50 million, the government has launched a number of large scale projects. The aim is to add another 2, 000 MW of generating capacity over the next five years. One of the mammoth projects underway is the Paunglaung hydel scheme, 14 miles east of Pyinmana in Mandalay division. The 430-foot-high dam there will have a storage capacity of 560,000 acre-feet and the turbines of the power station will have a capacity of 280 MW. Power generation is slated to start in December 2003. An eve larger project is underway at Yeywa, near Mandalay where four 195-MW turbines will be installed.

Additional references

Tin Maung Maung Than. *State Dominance in Myanmar: The Political Economy of Industrialization*. Singapore: Institute of Southeast Asian Studies, 2007.

The following pages have important information relating to the development of the electric power sector in Burma/Myanmar from the colonial period to the early 2000s. p18, p36, p71, p82, p91, pp122-24, pp130-32, pp143-44, pp168-69, pp253-58, p268, p274, p281, pp384-86, pp395-96.

Min Khaing, "Development of Hydropower in Myanmar" in *SHP News*, Volume 23, Issue Winter, 2006, pp 21-24. <http://www.hrcshp.org/shp/en/pdf/2006/winterdetail.pdf>

The author, an employee the Design and Technology Branch of the Dept of Hydropower Implementation of EPM-1, briefly presents some background information on the history of the development of the electricity supply system in Myanmar. Also useful, is a section listing the existing 32 small hydropower stations under the Hydropower Generation Enterprise of EPM-1 at the time of writing (2006).

World Bank. a, (WB Report No. 5416-BA: June 1985), p 63. http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/1999/09/17/000009265_3970723102606/Rendered/PDF/multi_page.pdf
Chapter VI (pp63-71) provides a good snapshot of the electric power system in Burma/Myanmar as it existed in the mid-eighties. See, also, the section 'Power Generation Market' (pp56-58) in Chapter V.

See, also, the articles in the sections 'Government Regulation, Organization, Priorities' ([GR](#)) and 'Overview' ([OV](#)) in the Topical Index.

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POWER STATION AT THE THAPHANSEIK DAM COMMISSIONED INTO SERVICE

NLM, 19/06/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlnm/n020619.htm>

The power station at the Thaphanseik Dam near Thaphanseik village, Kyunhla township, has been commissioned into service. Installed at the Thaphanseik Dam lying 12 miles west of Kyunhla, the power station has three 10-MW turbines. It was built at a cost of K 1,375 million and US\$20 million.

Maj-Gen Ye Myint of the Ministry of Defence said the power station was installed at the Thaphanseik Dam which was opened in April 2001. The massive dam is over four miles long, and reportedly the longest in south-east Asia. Arrangements have been made to irrigate crops in Shwebo, KhinU, Kanbalu, Taze, YeU and Dabayin townships and even Budalin and Ayadaw townships. The dam will irrigate about 530,000 acres of crops. The three turbines at the power station are capable of generating 30 MW of electricity, fulfilling the nation's power needs to a certain degree. Myanmar engineers and technicians implemented the project on self-reliance with the leadership of the State. Forty-eight pump stations have been installed along the banks of Ayeyawady, Chindwin and Mu rivers. Over 600 small-scale dams and reservoirs have been built with the co-operation of people in rural areas. When completed, Yebutalin, Indaw and Nyaungbingyi water pumping stations will irrigate more than 60,000 acres of crops. The electricity generated from Thaphanseik Dam will supply power to these stations.

North-west Commander Soe Naing said that it is a matter of special pride that the Thaphanseik facility is the first multi-purpose dam in Sagaing Division. Surveys are underway to implement others such as the Htamanthi, Yuwa and Shwesaray hydel power projects along the Chindwin River.

EPM Tin Htut said that electric power plays a vital role in economic, social and production sectors. The EPM is facing a great challenge in supplying to the increasing demand for electric power in the nation.. The ministry is making efforts day in, day out, to implement medium scale and large scale electric power projects. During the five-year plan that started in 2001-2002 plans were laid down to generate an additional 2,000 MW. Altogether 21 projects are underway to that will use hydro, natural gas, diesel, steam and coal to generate electricity for national development. In the long run, it will be the most cost-saving to develop the immense hydro power resources that Myanmar is endowed with. According to feasibility studies, about 40,000 megawatts can be generated from creeks and rivers including the Mu River. However, to implement a hydel power project, a huge sum of money is needed and it takes a long time as well. So the State had to spend K1,155 million and US\$20million on Thaphanseik hydel power project which took about four years to build.

Chairman Sun Xiao Wen of CITIC Technology Co Ltd of the PRC spoke words of thanks. On behalf of local residents, Shwebo District USDA Secretary U Tin Myint also thanked the State for construction of the power station. Afterwards, Maj-Gen Ye Myint presented a gift to Chairman Sun Xiao Wen and gifts of honour to the personnel who took part in construction of the project.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 46-04: Wuntho Thapanzeik dam near Poktaw village [23° 12' N, 95° 22' E], grid square reference: 6/7, 36/0
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf46-4.jpg>

The sluice gates are easily located on Google Earth at 23° 13' N, 95° 22' E along with the dam barrier and large reservoir behind the dam.

Additional references

Data summary: [Thaphanseik](#)

Pyu Myint Oo, NLM, 25/03/11. <http://www.burmalibrary.org/docs11/NLM2011-03-25.pdf>

This brief by-line article is accompanied by two photos, one showing the control tower at the dam and the other showing the power plant in the distance.

NLM, 11/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-11.pdf>

General Maung Aye and party tour Thaphanseik dam and are briefed by the director of the Irrigation Dept. Before the dam was built, Kaboe dam irrigated about 280,000 acres of rice fields during the rainy season. Since the completion of Thaphanseik dam, over 800,000 acres of rice fields can be irrigated in the rainy and summer seasons through the Kaboe and Kintat diversion dams and canal systems. Thaphanseik dam is also providing water to the hydropower plant located at the dam. [A photo of the main control gate is included in the print edition of NLM.]

NLM, 13/08/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080813.htm>

Maj-Gen Ohn Myint of the MoD puts fingerlings into Thaphanseik dam in Kyunhla township. He looks into the spillway structure and hydropower station and is briefed on the supply of water to irrigated farmlands and the production of hydropower by the director of the Irrigation Dept of Sagaing division, [Group photo showing crowd release fingerlings at one of the dam gates.]

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)

In June 2002, MEP announced the completion of the Thaphanseik hydroelectric plant on the Mu River in Kanbalu township. The plant has three 10-MW sets built for about US\$ 20 million by CITIC. The China Import-Export Bank (CIEB) provided a seller's export credit.

NLM, 25/02/05. <http://mission.itu.ch/MISSIONS/Myanmar/05nlm/n050225.htm>

General Maung Aye and party visit the Thaphanseik Dam. He notes that abundant water inflow into the reservoir is necessary to realize the irrigation and power generation targets of the dam. Effective forest conservation as well as plantation is required in the watershed areas [above the dam]. Records should be kept of the rainfall in nearby townships and of the inflow of water into the reservoir in order to be able to analyze the reasons behind any failure to meet the targets.

NLM, 08/02/05. <http://burmalibrary.org/docs2/SagaingDvm.pdf>

A good photo of the switching yard and the exterior of the generating plant at the Thaphanseik power plant is included in the feature article on Sagaing division in the New Light of Myanmar of 08/02/05.

Sinohydro website, 17/01/05.

[http://www.sinohydro.com/portlet?](http://www.sinohydro.com/portlet?pm_pl_id=7&pm_pp_id=13&ARTICLEID=11471537840078&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1)

[pm_pl_id=7&pm_pp_id=13&ARTICLEID=11471537840078&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1](http://www.sinohydro.com/portlet?pm_pl_id=7&pm_pp_id=13&ARTICLEID=11471537840078&COLUMNID=11424148920001&CHCOLUMNID=11443003710001&GSCOLUMNID=-1)

Sinohydro's 1st Engineering Bureau assisted with the installation of the generating equipment and structures at the Thaphanseik power plant and has secured maintenance contracts worth RMB 14.88 million for the project. Reference and translation from Chinese, courtesy of ERI's *China – Burma Development Projects*.

MT, 03/06/02. www.myanmar.gov.mm/myanmartimes/no118/myanmartimes6-118/Briefs/briefs.htm

Two of the generators at the Thaphanseik power station are in operation on a trial basis. The plant was scheduled to open in May 2002, but the start-up has been delayed due to late delivery of some equipment.

NLM, 02/03/02. www.myanmar.gov.mm/NLM-2002/enlm/March2.htm

Gen Maung Aye is briefed on the installation of cables to link the power generated by the station with the national grid system and on the construction of a sub-power station.

NLM, 18/04/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010418.htm>

Thaphanseik multi-purpose dam was commissioned into service. It is the largest of its kind in Myanmar, and it will irrigate 500,000 acres and generate 30 MW. It is the main facility supplying water to Kindat diversion dam that was opened in March 1997. Presently, only 30pc of the 2.8 million acre feet that flow along the Mu River is being used for agricultural production. The Thaphanseik dam will make it possible to cultivate two crops in the summer season. Survey work for the project was first undertaken 40 years ago. The earth dam is 22,578 feet long and 108 feet high. Maximum water storage capacity is 2,888,000 acre feet. The surface area of the dam at full brim is 106,200 acres; its main spillway is of Ogee type; it has 12 sluice gates each measuring 15 feet by 30 feet. The total cost of the project is over K 7,500million.

NLM, 12/10/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n001012.htm>

Thaphanseik multi-purpose dam on the Mu River is intended to feed Kindat diversion dam nine miles downstream in order to irrigate 150,000 acres. It will also irrigate 350,000 acres fed by the Kabo dam. The right canal of Kindat diversion dam will irrigate over 10,400 acres through Budalin canal and 14,800 acres through Ayadaw canal. Altogether, 520,000 acres will be opened up for double and mixed cropping through the storage facilities of Thaphanseik dam. The hydro-electric power station will supply 117.2 million kWh annually. Work is underway on the diversion canal, three coffer dams, the irrigation outlet, the hydro-electric power station and three penstock as well as a concrete structure connecting the main power station and the penstocks, 12 radial gates with ogee-type sluice gates, the main and auxiliary spillways and the main structure of the dam.

NLM, 26/07/99. <http://mission.itu.ch/MISSIONS/Myanmar/99nlm/n990726.htm>

The Ag & Irrig Minister, EP Minister and the PRC ambassador inspect Mone Creek, Paunglaung and Thaphanseik multi-purpose reservoir projects and the construction of diversion tunnels for power generation. At the Thaphanseik project, they visit the site chosen for construction of the hydroelectric power station and inspect construction of the service and auxiliary spillways.

NLM, 21/11/98. <http://mission.itu.ch/MISSIONS/Myanmar/98nlm/n981121.htm>

MEPE and CITIC Technology Co Ltd of the PRC signed an agreement on implementation of the Mon creek hydroelectric power project and the Thaphanseik hydroelectric power project at the International Business Centre in Yangon on 20/11/98. Minister for Electric Power Tin Htut said the agreement is worth about US\$ 52 million.

WPD, 04/08/90. <http://www.ibiblio.org/obl/docs3/BPS90-08.pdf>

Gen Than Shwe chairs a co-ordination meeting of SPIC and outlines major irrigation projects, including, notably, the Mu river valley irrigation development project. Among the various projects, priority will be given to the Mu river valley project and the multi-purpose Yenwe dam project.

Aung-Thwin, Michael, *Heartland of Burma: Foundations of the Pre-Colonial Burmese State*, (Centre for Southeast Asian Studies, Northern Illinois University, 1990) pp. 22 - 26;
A review of the irrigation works in the Mu valley which have existed since times of antiquity. Maps are available on pp 72 - 73.

Compiler's Note: In the late 1960s, the Burmese government commissioned a study under the auspices of the UNDP concerned with the re-furbishing of the irrigation system developed during British colonial times in the Mu valley. This study focused mainly on agricultural considerations but it also included the production of hydro-electricity. The study is reviewed in *'Management Science in the Developing Countries: A Comparative Approach to Irrigation Feasibility'* by C.J. Rose (Management Science, Vol. 20, No. 4, Applications Series, Part 1, [Dec., 1973], pp. 423-438. This study, carried out by European Operational Research and Italconsult SpA, appears to have formed the basis for the construction of the Thaphanseik dam and power plant.

MEIPAN CREEK HYDROPOWER PLANT INAUGURATED

NLM, 16/05/02. <http://missions.itu.int/~myanmar/02nlm/n020516.htm#%28%203>

The inauguration ceremony of the Meipan creek hydel power plant was held at the power plant in Monghsat township, attended by Maj-Gen Aung Htwe of the Ministry of Defence. He said the government was putting special emphasis on development tasks in the border areas where the national races predominated. Meipan creek hydel power plant will supply power to the town of Monghsat and surrounding villages and contribute to the growth of cottage industries in the region. He urged local people to safeguard it and to maintain its durability. .

EPM Tin Htut explained the construction of power plants all over the country and how Meipan creek power plant came to be built. U Ar Gah, an Akha national and USDA executive, spoke words of thanks.

Afterwards, Maj-Gen Aung Htwe presented a cash award for the workers of the EPM to U Tha Aung who is in charge of the Meipan creek plant. It was built at a cost of K150 million and US\$ 0.32 million. Two 600-kW generators are installed at the plant which will supply power to Monghsat and surrounding villages all day. The power plant is the 15th in Shan State built by the EPM.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-15: Amphoe Mae Chan. Meipan Creek and the village of the same name can be seen in grid square 5/7, 22/3.
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-15.jpg>

Additional references

See above: 'Namwok hydropower plant re-opened' (SHAN: 09/04)

See also several projects listed under 'Hydro power station commissioned in Kaungkha' (NLM: 26/07/05)

NLM, 16/07/03. <http://burmalibrary.org/docs4/NLM2003-07-16.pdf>

A photo of the penstock and exterior of the Meipan station is included in the print edition of NLM with this caption: The photo shows the construction of a hydel power plant in the Mongyun region of Monghsat township in Shan state.

Xinhua, 16/05/02. <http://www.highbeam.com/doc/1G1-86217627.html>

Myanmar has added a new hydropower plant in the country's eastern Shan state, bringing the total number of such plants built in the state to 15, according to a report of the Myanmar EPM. The Meipan creek hydropower plant in Monghsat township, put into service on Tuesday, was built at a cost of K150 million (US\$0.31 million) plus US\$320,000, the report said. The plant, installed with two 600-kilowatt generators, can supply electricity to Monghsat and its surrounding areas where cottage industries are being extended.

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Appendix A: p 31* (September 2003).

<http://lvzopac.jica.go.jp/external/library?>

http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5

In 2001-02, a Japanese study team looking into prospects for developing small and mini-electricity generating projects in rural Myanmar received information from MEPE about the Meipan creek project which was then under construction. They reported the proposed generating capacity as 2000 kW. The final installed capacity, however, was 1200 kW.

ASEAN energy centre [undated, circa 2001]

http://www.aseanenergy.org/energy_sector/electricity/myanmar/future_electricity_projects.htm

A hydropower plant with a generating capacity of 1,200 kilowatts will be constructed on the Mepanchaung, six miles northeast of Monghsat in Shan State East. It will supply electricity to Monghsat and Mongton.

YMEC, 1991. http://www.ymec.com.cn/en/about_yj_2.htm

YMEC (Yunnan Machinery and Equipment Corp) lists the Mepan hydropower project as one of the projects in Myanmar for which it supplied two turbine-generator sets, each with a capacity of 630 kW, as well as construction services.

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PRIVATE OPERATORS MEET CONSUMER NEED FOR ALTERNATIVE POWER SERVICE

Win Kyaw Oo, Myanmar Times, 03/02/02.

(Compiler's note: Issue 100 of the Myanmar Times is not available on-line.)

Small-scale independent operators are filling a niche market in Yangon for electricity supply. They include U Thein Tan of Thaketa township, in south-east Yangon, who has invested K3 million in two 5kW generators to supply power to residents of his community. U Thein Tan, whose operation is one of several throughout the metropolitan area, said the independent suppliers wanted to contribute to their communities by supplying power during blackouts. "Most of these projects are for the convenience of the community rather than for commercial benefit," he said.

The independent suppliers apply for oral permission from township councils and MEPE. They also reach agreements with those who want to be connected to their generators. Most subscribers are limited to enough power for one two-foot fluorescent light, but some are entitled to buy electricity for appliances such as TV sets. The cost of supplying six hours of power for a light is K40 and for a TV set, K60. This is about four times as expensive as the cost of power from the state utility, U Thein Tan said. He said subscribers were provided with wiring and lights.

"Business is expected to be good until the end of 2004, when several state power supply projects will have been completed," U Thein Tan said. Power shortages are a common problem in many developing countries and Myanmar is no exception, he said. Large scale private power suppliers could ease such supply problems but their costs would be much higher than state utilities, he said.

Additional references

See above: ['Homemade lighting system' for noodle vendor](#) (MT: 21/07/08)
['Coping with power black-outs in Rangoon'](#) (Mizzima News: 27/04/04)
['Premium rates' for electricity in Mon state villages](#) (IMNA: 03/08/07)
['Electricity metering' program taking root](#) (IMNA, 11/05/07)

Alfred Oehlers, Behind Burma's Fuel Price Rise, IRROL, 22/08/07. http://www.irrawaddy.org/article.php?art_id=8318

To fully understand the pressures behind the [recent] increase in fuel prices [in Burma], it is important to consider some deeper structural characteristics of the Burmese economy and oil and gas sector. To begin, one bold fact: Burma is essentially a diesel-powered economy. We see this in the buses, trains and trucks that rumble around the country. We also see this in the dilapidated power plants that sometimes generate electricity. Most of all, we see this in the ubiquitous portable generators that exist in nearly every home, factory and shop that can afford one. For a long time now, diesel prices have been kept artificially low through subsidies. And as demand for diesel has continued to grow in tandem with an expanding economy, the amount spent on these subsidies has similarly expanded, posing an ever increasing strain on the regime's finances. In an attempt to increase the supply of diesel, the regime attempted to encourage greater crude oil output from the domestic oil industry in recent years. This has not met with great success, as onshore wells are declining in productivity (the "peak oil" phenomenon) and there are few, if any, offshore wells. In any case, sources suggest, even if higher volumes of crude could be obtained domestically, another bottleneck would have developed around the available refining capacity in Burma. Burma's ageing refineries simply cannot refine crude volumes sufficient to meet demand. These refineries, in addition, are incapable of refining crude from other sources with different sulfur content, thus ruling out imports of crude to augment domestic supplies. The only solution then, is to import diesel. And as this is usually done at spot market prices, it is an extremely costly solution. . . . [Moreover,] rising imports of diesel, gasoline and gas products at escalating prices cannot be paid for from existing gas revenues. Nor can an already weak state budget—depleted by projects such as a new capital—absorb such rising costs. The only solution is to slash the subsidies and raise fuel prices.

Kumudra WJ, 23/01/04 [as excerpted in the Myanmar Times, 02/02/04].

(Compiler's note: Issue 202 of the Myanmar Times is not available on-line)

Small-scale businesses that use diesel-powered generators are becoming increasingly important as suppliers of electricity in townships on Yangon's outskirts, reports Kamudra journal. The report said that in Hlaingthaya generators supply power to households for seven hours a day: from 4am to 6am and from 6pm to 11pm. It said the minimum cost of the electricity is K40 a day, enough to illuminate a two-foot-long fluorescent light. For K180 a day, the systems provide enough power for a TV set, a video player and a fluorescent light. The businesses collect their charges daily or monthly. Similar businesses are operating at Dala, Shwepyitha and South Dagon townships, on the capital's outskirts, and elsewhere in Yangon division at Shwepaukkan, Twante, Kwunchankon, Htantabin, Hmawbi and Taikkyi.

NLM, 06/07/03. <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030706.htm>

From a speech by the Minister of Co-operatives: As regards the promotion of living standards of the rural people, co-operatives are extensively carrying out the supply of electricity. Electric power is being supplied to rural areas with 126 generators including hydro-electric power plants. To be exact, these generators are supplying electricity to 119 villages in 93 townships in 12 states and divisions. Plans are under way to supply more electricity to the rural areas.

NLM, 13/09/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020913.htm>

At a press conference with local and foreign correspondents, Vice-Chief of Military Intelligence Kyaw Win explained matters related to the power supply station projects of the EPM. He said over 450 MW can be produced on self-reliance, and the Government is always seeking ways and means to solve difficulties.

MYANMAR CONFIRMS PLANS TO BUILD **NUCLEAR RESEARCH REACTOR**

AFP, 22/01/02 <http://www.spacedaily.com/news/nuclear-civil-02b.html>

The military regime in Myanmar (Burma) is planning to build a nuclear research reactor and is in negotiations with Russia over the facility, Deputy Foreign Minister Khin Maung Win has confirmed. In a statement issued late Monday, Khin Maung Win said the junta had informed the International Atomic Energy Agency (IAEA) of its intention to construct the reactor which would be used "for peaceful purposes". "The Myanmar government is striving to acquire modern technology in all fields, including maritime, aerospace, medical and nuclear," he said in the statement. "It is in the light of these considerations that Myanmar made enquiries for the possibility of setting up a nuclear research reactor. A proposal has since been received from the Russian Federation."

Russia said last February that it planned to enter talks with Myanmar on building a nuclear reactor in the Southeast Asian country for scientific purposes. Media reports have said that hundreds of Myanmar scientists are presently in Russia receiving nuclear training.

Khin Maung Win said that under the Non-Proliferation Treaty which Myanmar signed in 1992, it had the right to pursue "the peaceful use and application of nuclear technology". "All our neighbouring countries, with the exception of Laos, are already reaping the benefits from nuclear research reactors operating in their countries," he said. "In this age of globalization it is imperative that developing countries such as Myanmar actively seek to narrow the development gap so as not to be marginalized."

However, the development is likely to raise concerns among western governments who view military-run Myanmar as a pariah regime due to its poor human rights record and refusal to make democratic reforms. There will also be questions over whether Myanmar, whose economy has been brought to its knees by heavy international sanctions, can afford such a facility.

Khin Maung Win denied media reports that Myanmar has secretly brought two Pakistani nuclear scientists into the country to help it fulfil its nuclear ambitions. "The Myanmar government categorically states once again that no nuclear scientists from Pakistan have been given sanctuary in Myanmar," he said. However, he said Myanmar scientists had been trained by the IAEA "in the application of nuclear technology for peaceful purposes".

Thailand's Bangkok Post has reported that the Vienna-based IAEA was concerned about the plans to build a reactor in Myanmar and had asked Moscow to provide details of the negotiations. It said Myanmar had approached the IAEA in September with its plans to acquire a reactor, and that two months later a team from the organisation made an inspection visit. The team concluded that the country's safety standards were "well below the minimum the body would regard as acceptable," it quoted an unnamed IAEA official as saying.

Additional references

Compiler's note: From time to time, media stories surface that the military government of Burma has set up deals with foreign powers, notably the Russian and North Korean governments and their energy agencies, that would enable it to acquire the necessary technology, raw materials and assistance to set up a nuclear research centre leading to the eventual construction of a nuclear reactor. In May 2006, for example, Reuters reported Russia's atomic energy agency, Rosatom, had signed a deal to build a nuclear research reactor in Myanmar that would include a 10-MW nuclear reactor with low enriched uranium consisting of less than 20pc uranium-235. Myanmar commentaries on these stories usually focus on the potential use of a nuclear reactor for medical research purposes. Some references to research leading to the possible use of nuclear energy for the generation of electricity are included below.

NLM: 22/01/02 <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020122.htm>

Replying to queries on the nuclear power issue during a press conference at the Tatmadaw Guest House in Yangon, Deputy Minister for Foreign Affairs Khin Maung Win said that the Ministry of Science and Technology had informed Director-General M El Baradei of the International Atomic Energy Agency (IAEA) that Myanmar intended to build a nuclear research reactor and had asked the IAEA for advice and assistance. In response the IAEA had sent a delegation to Myanmar from 18 to 21 June, 2001 who reported that Myanmar's consideration of building a nuclear research reactor was based on peaceful purposes such as . . . "performing feasibility study for generation of electricity from nuclear power".

Energy Planning Department, Myanmar Ministry of Energy, website information, 2001.

http://www.energy.gov.mm/Nuclear_1.htm

With the rapid growth in economic development and the pressing demand of the existing supply-demand gap and the responsibility to cope with future electricity requirements, the need arises to conduct studies for alternate energy sources capable of producing power in high volume and densities. Power generation plans in Myanmar have all along been based on hydropower and gas-based generation and consideration is made to use nuclear power for future generation of electricity only as an option. It is believed that future demands of electricity can be met with available natural gas resources and future development of hydropower resources, of which less than one percent of its potential has been utilized up to the present. As nuclear energy is not environmentally friendly and development of nuclear power requires high technology and also is capital intensive, Myanmar is only at the stage of initiating study on nuclear energy as an ongoing programme on alternative energy sources.

See also the section on nuclear energy in '[Electricity potential](#) of energy sources available in Myanmar'.

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[Start 02](#)

GENERATION FACILITIES SCHEDULED FOR [COMMISSIONING IN 2002-2004](#)

Win Kyaw Oo, Myanmar Times, 07/01/02. <http://www.ibiblio.org/obl/docs3/MT097.htm>

(Compiler's note: Issue 97 of the Myanmar Times is no longer available on-line.)

Five hydro-electricity plants with a total generating capacity of 470 MW are due to go into operation by the end of 2004, according to a senior government official. "The plants are part of a move to realise more than 10 planned projects aimed at generating an extra 2000 MW during the next five years," said Dr Thein Tun,

the director-general of the Department of Electric Power. He said more than half of the projects were due to be completed by the end of 2006.

As reported in the Myanmar Times of 29/10/01 (see below), a 30-MW hydro-electric power station near Kantbalu township in Sagaing Division is due to be commissioned early this year.

Another two hydro-power stations are due to go into operation in 2003. They are a 280 MW facility near Pyinmana township in Mandalay Division and a 25 MW station near Nyaung-laybin township in Bago Division. Two plants will be commissioned in 2004 – a 75 MW facility in the Magway Division township of Saytottaya and a 60 MW station in the Bago Division township of Phyu. Dr Thein Tun said tenders would be called early in 2002 for the supply of turbines and other machinery for the two plants in Bago Division.

The supply and installation of machinery is the biggest expense of a hydro-electricity project. The cost of machinery needed to generate each megawatt averages between US\$500,000 to \$800,000.

Additional references

See above: 'National [hydropower project schedule updated](#)' (MT: 21/07/08)
 'Completion of hydropower plants assigned [highest priority](#)' (MT: 12/02/07)
 'Government will [prioritize hydropower](#) projects over gas' (MT: 10/07/06)
 'Hydropower project [nearing completion](#)' (MT: 28/06/04)
 See below: 'More inputs needed to power a [hydro future](#)' (MT: 04/06/01)

NLM, 19/11/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n021119.htm>

General Than Shwe speaking to the AGM of the USDA: Nine hydel power plants with a capacity of 1,790 MW and a steam power plant with a capacity of 120 MW -- totalling 1,910 MW -- are under construction. Three of these projects, namely, Paunglaung, Mon Creek and Tikyit power plants will be completed soon and they will generate 475 MW. In addition to these projects, it is planned to build five hydel power plants and a steam power plant during the period from 2006-2007 to 2010-2011. The plants will be capable of generating 5,468 MW. The completion of one power plant after another will surely help strengthen the economic power of the nation. It is necessary not only to produce more electricity but also to use it systematically. The use of electricity in government offices has been sharply reduced and this measure is aimed at supplying more electricity to the public and industrial enterprises.

Win Kyaw Oo, Myanmar Times, 29/10/01

(Compiler's note: Issue 87 of the Myanmar Times is not available on-line.)

Electricity output will rise sharply in the coming years as more hydro-power stations come on stream, according to D-G Thein Tun of the Department of Electric Power. More than 12 power stations are at various stages of development, with three capable of producing a total of 225 MW due to be completed by the end of 2004. They include a 30-MW hydro-power station in Kyunhla township in Sagaing division which is due to go into operation early next year. A 75-MW hydro-power station near Saytottaya [Sedoktaya] in Magway division as well as a coal-fired power station in southern Shan state capable of producing 120 MW are expected to be commissioned in 2003. Meanwhile, site clearing work is well underway for a big hydro-power station to be built on the Myitnge river in Kyaukse township, south-east of Mandalay, which will generate 700 MW. It will begin generating electricity after the first of four 175 megawatt turbines is installed. Dr Thein Tun said there were also prospects for extending the number of gas-powered stations, subject to the availability of adequate supplies of natural gas. As reported in Myanmar Times (04/0601), extra financial and human resources and equipment will be needed to complete more than 10 projects aimed at generating an extra 2000 megawatts over the next five years. Out of a current supply of about 1000 MW in the national grid, hydro-power accounts for about 300 MW. Financial contributions for power projects come in the form of aid grants and soft loans from such countries as Japan and China.

WPD, 15/09/90. <http://www.ibiblio.org/obl/docs3/BPS90-09.pdf> [document p. 31]

The Special Projects Implementation Committee, chaired by SLORC V-C Gen Than Shwe, met to review hydel power and energy projects. Power generated has grown from 840 million "power units" in 1976-77 to 1,489 million in 1989-90, for an annual increase of about 10%. MEPE supplies power in two ways: 621 MW

high tension and 186 MW [not connected to the grid?]. The high tension line system is 621.46 MW and will increase to 721.46 MW in 1992-94, with the coming on-line of the Biluchaung hydroelectric power project No 1 in 1992 (28 MW) and the Mann thermal generation project (72 MW) in 1993. Firm capacity will then be about 562.91 MW. More capacity will be needed later. Projects planned for later include: Saingdin hydroelectric project in Buthidaung township (15 MW) which will serve 10 northern townships in Rakhine state, rather than providing 76.5 MW of industrial power as originally anticipated in 1956. Cost will be K 335 million (including US\$ 32 million); Paunglaung hydel power project (280 MW) in Pyinmana township which will cost K 4,250 million (incl. US\$ 410 million) for power, and K 135 million (incl. US\$ 14 million) for irrigation of 40,000 acres; Bilin hydel power project (240 MW) in Mon state which will cost K2,590 million (incl. US\$ 245 million); Kun hydel power project (84 MW) in Pyu township in Bago division which will cost will K 1,110 million (incl. US\$ 100 million); Yenwe multipurpose dam project (16.2 MW) in Kyauktada township in Bago division including irrigation of 40,000 acres. There are 151 potential hydroelectric sites in Myanmar.

WPD, 04/08/90. <http://www.ibiblio.org/obl/docs3/BPS90-08.pdf> [document p. 21]

SLORC Vice Chairman Gen Than Shwe chaired the co-ordination meeting of the Special Projects Implementation Committee. He outlined major irrigation projects. Following discussions, Than Shwe said priority would be given to the Mu river valley project and the multi-purpose Yenwe dam project.

GAS FIRED ELECTRIC POWER PLANT AT [THATON](#) UPGRADED

Win Kyaw Oo, Myanmar Times, 01/10/01.

(Compiler's note: Issue 83 of the Myanmar Times is not available on-line.)

Cement production is set to rise following a decision by Myanma Electric Power Enterprises to increase the capacity of a gas-fired electricity station in Thaton, about 100 miles east of Yangon. The director-general of the Dept of Electric Power, Dr Thein Tun, said an upgrading project at the station, which supplies Thaton and the nearby towns of Mawlamyine and Pa-an, would increase its output from 18-MW to 51-MW. The upgrading work was expected to be finished soon, he said. "The station will mainly supply power to nearby cement processing works, including a new, 4000-ton factory that will go into service soon," Dr Thein Tun said.

The upgrade at the station has involved the transfer of equipment from a station at Myanaung, a town more than 100 miles north of the capital. Dr Thein Tun said the upgrade has been made possible by an increase in the gas supply available at Thaton. The supply will come through a pipeline attached to the pipeline linking Thailand with Myanmar's major offshore reserves, Yadanar and Yetagon.

Additional references

Data summary: [Thaton](#)

See above: '[Pipeline to solve](#) electricity shortages' (Myanmar Times: 16/09/02)

Hong Dein, IMNA, 18/03/11. Edited and condensed.

<http://www.bnionline.net/news/imna/10321-new-construction-on-gas-pipeline-destroys-villagers-livelihoods-in-mon-state.html>

Mudon residents report construction of a new 30-inch gas pipeline is underway between Mudon and Thanphyuzayar. It will replace an older line constructed in 2000 which has been plagued by repeated leaks and explosions. They say that bulldozers used to clear the route for the pipe are destroying land where farmers cultivate their rubber plantations. The new 30-inch pipeline will cover the entire distance of 850 miles long between Kanbauk and the large cement factory at Myaing Kalay. It will deliver 100 million cubic feet daily, some of which will be transported to the Ngante (Mawlamyine) and Thaton electricity stations.

NLM, 05/12/10. Edited. <http://www.burmalibrary.org/docs09/NLM2010-12-05.pdf>

Equipment needed for the maintenance and repair of the main power stations of MEPE at Thaton and Mawlamyine will be provided by three Myanmar and PRC companies. The equipment includes a power

transformer, capacitor bank and substation materials for the two stations. It will be purchased from Chint Electric Co Ltd, Gunkul Engineering Public Co Ltd and Central China Power Grid International Economic & Trade Co Ltd. D-G Aung Than Oo of MEPE and the managing directors of the three companies signed the contracts in Nay Pyi Taw on 02/12/10. [Notice of the contract signing in NLM did not specify who would be responsible for the installation of the various pieces of equipment or which station they were intended for.]

IMNA, 31/08/07. http://www.bnionline.net/index.php?option=com_content&task=view&id=2373&Itemid=6

The 'Weekly Eleven' journal recently reported that Moulmein and Thaton electric power stations and other factories in Mon State are operating on natural gas to cut expenses in half.

NLM, 25/09/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010925.htm>

EPM Tin Htut and MEPE MD Yan Naing inspected the generating of electricity at full capacity by No 1 Power Plant and the test-run of No 2 Power Plant at Thaton power plant extension project in Mon State on 21 September. In meeting with officials at the briefing hall, the minister said the two power plants had been installed ahead of schedule. He spoke of the need to run the power plants at full capacity and generating electricity as soon as natural gas is available. He also gave instructions on the generation of electricity in co-ordination with No 3 power plant which is already producing power, on the construction of power lines and on the supply of enough electricity to the cement plants. On 22 September, the minister returned to the Thaton power plant and inspected three steam turbines there. He gave instructions on timely completion of repairs to the No 2 Boiler, repair of another boiler to be kept ready for use, the storing of required machinery and on innovative measures to be taken.

NLM, 17/08/01. www.myanmargeneva.org/01nlm/n010817.htm

EPM Tin Htut, accompanied by Adviser to the Ministry U Bo Kyin and officials, arrived at the natural gas power plant extension project in Thaton where they inspected the test-run of the No 1 power plant and the installation of No 2 power plant. The minister urged those responsible to finish the installation of the No 2 power plant ahead of schedule.

NLM, 28/02/94. <http://www.ibiblio.org/obl/docs3/BPS94-02.pdf> [document, p 29]

By the end of March, 1994, the following pipelines are due for completion: Aphyauk-Ywama (42 miles, 14"), Sittaung-Thaton (45 miles, 10"; 21 miles, 8"), Thaton-Myainggalay (16 miles, 6") and Pyay Oil Field-Seiktha Methanol Plant (12 miles, 10"). Upon completion, the Aphyauk gas field will distribute 80-100 million cf/d to Pyay, Yangon, Sittaung, Thaton, and Myainggalay.

NLM, 17/10/93. <http://www.ibiblio.org/obl/docs3/BPS93-10.pdf> [document, p 38]

Minister for Energy U Khin Maung Thein inspected laying of gas pipelines along the Sittaung-Thaton-Myainggalay in Kyaikhto township. The natural gas from the Aphyauk wells will be sent to a power station and tyre factory in Thaton, and a cement factory in Myainggalay.

WPD, 25/09/87. <http://www.ibiblio.org/obl/docs3/BPS87-09.pdf> [document, p 11]

The Thaton thermal project, launched in 1980-81 and now completed, is providing electricity to the Thaton tyre and rubber products factory and the Myainggalay cement factory in Karen State.

Tin Maung Maung Than, "Burma's Energy Use: Perils and Promises" in *Southeast Asian Affairs 1986*, (Institute of Southeast Asian Studies, 1986), p 84. [not available on-line]

The Thaton gas turbine power station, being implemented under the Fourth Four-Year Plan (targeted for completion in 1985/86), was aided by a British loan. The thermal power station (6 MW X 3) under construction there will provide electricity for local industries. It was partly funded partly by a US\$10 million loan from Czechoslovakia.

World Bank, *Burma: Issues and Options in Energy Sector*, June, 1985, p 54.

http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/1999/09/17/000009265_3970723102606/Rendered/PDF/multi_page.pdf

There are plans to convert the Thaton thermal power plant from fuel oil to natural gas. The gas will be supplied through a pipeline from the Payagon field via Thilawa, Sittaung and Thaton. It will use 9,400 TOE.

EARTH INDUSTRIAL SUBCONTRACTING FOR ELECTRONICS MANUFACTURERS

Business Tank, 15/08/01. [not available on-line]

In the Myanmar manufacturing sector, Earth Industrial (Myanmar) Ltd is the only one-hundred-percent locally-owned electronics producer. Other industrial concerns are mainly concentrated on manufacturing consumer products, garments and production of foodstuffs. Very few are involved in the electronics sector and fewer still are wholly capitalized and managed by local Myanmar entrepreneurs.

"Earth Industrial has established three facilities in this South Dagon Industrial Zone No 1, namely the transformer factory, power supply factory and thermal cutoff factory. The transformer factory was opened in December 1997. Our latest addition, the power supply factory, was completed as recently as September 2000," explained the company director U Nyein Chan Soe Win. He was conducting a tour around the company's 96,000 sq m facility at Plot No.23 where two shifts of over 1000 workers churn out miniature transformers. Another hundred workers produce printed circuit boards and adaptors in the power supply facility.

Earth Industrial gets orders from the Malaysian electronics goods manufacturer, Tamura Electronics Co Ltd, under the subcontracting system. "Our plants operate according to international standards and norms. We tried very hard to obtain ISO 2002," noted U Myint Swe. "As a result of the co-operative efforts of management and workers, we received ISO 2002 [in] December," he said proudly pointing to a certificate hanging in a glassed frame on the wall.

Beside the ISO certificate were others such as those from JQA (Japan Quality Assurance), UL (Underwriter's Laboratory), CSA (Canadian Safety Association) and TUV. "ISO is given for quality assurance while others are for safety purposes. For safety reasons, audit groups from different countries and associations came here to check on production factors and the use of materials. The production methods and the materials utilized must be in conformity with the criteria and safety standards of these associations," explained Quality Control Manager U Kyaw Min.

Their suppliers accepted up to a 3.0pc rejection rate when the factory made its first run. Then management tried to reduce the waste and rejection rates further. The 3 per cent rate was reduced to 2.0pc. Now they are aiming for 0.7pc, noted to U Kyaw Min. "We all follow the ISO and other reference standards," he explained confidently. He went on to say that Tamura (Malaysia) has brought other manufacturers in Malaysia to Myanmar. "They thoroughly reviewed our production processes and as they are satisfied, with our capabilities, we received production orders too. The auditors are satisfied as we test our products for quality assurance by using the latest computer systems," noted U Nyein Chan Soe Win, pointing to workers engaged in quality control.

While the "Earth Industries" is presently engaged in sub-contracting for others, their ultimate aim is to get involved in producing under direct order according to their own design. Nyein Chan continued, "We have picked up the technology by doing sub-contracting work. But gradually, we are making our way towards the point where we find our own materials and markets. Eventually, we want to carry out our own design work. Electronics industries are gradually being relocated from newly industrialized economies to developing states. The most notable aspect is the emergence of electronic manufacturing facilities in China and Vietnam within the past few years.

See also the website of the Earth Industries Group. <http://www.earth.com.mm/>

MYANMAR TAKES MEASURES TO TACKLE POWER SHORTAGE PROBLEM

Duan Tingchang, Xinhua, 26/06/01. <http://www.burmalibrary.org/reg.burma/archives/200106/msg00106.html>

The shortage of electric power is a major difficult problem which the Myanmar government has long been facing. It has not only restrained the country's economic development but has also brought extreme inconvenience to the daily life of the people.

Since assuming state power in September 1988, the Myanmar government has taken four main measures to solve this problem. Firstly, by breaking the monopoly of the state on the electric power industry and encouraging co-operatives and private enterprises to engage in the exploitation of electric power resources on an appropriate scale. The monopoly on the electric power industry had been in place for a long time. But starting in 1994 a policy which allowed co-ops and private entrepreneurs to build small-scale hydropower stations was introduced. Under this policy co-ops can set up small hydropower stations with a capacity up to 750 kW and private entrepreneurs can establish stations up to a maximum of 3,000 kW. This has marked a major step forward.

Secondly, by strengthening co-operation with foreign countries in the exploitation of electric power. In October 1998, YMEC of China and the state-run MEPE signed a contract to work together in building the Paunglaung hydropower plant with an installed generating capacity of up to 280 MW. Now under implementation, this project is expected to provide 25pc of the country's domestic power consumption on completion. Similarly, in November 1998, CITIC and MEPE endorsed a contract on the implementation of the Thanphanseik and Mone power stations. The installed generating capacity of these two smaller hydropower plants are respectively 30 MW and 75 MW. In addition, Japan announced in May this year that due to failures in maintenance and outdated equipment at the Lawpita hydropower station, built by in the 1960s, that the Japanese government would extend ¥3.5 billion (US\$ 28.6 million) in aid for this station.

Thirdly, by a steep raise in electricity charges. Beginning in February 1999, Myanmar boosted the monthly charges for electricity. These are now collected on the basis of K 2.5 for the first 50 units, K10.0 for consumption between 51 and 200 units, and K 25.0 for 201 units or more. Electricity charges at K 30.0 per unit experience the sharpest rise. .

According to the figures published by Myanmar's Central Statistical Organization, as of 2000, the installed generating capacity of the MEPE came to 1,172 mw, an increase of 509 MKW 43.4pc from 1988. Gas power plants increased by 255 Mw, steam power rose by 143 MW, and hydropower by 111 MW. In 2000, MEPE generated 5.028 billion kWh, up 55pc from 2.226 kWh generated 13 years ago.

In spite of some achievements in easing the shortage of electricity in the country Myanmar is far from meeting domestic demand and its economic development continues to be restricted.

Additional references

See above: 'Gas in short supply to meet demand for electricity' (MT: 17/09/07)
 'Myanmar learns to live with the [lights out](#)' (Reuters: 09/04/07)
 'Power supply improves after [years of abnormal status](#)' (Xinhua: 02/09/06)

MORE INPUTS NEEDED TO POWER A [HYDRO FUTURE](#)

Win Kyaw Oo, Myanmar Times, 04/06/01.

(Compiler's note: Issue 66 of the Myanmar Times is not available on-line.)

Myanmar's hydroelectric industry is "in need of inputs like development machinery, human resources and financial resources, including hard currency", to realise more than 10 planned projects aimed at generating an additional 2000 MW over the next five years, according to U Win Kyaw, deputy chief engineer of MEPE.

The country is endowed with potentially vast hydropower resources. According to preliminary studies, hydropower resources identified to date are about 37,000 MW, of which about 25,000 MW will be large scale production. For the time being, there are seven hydropower stations supplying power for both domestic and industrial use. Out of the 870 MW in supply, 327 MW is hydropower and the rest is of power generation by

gas, oil and coal combined. Hydropower supply depends on the availability of rainfall. The plants currently generating hydropower are Beluchaung No 1 and No 2, Kintar, Sedawgyi, Zawgyi No 1 and No 2, and Zaungtu. In addition, technology and financial resources for 12 plants under construction are being provided by state. With enhanced participation by the private sector, the potential also exists for the export of surplus power.

Although the electricity tariff is metered at different rates for different consumption categories – K0.5 per kilowatt hour (kWh), K10 per kWh and K25 per kWh – the average payment to MEPE is at K5.5 per kWh. "If we increase the present tariff rate, there will be other side-effects such as a rise in the prices of consumer goods because of a conditional increment in their production costs," he said. The electric power sector is the most highly subsidised of all those supported by the government, including the telecom sector. But the need in the industry now is for finance and expertise. The supply and installation of machinery is the most expensive overhead in the development of a new plant – on average US\$0.5 million to \$0.8 million to generate one MW. It is perhaps for that reason that in Myanmar the development of the hydropower sector has lagged behind other infrastructure development like the construction of roads and bridges. "Such developments do not need much foreign exchange," U Win Kyaw said.

At present, financial contributions to power projects comes in the form of aid grants and soft loans from countries like Japan and China. Local developers are invited to participate wherever possible, for instance in the construction of dams, access roads to power plants, office buildings. "The formation of a power-development consortium of local investors and MEPE is now under discussion," U Win Kyaw told the Myanmar Times. In a case such as that of the large Yeywa plant in Mandalay division, matters like the construction of access roads and the preparation of tender documents that involve the private sector in supplying materials and equipment have been undertaken in consultation with a European firm.

In the distribution of power, there are some technical losses from the grid. There are several mitigating factors including the size and length of transmission lines. Apart from such technical loss, there exist non-technical losses related to human error and opportunism, as is experienced in other developing countries like the incorrect reading of units consumed and the illegal sourcing of electricity direct from transmission lines. In Thailand and Malaysia, technical and non-technical losses combined account for the loss of 12-15pc of output. In Japan, the figure is 6 -7pc. "As part of the measures to overcome such losses, MEPE has campaigned to replace old unit meters with new ones," U Win Kyaw said.

According to a paper prepared by a Japanese expert, who declined to be named, issues facing the sector included generation capacity, circuits in main high voltage transmission lines and distribution facilities in urban areas. The development issues to be addressed, according to the paper, included the limited availability of capital funds, the financial viability of foreign investments, poor access and security constraints, and agreements on the use of water resources.

Sr. No.	Power Plant	Capacity (MW)	Capacity	Energy (GWh)
1	Thaphanseik	Sagaing	30	117
2	Paunglaung	Mandalay	280	911
3	Mone-chaung	Magwe	75	330
4	Yeywa	Mandalay	700	3316
5	Kunchaung	Bago East	60	190
6	Yenwe	Bago East	25	123
7	Khabaung	Bago East	30	125
8	Phyuchaung	Bago East	65	260
9	Shwekyin	Bago East	120	400
10	Bawgata	Bago East	160	500
11	Thaukyekhat	Kayin	150	780
12	Shweli	Shan North	300	2090

Additional references

See above: 'National [hydropower project schedule updated](#)' (MT: 21/07/08)

'Completion of hydropower plants assigned [highest priority](#)' (MT: 12/02/07)

'Government will [prioritize hydropower](#) projects over gas' (MT: 10/07/06)

'Hydropower project [nearing completion](#)' (MT: 28/06/04)

'Generation facilities scheduled for [commissioning in 2002-2004](#)' (MT 07/01/02)

See below: '[Invitation for foreign investment](#) in electric power sector' (GUM: circa 1998)

U Zaw, NLM, 09/04/04. <http://burmalibrary.org/docs/NLM2004-04-09.pdf>

Experts say the annual volume of water flowing in all the rivers and creeks in the nation combined exceeds 876 million acre-feet. The annual current volume of the Ayeyawady alone is over 250 million acre-feet, while that of the Thanlwin is about 209 million A-F, the Chindwin about 115 million A-F, the Sittoung about 34 million A-F, the Myitnge about 12 million A-F, the Bago about 6.5 million A-F, the Paunglaung about 1.1 million A-F, the Zawgyi about 400,000 A-F. According to surveys, the nation has 268 places to erect large, medium and small hydel power stations with a total generation capacity of nearly 40,000 MW. The generation capacity of the 42 existing stations is only over 390 MW or only one per cent of the calculated total potential capacity. Besides, the majority of the stations lie outside the national grid as they are supplying power for local consumption only. General Than Shwe has given guidance to extend new stations, with a total generation capacity of 2,000 MW, based on the rich water resources, during the third five-year national economic plan from 2001-2002 to 2005-2006.

[FLUORESCENT LIGHT MANUFACTURER](#) TAKES ON IMPORTERS

Moe Zaw Myint, Myanmar Times, 21/05/01.

(Compiler's note: Issue 64 of the Myanmar Times is not available on-line.)

After many years of import domination in the fluorescent lamp industry, the proprietors of a new privately-owned factory are hoping to cater to the lion's share of demand in the local market and to begin to penetrate the global market. Local demand for the lamps is about 500,000 a month but output from the only existing production plant had been enough to satisfy only a few percentage points of that figure.

The government-owned production plant in Thanlyin township, run by Myanmar Heavy Industries under Ministry of Industry No 2, had been hampered by the absence of high technology and low productivity levels. Most of the local demand was supplied by imports from Thai, Indonesian, Chinese, Korean and Indian sources. About six months ago, however, the government factory began operating in partnership with the Myanmar Lighting Manufacturing Co. Sales of the existing 'National' brand, and the new 'Super Lamp', jumped swiftly to lift the factory's market share from just 7pc to about 25pc.

Not content with that, however, Myanmar Lighting set up a new fluorescent factory in Shwepyitha IZ which has now been in operation for two months. In that short time it has taken another 15pc of the market away from imports. "There is no questioning our ability to be able to compete with imported products in either quality or price," said U Sein Wan, Chairman and CEO of Myanmar Lighting. "There are about 50 brands on the market. Except for the local 'National' and 'Super Lamp' brands, the rest are imported and most of them are low quality."

The production from the two factories – more than nine million units a year – easily exceeds the local demand for about five million lamps annually. U Sein Wan told the Myanmar Times that he intended to export the surplus and put in an additional assembly line to manufacture three kinds of electronic accessories such as chokes and starters in 2002. He intends to export the lamps first to Singapore and then to the Philippines and Pakistan in the near future. "As a first step, I will export my lamps at very competitive prices in order to enable the people in those countries to appreciate the high quality of our lamps," he said. U Sein Wan has been surveying the market for the past two years and is himself an importer and distributor of a fluorescent light brand.

"My arch rivals are the most popular brands like Silver Light, Philips and National," he said. "But my products are very competitive in both quality and prices compared to the others in the local market. Last month, I sold my lamps for K240 and K315 for the T-12 two-foot and four-foot lamps, whereas Silver Light

stood at K350 and K400 respectively. But their quality is no better than mine. So I am strongly confident that people will prefer mine in the near future. The market share will be enhanced since my products have been selling as quickly as they can be produced," he said.

U Sein Wan has an extensive commercial background in the construction and fisheries industries and the manufacture of soft drinks. Clarifying his decision to invest in the lamp business, he remarked, "When we were doing construction business, we needed a lot of fluorescent lamps and we found that most of the ones we used were not as long-lasting as they should be. At the time the quality and production capacity of the government's fluorescent lamp factory were very low," he said. As a result, his company and the government factory decided to co-operate to produce quality products.

Under the terms of agreement, Myanmar Lighting had to renovate the Japan-made machinery from the 1960's in the government factory in return for a lease to to operate the factory for a seven-year period. The overhaul cost K120 million (about US\$300,000). Current production is 450 lamps an hour, about twenty times previous production capacity.

In addition, based on an initial investment of \$3 million, Myanmar Lighting set up a new factory equipped with Korean-made KUMHO machinery that uses Japanese high-tech equipment. The new factory in Shwepyitha township can produce up to 1,200 lamps an hour. The current staff of 80, including 25 factory workers, is producing about 9,000 T10 two-foot fluorescent lamps a day, about one-third of full capacity. The other factory taken over from the government is working two 9-hour shifts producing 9,000 two- and four-foot lamps a day. All the raw materials for the two factories are imported.

U Sein Wan gave his assessment of the lamp market: "Currently, some businessmen are speculating on the market and stocking up on the assumption that prices will be going up." He said he intended to sell his products only to retailers who will distribute them to the end-users. "The durability of the fluorescent lamps from my factory is 6,000 hours. But it is a little bit difficult to tell how long they will actually last because of the fluctuations in the power supply," he said.

Additional references

Maung Tway Htet, NLM, 25/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-25.pdf>

The LED Bulb Factory in Hline Township, Yangon Division has been manufacturing about 24 million bulb units a year since 2008.

NLM, 28/02/10. <http://www.burmalibrary.org/docs08/NLM2010-02-28.pdf>

The 9th anniversary show of Myanmar Lighting Manufacturing Co Ltd (Superlamp) and the launch of LED lamps, produced by EU THAR factory in Kyaukse IZ, were held at Sedona Hotel in Mandalay on 20 February. Deputy MD Win Kyi of UMEHL and Ch and CEO U Sein Wan of Myanmar Lighting Manufacturing made speeches. Factory Manager Thein Win explained the LED technology used by the EU THAR factory, U Win Tin of Capital Power spoke about transformer technology and U Khant Zaw, the electronic materials of Myanmar Lighting Manufacturing (Superlamp). Those present viewed the LED-related electronic materials, transformers, LED solarlamps and, 101-lamp brand fluorescent lamps.

NLM, 06/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-06.pdf>

Gen Myint Swe of the MoD Myint visits the MMTEI factory of the Ministry of Industry-2 at the corner of Mindhamma and Parami Streets in Hlaing township, Yangon, where he is briefed by the advisor to the section dealing with LED electric bulbs on the production of bulbs, bio-batteries and the generation of solar-power. He checks on the production of LED bulbs. [A photo of the machinery used to produce the bulbs accompanies this news item in the print edition of NLM. **Compiler's Note:** This is the first reference to the production of LED bulbs by MMTEI. A variety of equipment is listed as being produced at the factory on the MMTEI website <http://www.industry2.gov.mm/mtei.htm>. Generators of varying capacities from 5 KVA up to 100 KVA have also been produced and tested at the factory. See the news item in NLM for 20/01/02 [http://mission.itu.ch/MISSIONS/Myanmar/02nmlm/n020120.htm#\(5\)](http://mission.itu.ch/MISSIONS/Myanmar/02nmlm/n020120.htm#(5)). It is not clear whether production of the generators continues at the No 2 factory on Parami road or has been shifted elsewhere

NLM, 06/07/08. <http://www.burmalibrary.org/docs5/NLM2008-07-06.pdf>

PM Thein Sein visits the Myanmar Lighting Manufacturing Co Ltd on Hla Theingi street in Shwepyitha IZ where he is briefed by company chairman Sein Wam on the background of the production process and future tasks of the factory. U Khin Maung Soe, Chairman of YESB reports on arrangements for supplying power to the new factory, and D-G Aung Win of DHSHD explains matters related to the factory building. The PM inspects a display of Superlamp fluorescent lamps and bulbs and Cyclone fans and electronics and notes the quality differences between Myanmar- and foreign-made lamps. He and his party view the production of lamps and bulbs and the quality control process at the factory. In 2000, the company could only produce 400 fluorescent lamps per hour. Since then, the company imported machinery to produce fluorescent lamps and accessories from the Republic of Korea. The company also sent staff to the RoK for technical training and in August, 2004 started producing Cyclone fans. In April 2006, the company began production of conductors and lead wires. Now, 2400 Superlamp fluorescent tubes can be produced per hour and annual output is over 11 million. Photos of the interior of the factory on pages 1 and 8 of the print edition of NLM. [A photo of the interior of the factory accompanies the article in the print edition of NLM.]

NLM, 08/10/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n001008.htm#>(

Minister for Industry No 2 Saw Lwin visits the electric bulb and fluorescent workshop in the appliance factory of MMTEI in Mayangon township and is briefed on preparations to increase production of quality fluorescent tubes.

Myanmar Lighting Manufacturing Company Ltd (MLMC) website: <http://www.myanmarlighting.com/>

According to information on the website, MLMC is the only manufacturer of fluorescent lights in the country. The products page on the website shows a variety of standard fluorescent tubes, incandescent bulbs, energy saving coil lamps, `superlamps`, electric fans and other electrical devices available at the company's head office and manufacturing facility in Shwepyitha IZ-3. A exterior picture of the plant on the website shows an attractive-looking building.

A Myanmar industrial directory website indicates that there is a connection between MLMC and Capital Power Co Ltd which manufactures transformers at a factory on Third St in the Ngwe Pinle IZ in Hlaingthaya. See http://myanmarindustry-directory.com/detail.aspx?com_id=mid_330. See also the news item above: NLM, 28/02/10. <http://www.burmalibrary.org/docs08/NLM2010-02-28.pdf>

MT, 0610/03. www.myanmar.gov.mm/myanmartimes/no186/MyanmarTimes10-186/e05.htm

'Chinese lighting products illuminate local market'

(Compiler's note: Not accessible from the truncated version of Issue of Issue 186 of the Myanmar Times that is available on-line.)

SPECIAL PRIVILEGES ALLEGED IN ELECTRICITY DISTRIBUTION SYSTEM

Thaung Htun, UN Affairs Representative, NCGUB: 21/05/01 www.ncgub.net/

The refurbishment of the Lawpita hydroelectric power generation plant alone is not enough to resolve the power problem in Burma. Even with full power generation of 180 MW from Lawpita, an increase of 27% more power, the total national power generation is only about 620 MW --a figure way below the current national demand of more than 1200 MW.

What is more disturbing is the current electricity distribution system in Burma and to figure out if the increase in power supply would really reach the intended people. Current electricity distribution incorporates a system of special privileges and prioritization that is discriminatory to ordinary citizens. Selective groups of people or certain categories enjoy reduced tariffs or simply pay no tariff at all at the expense of ordinary consumers.

For instance:

(1) A special distribution network or power grid for the residences of top military personnel and government ministers get special privileges and priority and a constant supply of electricity with reduced tariff or no tariff.

- (2) Military establishments all over the country enjoy special privileges and given priority and a constant supply of electricity with reduced tariff or no tariff.
- (3) Factories and businesses owned and controlled by the Ministry of Defense enjoy a constant supply of electricity with reduced tariff or no tariff.
- (4) Factories and business owned and controlled by various army, navy, and air force divisions, battalions, and regiments enjoy a constant supply of electricity with reduced tariff or no tariff.
- (5) Factories and businesses owned and controlled by the Myanmar Economic Holdings Enterprise, MEHE, (run by the Defense Services) enjoy a constant supply of electricity with reduced tariffs.
- (6) Factories and businesses jointly owned by foreign investors and MEHE enjoy a constant supply of electricity but with an electricity tariff of 0.80 per unit payable in Foreign Exchange Certificate to the MEHE.
- (7) Factories and businesses owned and controlled by the military-organized and managed Union Solidarity Development Association, a so-called civic association, enjoy a constant supply of electricity with reduced tariffs.

Additional references

See above: Electricity [rates raised](#), subsidies for civil servants dropped (AP: 15/05/06)
 See below: 'Myanmar reels under [huge electricity price hike](#)' (AFP: 03/08/99)

ELECTRICITY POTENTIAL OF ENERGY SOURCES AVAILABLE IN MYANMAR

From information posted on the Myanmar Energy Ministry website in 2001

<http://www.energy.gov.mm/energyefficiency.htm>

This website has a new address but the information it provides about sources of energy in Myanmar does not appear to have been changed since it was first uploaded in 2001. According to information available then, electricity generation in Myanmar had doubled in the decade of the 90's. "In fiscal 1988-89, the total generated was 2226 GWh, whereas in fiscal 1999-2000 it had increased to 4508 GWh. The average annual growth rate during these years was 6.81pc per year." For up-to-date information on the generation of electricity from the various sources listed, check the links to the key articles noted for each of the sources below. Note that the information available in the key articles is regularly updated.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>

Information presented by the Energy Planning Dept of the Myanmar Ministry of Energy at the second subregional energy forum in Ho Chi Minh city on 22/11/08 indicates that the installed electrification capacity of renewable energy sources at the end of 2008 was as follows: Solar power: 0.1157 MW, Wind power: 0.5194 MW, Mini hydro power: 8.3530 MW, Bio-mass power: 18.1942 MW; Bio-gas power 1.5993 MW.

Hydropower

The hydropower potential of the country is estimated to be more than 100,000 MW on an installed basis. MEPE has identified more than 200 potential hydropower sites through out the country with a total installed capacity of 38,000 MW. Even though Myanmar has abundant potential for hydro electricity, the installed hydropower capacity is currently only 360.32 MW, constituting about 31pc of total installed power capacity. The generation of electricity from hydropower plants during 1999-2000 has amounted to approximately 959.46 million kWh or about 21pc of the total generated. There have been delays in the exploitation of hydropower reserves because of the high capital investment requirement. In the past several years, the contribution of hydro electricity is about 3pc - 5pc of the country's total energy consumption. MEPE has developed 26 mini and 9 medium size hydropower projects whose capacities are between 24 kW and 5,000 kW, mostly in remote border areas.

Additional references for hydropower

See above: 'Government will [prioritize hydropower](#) projects over gas' (MT: 10/07/06)
['Mini hydropower](#) plants planned for rural areas' (MT: 08/08/05)

Hla Kyaw et al., ***Status and Potential for the Development of Biofuels and Rural Renewable Energy: Myanmar*** (ADB: Greater Mekong subregion Economic Cooperation Program, Manila, 2009, p 19)
<http://www.adb.org/Documents/Reports/Biofuels/biofuels-mya.pdf>

Myanmar has abundant resources for electricity generation by small hydropower plants and turbine generators. Appropriate renewable energy technologies and the skills to design and build such systems are available. Some 160 sites are suitable for small hydropower with a total potential output of 170 MW. In addition, numerous village sites have the potential for hydropower generation of less than 50 kW and turbine generator installations of 1 kW or less in hilly regions.

Wind Energy

Use of wind energy is at a very initial stage in Myanmar. The potential available wind energy is around 365.1 terra watt hours (TWh) per year. Due to the high initial investment costs, wind energy has been harnessed only on an experimental and research phase. The promising areas for the use of wind energy sources are the hilly regions of Chin and Shan states, the coastal region and central parts of the country. Currently available data on wind energy sources are not enough to evaluate suitable sites for construction of wind turbines. Judging from existing data collected by the Dept of Meteorology and Hydrology, the western part of the country has the best potential for development of wind power. The evaluation of wind energy resources using modern acquisition systems has been conducted since 1998. Myanma Scientific and Technological Research Dept of the Ministry of Science and Technology has carried out research and development activity related to the utilization of wind energy. Studies and research were also conducted by the Dept of Physics at Yangon University. The Dept of Electric Power and MEPE of the EPM in cooperation with yjr New Energy and Industrial Technology Development Organisation of Japan has constructed meteorological observation stations and installed wind and solar measuring equipment at sites in both central and lower Myanmar to collect data and to conduct feasibility studies for a wind and solar power hybrid system. The results obtained from these investigations indicate that the most feasible areas for harnessing energy using wind turbines would be in locations with an average wind speed of between 5.6 m to 7.4 m per second where the outputs would yield in the range of 55kW to 225 kW.

Additional sources for wind energy

See above: [‘Wind energy](#) boosts rural development’ (MT: 05/03/07)
[‘Wind power system ideal](#) for villages, says engineer’ (MT: 05/12/05)

Solar Energy

Use of solar energy in Myanmar is at a very initial stage. Potential available solar energy of Myanmar is around 51973.8 TWh/year. As with wind energy, the expense of initial investment costs has meant that solar energy has remained in a research and development phase. Solar energy is abundantly available in the central dry zone area of the country. Experimental measurements showed a radiation intensity of more than 5 kWh/sq m/day during the dry season. Except for small experimental systems installed with the co-operation of foreign participants, the use of photovoltaic power has not yet developed in Myanmar. Where it has been introduced in rural areas, solar energy has been collected through the use of photovoltaic cells to generate electricity for charging batteries and for driving motors to pump water for irrigation, but this has only been done on an individual basis.

Additional references for solar energy

See above: [‘Solar power](#) seen as solution for remote villages’ (MT: 06/10/03)

Hla Kyaw et al., ***Status and Potential for the Development of Biofuels and Rural Renewable Energy: Myanmar*** (ADB: Greater Mekong subregion Economic Cooperation Program, Manila, 2009, p 19)
<http://www.adb.org/Documents/Reports/Biofuels/biofuels-mya.pdf>

Myanmar's tropical location allows it to enjoy abundant year-round sunshine, especially in the central dry zone. Potential available solar energy is estimated at 51,973.8 terawatts per year. Experimental measurements by the MEPE indicate that irradiation intensity of more than 5 kilowatt-hours per square meter per day was observed during the dry season. Of the many kinds of solar technology available, wind and solar hybrid home systems have the advantage of 24-hour electricity generation. However, the technology has drawbacks, including barriers to information awareness, the high initial investment cost, and high customs duty on imported parts of the solar home system.

Geothermal Energy

Myanmar has abundant geothermal resources. A total of 93 locations have been identified throughout the country. Of these, 43 of them were investigated by MOGE and MEPE in co-operation with the Electric Power Development Co Ltd of Japan, the U.S company Unocal and Caithness Resources Inc of the U.S. Water samples were taken from hot springs and chemical and X-ray diffraction analysis were carried out on the samples.

Nuclear Energy

Plans for the use of nuclear energy are at a very early stage in Myanmar. However, some studies are underway. Hydropower and gas-based generation are the preferred sources for generating electricity. But demand for electricity has increased rapidly and studies are being conducted for alternative energy sources including nuclear energy. Since nuclear energy is not an environmentally friendly source of energy and malfunctions in nuclear plants could create drastic problems, nuclear power would only be considered as a last resort. Nevertheless requests have been made to possible sources both inside and outside the country for assistance in carrying out studies related to the social and economic aspects of the peaceful use of nuclear power including the following: 1) Study of the development of radioactive ore known to exist in the country; 2) Building in-house capability that would assist in long-term planning for the use of nuclear energy.

See above: 'Myanmar confirms plans to build [nuclear research](#) reactor (AFP: 20/01/02)

Biogas

Biogas generation from animal residue is encouraged in rural areas. Since 1980 biogas generation has been used as a substitute for fuelwood where wood is scarce in the central Myanmar region. Biodigesters serve to prevent deforestation and to control pollution. The residues from biodigesters can be utilized as fertilizer.

See above: '[Biogas power plants](#) supply electricity to rural areas' (MT: 16/08/04)

See below: '[Cogeneration potential](#) of Myanmar's production of sugarcane' (Appendix 17)

Additional references

See above '[Energy exports](#) to fuel GDP growth' (Myanmar Times: 04/01/10)

[Start01](#)

[EXPERTS DIFFER](#) OVER HOW TO FINANCE IMPROVEMENTS IN POWER SUPPLY

Myanmar Times, 11/12/00.

(Compiler's note: Issue 41 of the Myanmar Times is not available on-line.)

Ways and means of improving the use Myanmar's energy systems were the subject of a seminar held in Yangon earlier this month. The event was sponsored by the Office of Strategic Studies of the Ministry of Defence and a Japanese research organization, the Association for Communication of Transcultural Study. Delegates to the seminar also considered how Japan could be of assistance to Myanmar in the utilization of its abundant renewable and non-renewable energy sources.

In order to stimulate growth, Myanmar needs to integrate its economy more closely with developments in neighbouring countries, the region and the rest of the world, Fuse Kazuo of Japan's Electric Power Development Corp told seminar delegates. He also said consumers would be willing to pay more in order to access improved electric power supply. Electricity tariffs in Myanmar fall into a number of different categories: general residential consumers; government organizations, public servants and pensioners; and commercial and industrial consumers. However, half of all the electricity is supplied to consumers who use

no more than 200 kWh per month and pay only 0.5 kyat per kWh. A survey conducted by a local market research group, the results of which were discussed at the seminar, found that consumers would be willing to pay a non-classified market rate if it would mean uninterrupted electric power service. "0.5 kyat per kWh is very low," Mr Kazuo said. "The rate should be consistent with the willingness of consumers to pay, if the power supply is reliable and continuous."

Dr Thein Tun, a government official, disagreed. He said the existing policy was that the affordability of power for consumers should be a key consideration in calculating charges. Dr Thein Tun suggested that infrastructural problems were more deserving of attention. "The distribution system is antiquated, he said, and one-third of the total power generated is wasted due to system losses." He said that frequent power outages were weakening the country's economic activities. It was important to upgrade the present distribution lines and to connect the grids with those in neighbouring countries. Myanmar should be armed with a vision to export power.

Dr Thein Tun drew attention to the use of diesel-powered generators the Department of Electric Power and MEPE in rural areas not reached by the national grid. He said 224 diesel generator sets have been installed in 161 villages with a total capacity of 8.367 MW. "Some local entrepreneurs have been running power supply businesses, deploying diesel generators to towns including Muse, Kawthaung and Myeik. MEPE has developed 34 mini and medium hydroelectric power projects with generating capacities ranging from 24kW to 5000kW. Most of these are located in the northern and eastern parts of the country.

At present, 63pc of the electricity supply in Myanmar is sourced from gas-based generation, followed by 21.27pc from hydro, 14.49pc from thermal and 1.24pc from diesel. Even though Myanmar has abundant potential for hydroelectricity, the installed hydropower capacity is only 360.32 MW, constituting 31pc of the total installed power capacity. The power generated from hydro plants in fiscal 1999-2000 was 959.46 million kWh, accounting for about 21pc of the total generated. "There have been delays in the exploitation of hydropower reserves because of the high capital investment requirement," Dr Thein Tun said.

The total energy consumption during 1988-89 in Myanmar was 69,160 thousand barrels oil equivalent (kBOE), and increased up to 91,887 kBOE in 1999-2000. The average annual growth rate has been in the order of 2.64pc. "Compared with Thailand or Malaysia, our use of energy is still very low," said Dr Thein Tun. Increased availability of alternative commercial energies like gas would have a positive impact on energy sufficiency. Natural gas supply has jumped significantly from 6,463 kBOE in 1988-89 to 9,567 kBOE in 1999-2000 with an average annual growth rate of 4.3pc. Crude oil consumption has also increased from 4,299 kBOE in 1988-89 to 20,599 kBOE in 1999-2000, representing an average annual growth rate of 15.43pc. The use of gasoline was growing at about 10pc per year, and more recently the rate had increase to an average 23pc per year. In the natural gas sector, consumption has been steadily growing about 10pc per year, depending mainly on the availability of new supplies.

One breakthrough in the government's policy has been the granting of allowance for multinational companies to explore and produce petroleum in the country, on a production share basis with MOGE. Currently both onshore and offshore contracts are active, with results in discoveries of new oil and gas reserves. They include, onshore, Aphyauk Gas Field, Kyaukkwet Oil Field and Nyaungdon Gas Field and, offshore, Yadana, Sein and Padamya Gas Fields and the Yetagun Gas Field. "Myanmar should develop combined cycle power plants with the use of gas also," said one Japanese official at the seminar. Biomass energy demand and supply was almost stable over the 10 years to 1998, but has declined noticeably following the introduction of differential tariffs in that year.

Additional references

- See above: 'Electricity [rates raised](#), subsidies for civil servants dropped' (AP: 15/05/06)
 'Special [privileges](#) alleged in electricity distribution system' (NCGUB: 21/05/01)
 See below: 'Generation, distribution, consumption of [electricity in Myanmar](#)' (World Bank: 18/08/99)
 'Myanmar reels under [huge electricity price hike](#)' (AFP: 03/08/99)

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SOFTWARE GROWTH BADLY IN NEED OF HUMAN TOUCH

Myanmar Times, 16/10/00.

(Compiler's note: Issue 33 of the Myanmar Times is no longer available on-line.)

Myanmar's computer business community is watching the global information technology (IT) industry expand at a phenomenal rate, and wanting a piece of the action. But the key issue confronting local efforts to find a niche in software development is – perhaps ironically – people.

"We are trying to establish a software industry in Myanmar," said U Thein Oo of ACE Data System. "There are many applications in the IT industry that are growing at an alarming rate. IT is a dominant industry on a global scale in terms of capital, labour and profit. We will be left behind unless we make a tremendous effort, now, to catch up with the world. Myanmar faces being left behind unless tremendous effort is made now. What we need is the human resources that will give us the capability to develop software," he said, adding that in his opinion there are currently no more than five proficient programmers in the country.

There is a reasonable level of interest and skill in program languages like Oracle, Java and Visual Basics but a shortfall in the attitude or quality consciousness that should accompany the technical know-how, he said – like recognising the importance of a job's timely completion. And the industry was not yet sufficiently well versed in applications like banking and tourism operations, he said.

But U Tun Thura Thet, MD of Myanmar Information Technology, believes the solution could be a simple matter of practice. "All that local software technicians need is to be in an environment where they will have exposure to developing such applications," he said. There are some firms here that focus on software development and they are perhaps in the best position to provide on-the-job training to newly-appointed technicians. Typically, those technicians have graduated from local computer science institutes that are not yet producing highly competent programmers. It takes a software firm about six months to train fresh graduates to proficiency. Analytical skills are also needed to develop application software for industries like banking and hotels.

Currently, local firms are using SQL server in Database and Visual Basis in programming languages. Other software like Java and C+ is also used, but rarely. Most programmers know software like Java, but their knowledge is insufficiently advanced for the development of application software for customers. "We co-operate with local institutions like the University of Computer Science to run a project when we fall short of programmers," said Tun Thura Thet.

Recently, a Japanese firm sought local operators here to co-operate on the domestic development of software. The project needed a workforce of about 50 people. It did not happen, but the Japanese firm at least put the idea of human resource development in the industry under the spotlight, said Tun Thura Thet. On the flipside of the coin, software development jobs in Myanmar are scarce – a situation which exacerbated the difficulty of producing experienced programmers. What might help overcome the problem, according to industry sources, would be the establishment of a taskforce to source expatriate trainers and projects, and to send local programmers to overseas training houses.

"According to my experience, very fluent programmers are not interested in training others," said Tun Thura Thet. What Myanmar also needs, industry players told Myanmar Times, is an efficient telecommunication infrastructure operated in conjunction with a counterpart like Japan. Last but not least, said observers, Myanmar should follow the lead of its very successful neighbour, India, and establish a software 'park' to replace isolated, scattered firms with a cohesive, geographically focused industry. Software parks in India and Malaysia, have been set up with government support through commercial tax breaks, 100pc foreign investment provision and power subsidies.

"It would be very fruitful if our government was able to create such a workable environment," said Tun Thura Thet. Another challenge faced by the local industry is access to the Internet, on which software is increasingly developed. "Without having experience in operating the Internet, a programmer will not be able to prepare software applications to be used in the Net," said Tun Thura Thet. He cited the example of Hong

Kong, where software houses have an apparently insatiable demand for well-versed programmers to create web pages.

Additional references

See above: [‘Homegrown software](#) industry struggles on’ (MT: 12/03/07)
[‘Collaborate on contracts, ICT sector](#) urged’ (MT: 12/12/05)
[‘Electronics industry spreading roots](#) in industrial sector’ (NLM: 06/06/04)

[POWER PARTS PROVE LUCRATIVE](#) BUSINESS FOR GUNKUL ENGINEERING

Myanmar Times, 28/08/00.

(Compiler’s note: Issue 26 of the Myanmar Times is no longer available on-line.)

Most Myanmar industry sectors have yet to fully recover from the losses sustained as a result of the mid-1997 economic downturn. But for some firms the damage was minor and now, with government infrastructure projects underway around the country, electrical and construction components suppliers are among those faring well. The Thai-based Gunkul Engineering company has been doing business in Myanmar for four years, the last two of which has seen its reputation consolidate and its business grow.

“We sold US\$1 million worth of our products last year,” said company representative Zeya Thura Mon. “It is expected that our sales revenue will climb to US\$2.5 million this year.” Gunkul supplies and installs engineering equipment, mainly to power sub-stations. Its main client is MEPE, successful tenders for which provide half the firm’s annual revenue.

Unsurprisingly, given its corporate roots, most of the company’s materials come from Thailand, including its Tira-Thai transformers. “The Tira-Thai has been chosen because the other two big Thai transformer companies, Ekarat and ABB, have their agents here,” Zeya Thura Mon said. It also imports components from Japan and European countries and sometimes, when Gunkul needs to keep its prices low to win a competitive tender, from India.

“We include some Indian products like high-tension circuit breakers in our bids,” Zeya Thura Mon said. “They meet the required standard and are cost-effective as well.” But there is a knack to doing business with Indian firms, he said. “In a country where people negotiate over the price even when buying onions, we have to haggle over the price of a product with them. “They will initially ask for K10 when they are ready to sell at a third of the asking price.”

Gunkul’s main competitors in Myanmar are LG, Siemens and ABB. Zeya Thura Mon said the firm sought to gain the competitive edge by remaining a small, moving target. Ours is a small firm, so our overhead costs are much lower,” he said. “And being a trading company, we need not stick to a particular product line. “We tender our bids offering different prices for different products in a package.”

Offering diversified products with different costs, and being flexible on prices quoted, is an important strategy in winning contracts, he said. “Normally, we submit two bids with different price ranges. Products included in the higher bid usually come from the west, especially Germany. “Being in the business for the past four years, we can roughly estimate whether high-quality products will be sought for a certain project.” The price given in the tender is not necessarily final and some negotiations take place before a deal is finally struck,” he added. “We win bids the values of which range between \$100,000 and \$200,000. Bids with higher values, like millions, usually go to multinational corporations. But it is not true that price competitiveness is the sole factor in winning a bid.”

“Sometimes high-quality products are sought for certain projects,” Zeya Thura Mon said. A lack of marketing knowledge is foremost among the company’s weaknesses as an industry player, he said. “I think that marketing skills of our staff should be developed. Training is given to all our staff including myself.”

Additional references

The power side of Gunkul Engineering's Myanmar subsidiary is now known as GK Power Systems. The company website provides an excellent overview of the company administrative setup and particularly of the many projects it has been and continues to be involved in: <http://www.gkmyanmar.com/>. These lists show that over a period of dozen years from 1998 to the end of 2010 Gunkul has provided electrical equipment for 41 projects in Myanmar, mostly to state economic enterprises. These were valued at more than \$US 71 million. Most of the government related projects were signed with MEPE, ESE and YESB under the Ministry of Electric Power No 2. The largest of these include several substations in the new capital of Nay Pyi Taw, worth almost \$US4 million, and a 100-MVA main substation at Tatkon, just north of Nay Pyi Taw, valued at \$US4,500,000. In Yangon, a contract for extensions to the substations in the commercial and industrial areas of Bayintnaung and Hlaingthaya was contracted to Gunkul for \$US3,660,000. Equipment for the newly finished 66/33/11-kV, 20-MVA substation at Lashio in Shan State North was supplied and installed by GK Power at a price of approximately US\$1.5 million. One large project still pending for transmission lines in the Irrawaddy valley and upgrading of the existing power stations at Shwedaung and Sedoktara is listed at a value of over US\$ 16 million. Gunkul has also provided transmission equipment and built substations at river pumping stations of the WRUD. The largest of these has been the contract worth US\$ 2,300,000 for the Yebudalin pump project on the Chindwin northwest of Monywa. This project will eventually irrigate a reported 40,000 acres of summer paddy and mixed crops in Budalin township. In the two period between 2009 and 2010, GK Power signed 38 additional contracts for the supply of electrical equipment to 38 projects valued at over US\$ 48,000,000. One of the more interesting projects of those still to be completed is for the supply PVC cable for the new Parliament buildings valued at more than US\$ 1,100,000. Two contracts still pending fulfilment are for capacitors, shunt reactors and other electrical equipment for substations on the national grid system valued at more US\$ 12,000,000. Another 11 contracts are currently under negotiation, according to information on the website. For the location of many of the projects described in Gunkul's 'completed' list see the map on Slide 22 of the presentations made by the Myanmar delegation at an ADB regional consultation in Ho Chi Minh City in November 2008.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar Presentation.pdf>

NLM: 29/06/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070629.htm>

A ceremony to sign a contract between MEPE and Gunkul Engineering Co Ltd was held at the Royal Kumutra Hotel, on 26 June. Those present included EPM No 2 Khin Maung Myint, EPM No 1 Zaw Min, D-G of the Dept of Electric Power Dr Thein Tun, MEPE MD Dr San Oo, EPSE MD Tin Aung and officials of Gunkul Co Ltd. Resident representative U Zeya Thura Mon of Gunkul Engineering Co Ltd spoke words of thanks. After signing the agreement, MD San Oo and Mr Gunkul exchanged documents. [This project is not found in the Gunkul list.]

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MYANMAR'S TREMENDOUS [POTENTIAL FOR ENERGY EXPORT](#)

Myanmar Times, 12/06/00.

(Compiler's note: Issue 15 of the Myanmar Times is no longer available on-line.)

Myanmar has tremendous potential for natural gas and renewable energy which is yet to be explored," said U Soe Myint, D-G of Energy Planning Dept. "In fact we have only developed one per cent of the hydroelectric power from our resources." He was chairing a two-day meeting of the Energy Co-operation Program of BIMST-EC regional grouping, and was hosting the group's Experts/Officials meeting in Yangon last week. U Soe Myint said the main objective of the meeting was to draw up a plan on energy sector co-operation and natural gas infrastructure development in the member nations.

BIMST-EC (Bangladesh, India, Myanmar, Sri Lanka, Thailand-Economic Co-operation) was formed in 1997 provide links in economic co-operation between South Asia and South East Asia. According to U Soe Myint special emphasis was given in the meeting to renewable energy projects, especially in the areas beyond the reach of conventional grid electricity and fossil fuel sources.

Asked about the possibilities for commercialising Myanmar's hydroelectric sources, U Soe Myint said that Myanmar would be in position to export hydropower to northeast India after a proposed project expected to cost in the area of US\$1 billion could be substantiated. "In five years' time we could be ready, he said. Rajendra K Pachauri, an expert from the New Delhi-based Teri group said he was impressed by the project under consideration. "This is very exciting prospect," he said. "There is enormous potential for Myanmar and India on energy generation.

U Soe Myint pointed to three-hydropower projects currently underway in Myanmar for exporting to Thailand soon. He also spoke about Myanmar's ongoing natural gas exporting project and the forthcoming deal with Thailand for exporting Myanmar natural gas from the Yedagun well. "Since 1998 we have been exporting to Thailand a total of 525 million cubic feet of natural gas per day," he said, "and we are expecting to export another 200 million cubic feet per day to Thailand from the Yedagun well," he said. Mr Pachauri also spoke on the possibilities of building an undersea gas pipeline, for exporting Myanmar's natural gas to India. India, he said, needs more natural gas for its domestic and industrial use.

The meeting approved a range of issues, including the setting up of a task force for improving natural gas infrastructure, setting up of a BIMST-EC web page and the establishment of an energy information sector in Myanmar. All initiatives will be put up at next month's ministerial meeting of the group.

Additional references

For a complete listing of current projects for the export of hydroelectric power see the the Index 'Hydro and thermal power export projects' ([EP](#)) A up-to-date summary of these projects can be found in Table [CP014: Foreign investment driven hydropower projects](#)

Aung Kyi and Aung Shin, Myanmar Times, 29/09/08. <http://mmtimes.com/no438/n009.htm>

Myanmar's Department of Hydroelectric Power Dept of the EPM No 1 is implementing [a number of] joint-venture hydropower projects with neighbouring countries to increase the country's power generation and to receive foreign exchange revenue over the concession period[s] [involved]. Under all the joint-venture agreements, Myanmar is entitled to get 10 to 15 percent of the annual electricity generation from the power stations free of charge. According to EPM No 1 Zaw Min, a preliminary survey of the potential of the water resources that could be exploited in Myanmar is nearly 50,000 MW. "The EPM No 1 has been implementing 10 projects and national entrepreneurs are working on another two projects, for a total of 12 projects," said Col Zaw Min. Notes on MoUs and agreements for the 12 projects have also been signed for execution, he said "Foreign firms are showing their interest in investing in and implementing hydroelectric power projects in Myanmar. Our ministry is inviting investment from national and foreign investors for the implementation of medium- to large-scale hydropower projects in our country," he said.

See above: '[Energy exports](#) to fuel GDP growth' (Myanmar Times: 04/01/10)

See below: 'Power purchase [deal between Thailand and Burma](#) on the way' (Nation: 27/05/97)
'[Invitation for foreign investment](#) in electric power sector' (GUM: circa 1998)

CHRONOLOGY OF THE CANCELED [LIGNITE POWER PLANT AT TACHILEK](#)

NLM, 10/05/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n000510.htm>

Vice-Chairman of the State Peace and Development Council Deputy Commander-in-Chief of Defence Services Commander-in-Chief (Army) General Maung Aye attended the cornerstone laying ceremony of a coal-fired power station to be built by Golden Triangle Hydro Electric Power Pte Ltd under Mayflower Group in Tachilek this morning (09/05/00). At the auspicious time, SPDC Secretary No 2 Lt-Gen Tin Oo laid the foundation and sprinkled scented water on it. Secretary No 2 laid the gem casket and stone plaque and sprinkled scented water over it. Minister Maj-Gen Tin Htut unveiled the stone plaque. Afterwards, General Maung Aye performed rituals of golden and silver showers to mark the ceremony.

Commander Maj-Gen Thein Sein, Minister Maj-Gen Tin Htut and Chairman U Kyaw Win reported on the construction of the power station. General Maung Aye gave instructions. The 12-megawatt coal-fired power station will be built on 24.42 acres of land on the bank of Maikhaungno Creek, 1.5 miles north of Tachilek. The station will generate more power than the township needs and it will also supply power to Tachilek and its environs. It will cost over K 2 billion including more than six million [dollars for equipment purchased from a foreign country].

Additional references

See above: 'Troubled history of [power supply at Tachilek](#)' (Shan Herald: 25/08/06)

Items below without a URL up to the middle of June 2001 are taken from a special edition of Rebound 88 devoted to Thai opposition to the lignite power plant project. The news items have been edited for clarity and abbreviated. For complete details consult the original version. www.rebound88.net/sp/ngb/sthai54.html

01/08/00: Nakhon Chiang Rai newspaper headlines the Burmese lignite power plant project, identifying it as a heavily toxic threat to the conomy of Mae Sai, the Thai border town a few kilometres south of Tachilek. The paper says the lignite power plant will adapt the most recent Chinese technology. Chinese engineers are quoted as saying that the plant will not create dust or emit acid. Water from the cooling system, the paper says, can be sold in the market as drinking grade water. But the paper also quotes a lignite expert who says a lignite-fired power plant needs the most recent technology to be truly clean. He does not believe that the Chinese technology is as advanced as that which is being used in Europe, which costs much more and requires highly expert engineers. The expert says the plant will emit dust and residents of Mae Sai will suffer, particularly in the winter. Authorities, he says, should meet to discuss ways to preserve not only the environment but also international relationships. The plant's lignite source will be a mine in Mong Hpayak, 100 kms north of Tachilek. The expert says the lignite mine at Mong Hpayak was surveyed by a Thai private company and inspected by Chiang Mai University experts. Their reports indicate that some of the lignite will provide unstable heat, while some of the lignite can provide from 3,000 to 4,000 kcal/kg. The news does not attract much attention in Mae Sai.

30/08/00: A minority of Mae Sai residents is aware of the power plant's specifications. However, several residents from different walks of life meet to discuss the pros and cons of the project. They agree to name their association the Rak Mae Sai Group (Love Mae Sai Group). The group remains unsure of the project and agrees to wait until the generators are transported by road through the Mae Sai district.

01/09/00: In its first edition, the local fortnightly paper Siang Seriphap (Independence News) headlines Burma's promise that the lignite power plant is pollution-free. The paper says Mae Sai residents fear the project will degrade the environment, as well as tourism and trade at the border. The project's engineers are quoted as saying that a device will clean the smoke of its sulfur dioxide content down to 0.01pc and release it through a 80-metre high chimney. They say [the ash] will be kept for use in a future cement plant. Chinese engineers claim that while the Mae Moh lignite power plant in Thailand can produce 2,625 megawatts of electricity from its 13 plants with 13 chimneys, Tachilek's plant will produce 12 megawatts from one plant with one chimney. They claim that pollution at Tachilek will be negligible.

05/09/00: The Rak Mae Sai Group meets and agrees to inform the district why a protest is in order. They will highlight the possible environmental effects of the project. They agree to meet at Baan Sob Kok School, where residents have suffered sulfur dioxide emissions from tobacco drying kilns.

10/02/01: Following several rounds of mortar fire from Tachilek landing in the Mae Sai market, authorities close the Mae Sai border pass. The mortar fire came from a Burmese military operation against positions near the border occupied by a dissident Shan ethnic army.

19/04/01: Word spreads around Mae Sai district that trailer trucks carrying containers filled with the Chinese-made coal power generators and equipment for the Tachilek lignite-fuel power plant are arriving. Members of the Rak Mae Sai group agree to stop the trucks from entering Tachilek.

20/04/01: Early in the morning on Phaholyothin Highway, a two-kilometre long convoy of trucks carrying 44 containers lines up, stretching all the way from the Wiang Phang Kham tobacco drying kilns to Baan Pa Mhuad School in Tambon Wiang Phang Kham. Later in the morning, the Pha Muang Military Task Force of the Thai army orders the convoy to move to a golf driving range at Baan Nam Jam in Mae Sai. Meanwhile, the Mae Sai Conservation Group and about 1,000 residents rally at the Sai River Bridge, which links Tachilek and Mae Sai. In the afternoon, Chiang Rai governor Samrerng Boonyopakorn and Mae Sai district chief Decha Sathaphol arrive at the bridge. The governor tells the protesters that the Thai government will never allow the power generators and equipment into Burma. The protesters move to Baan Nam Jam, where the convoy is parked.

Nation (Bangkok): 23/04/01 <http://www.ibiblio.org/obl/docs/SW10.htm>

Thailand's PM Thaksin Shinawatra expresses concern over the planned lignite power plant in Burma's border town of Tachilek, says it will be detrimental to the environment in both countries if Rangoon goes through with the plan. Thailand will raise the issue with the Burmese government but Thaksin dismisses suggestions the incident will further strain already tense bilateral ties following cross-border shelling between the two countries' armies in February. The premier's statement comes a day after he ordered 44 containers of equipment heading for the power plant to return to a pier in Samut Prakarn's Pappadaeng district to be shipped back to China. Local residents in Mae Sai district had threatened to burn the 44 containers parked just kilometres away from the Mae Sai-Tachilek border crossing. Many villagers, still upset over cross-border shelling in their area two months ago, have called on authorities to open the containers, which they suspect of containing precursor chemicals bound for clandestine methamphetamine drug labs belonging to a Wa armed group. Pang Pholchai, a leading environmentalist in Chiang Rai, says local residents are stepping up their campaign against the planned power plant and called on the government to intervene on their behalf. Third Army deputy commander Maj-Gen Chamlong Phothong has compared the planned power plant to the one in Lampang's Mae Moh district, where hundreds of local villagers have been admitted to hospital over the years after being exposed to pollution generated by the plant. Pang says the planned 24-megawatt Burmese plant would need to be 80 kilometres from the border to be considered safe for Mae Sai residents. Its current location would be too close for comfort, especially in the cold season when the wind blew from Burma to Thailand.

24/04/01: The Rak Mae Sai Group meets and agrees that any sulfur dioxide emissions will fall on Mae Sai and Mae Chan districts. A member of the group says that over 50 million baht has been spent on the plant's construction. If the generator equipment gets through, any protest will be useless.

27/04/01: Leaders of the Rak Mae Sai Group hand over the signatures of Mae Sai residents to Thai PM Thaksin Shinawatra and other relevant ministers at Government House, calling on the Burmese government to relocate the project away from community areas in both countries.

01/05/01: MP Ithidej writes to ask MP Sermsak Karun, chairman of the extraordinary House committee studying problems along the Thai border, asking him to look into the problems of the lignite-fired power plant in Tachilek.

08/05/01: Posters and banners are hung along a two-kilometre stretch of Phaholyothin Road leading to the Sai River Bridge. The banners attack the lignite power plant and ask the government to look into its effects on Mae Sai residents.

25-26/05/01: The extraordinary House committee of the Thai Parliament arrives in Mae Sai on a fact-finding mission.

29/05/01: Over 500 Mae Sai residents attend a meeting in the district to discuss the effects of the lignite power plant and work out what to do if Burma permanently closes the border.

19/06/01: The Mae Sai border remains closed despite reports that Burmese authorities will reopen it following Premier Thaksin's state visit to Burma.

Nation (Bangkok), 25/06/01. <http://www.ibiblio.org/obl/reg.burma/archives/200106/msg00095.html>

Thai-Burma border at Tachilek re-opens following a conciliatory visit to Rangoon and meeting with General Than Shwe by Thai PM Thaksin Shinawatra. Mae Sai residents are delighted at border reopening but some continue to worry about the building of the lignite power station. Prapan Srivichai of the Rak Mae Sai Group urges that the station be moved at least 80 kilometres away. "We're not against the reopening of borders, but we'd like negotiations on the power station to proceed for the safety of Mae Sai residents."

Bangkok Post, 22/11/01. [not available on-line]

Thai Defence Minister Chavalit Yongchaiyudh has backed China's request for Thailand to allow the shipment of power generators through Mae Sai district to Burma. The generator parts are intended for a lignite-powered electricity generating plant in the Burmese border town of Tachilek. China and Burma have made several requests for the shipment of parts via the Mae Sai border checkpoint. Both confirm the power plant will not cause any adverse environmental impact on the Thai border. Officials sent by Chavalit to inspect the plant found that old technologies were already replaced with new ones. According to the Defence Minister it is difficult to block the shipment from crossing the border since the Mae Sai checkpoint has been reopened. A meeting of the National Security Council has been called to discuss China's request.

Theerawat Khamthita, Bangkok Post, 28/11/01. <http://rebound88.tripod.com/01/nov/28.html#story7>

The Rak Mae Sai group wants PM Thaksin Shinawatra to convince Burma to scrap the planned coal-fired power plant on the border or take responsibility for the environmental consequences. Burma has reportedly sent a letter to the Thai Foreign Ministry saying the contractor guarantees the generators meet international industrial standards. Thai Pollution Control Department chief Sirithan Pairojbariboon says checks found the generators used newer technology than the Mae Moh plant. Since the plant at Tachilek would be 200 times smaller than the one at Mae Moh, the environmental effects will be minimal. The Thai government may opt to ask Burma to move the plant 30km away from the border.

Nation (Bangkok), 20/12 01. www.burmalibrary.org/TinkYi/archives/2001-12/msg00008.html

Mae Sai conservationists express surprise at reports the Burmese military junta has ordered a halt to the construction of a lignite power plant in Tachilek. The Tachilek commander says the SPDC gave no clear reason for the order, but construction of the almost-completed plant has stopped. It is unclear whether the order will close the power plant permanently. The controversial lignite power electrical plant is at the core of a conflict between local residents in Mae Sai and Burmese authorities in Tachilek over fears about pollution from the plant. In April, an environmentalist group, Rak Mae Sai, organised a series of protests to oppose the construction. Transportation of equipment from China via Thai soil has been halted since then. The conflict then moved to the construction site - about five kilometres from the Thai border - in November. The group is insisting the power plant be moved at least 50 kilometres from the Thai border, and that compensation be paid if the plant pollutes Mae Sai. A Thai official says the latest move signals that the Burmese junta wants good relations with Thailand.

Platts Myanmar Country Energy Profile. [mid-2007]. For access information, see [Power Profile](#)

In May 2000, the cornerstone was laid for what was to be Myanmar's first coal-fired power plant, a 12-MW facility near the border town of Tachilek, in eastern Shan state. The \$6.25 million plant was promoted by Golden Triangle Hydro Electric Power Pte Ltd, an affiliate or subsidiary of Myanmar's Mayflower Group which in turn is (or was) one of the country's most prominent private-sector financial and industrial groups. The site is on the bank of Maikhaungno Creek, about 2 km north of Tachilek and two 6-MW generating units with Chinese equipment were specified. In April 2001, the construction work was interrupted by Thai protests over the plant's environmental impacts and 44 containers of plant equipment were ordered returned to the docks at the Thai port of Samut Prakarn to be shipped back to China. In May 2004, Mayflower's banking operation was placed under restriction due to allegations of money laundering and other improprieties, although it is not known what if any impact this may have had on the power project. The current status of the Tachileik power project is obscure.

Poison Clouds: Lessons from Burma's largest coal project at Tigyt (Pa-Oh Youth Organization: January 2011), at <http://www.scribd.com/doc/47176385/Poison-Clouds-English>

In May 2000, Golden Triangle Hydro Electric Power Pte Ltd began construction of a 12MW coal-fired thermal power plant in Shan State just north of Tachilek on the border with Thailand. Residents on the Thai side of the border were very concerned about the pollution impacts of the power plant and formed a group to protect

their community. They gathered together to stop trucks from delivering equipment to build the plant, wrote letters to the government and posted banners against the project at the border bridge. All of these activities raised awareness about the impacts of coal-fired power plants. Eventually after these efforts, the power plant was stopped in April 2001. [Includes the following citations: "The Grievous Mae Moh Coal Power Plant," 2 February 2008 at <http://developmentdebacles.blogspot.com/2008/02/grievous-mae-moh-coal-power-plant.html> and "Tachilek Power Plant: Skepticism over work halt," The Nation, 20 December 2001. www.burmalibrary.org/TinKy/archives/2001-12/msg00008.html and "Chronology of Thai Anti-power Plant Struggle Against Burma," Bangkok Post, 24 June 2001

ZAUNG TU HYDROELECTRIC PLANT OPENED ON UPPER BAGO RIVER

NLM, 23/03/00. [http://mission.itu.ch/MISSIONS/Myanmar/00nml/n000323.htm#\(4\)](http://mission.itu.ch/MISSIONS/Myanmar/00nml/n000323.htm#(4))

Zaungtu dam and hydel power plant, newly built by the EPM on the Bago river near Taikkyi village in Bago township was inaugurated on 22/03/00. The inauguration was attended by SPDC Secretary No 2 Tin Oo, various ministers, officers, officials, D-G Yang Shu Wei of the Yunnan Bureau of Machinery Building Industry, and the YMEC Chairman Lin Zayou, and officials. Ltr-Gen Tin Oo presented gifts to YMEC personnel through Project Engineer Zhang Ning, to MD Tae-Chul Shin who provided machinery for the earth work, and to Chief Engineer San Oo and officials of MEPE.

Zaungtu dam is 5,896 feet long and 147 feet high. The catchment, area of the dam is 330,000 acre feet. It can irrigate 36,250 acres of land. Two 10-MW generators are installed at the hydel power plant. It can generate 76.3 million kWh a year. It was built at a cost of over K4.3 billion.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-09: Pegu

Zaungtu dam, near Dawe village [17° 45' N, 96° 14' E], grid square reference: 8\5, 25\5

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-9.jpg>

The dam barrier and large reservoir are clearly visible on Google Earth.

Compiler's note: A good photo of the exterior of the Zaungtu plant is included in an article on page 11 of the 11/10/07 print edition of the NLM. <http://myanmargeneva.org/NLM2007/eng/10oct/n071011.pdf>

Website references

Yunnan Machinery and Equipment (I & E) Co Ltd website, http://www.ymec.com.cn/cn/about_yj_1.htm

In 1994 YMEC was awarded a contract to supply two 20-MW generators for the Zaungtu project and in 1996 another contract to supply the [intake?] gate and penstock for this project. A picture of the exterior of the Zaungtu hydropower station is available on another YMEC website:

http://www.ymec.com.cn/en/hpp/Project_zd.htm

Additional references

Data summary: [Zaungtu](#)

NLM, 05/04/09. <http://www.burmalibrary.org/docs6/NLM2009-04-05.pdf>

EPM No 1 Zaw Min visits Zaungtu hydroelectric power station and inspects storage of water in Zaungtu dam, installation of sluice gates and spillways, operation of the power station and functions in the control room. The 20-megawatt Zaungtu Hydroelectric power station generates 76 million kilowatt hours a year.

Khin Aung Kyaw, NLM, 22/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-22.pdf>

Zaungtu multipurpose dam benefits 36,000 acres of farmlands in Bago division. It also generates 20 MW to meet the power demand of the division. When Shwekyin, Kunchaung, Phyuhaung, Khabaung and Yenwe multipurpose dams in Bago division are finished, the six power stations together will be able to generate 230 MW. [A photo of one of the control stations of Zaungtu dam is included in the print edition of NLM.]

NLM, 05/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-05.pdf>

Distribution of water at Zaungtu diversion weir near Bawnatgyi village and hydropower plant station inspected. Report on the generation and distribution of electric power by the superintending engineer.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)

In March 2000, the EPM completed the 20-MW Zaungtu hydro project in Bago division, 100km from Yangon. The multipurpose project on the Bago River was built under a contract dating from December 1994 between YMEC and EPM. YMEC provided all machinery and engineering services while EPM took responsibility for civil works.

U Zaw, NLM, 14/10/01 <http://www.myanmar.gov.mm/Article/Article2001/Oct/oct14.html>

(Compiler's note: The original of this by-line article in the New Light of Myanmar is now only available in hardcopy editions of the print version of the daily.)

On 8 October, I again had a chance of visiting the Zaungtu hydro-electric plant together with SPDC Secretary No 3 Win Myint and ministers who went there in connection with the establishment of a pulp factory in the dam area. When MEPE began work on the Zaung dam in 1993, twenty years had passed since the building of the Moebye dam and Lawpita No 2 hydro-electric plant, the only other project it had undertaken. At the time MEPE did not have technicians with experience in building dams and sufficient machinery. So it had to strengthen its staff and collect machinery. Construction of the dams at the Hsedawgyi and Kinda hydroelectric power projects in the 1980s was undertaken by the ID, although MEPE was responsible for building the hydro-electric plants. The area in Bago township where the Zaungtu project was implemented was difficult of access. Because rainfall in the area is over one hundred inches a year, it was inundated during the rainy season and the only mode of transport was by river. The Phayagyi-Bawnatgyi-Zeedaw-Zaungtu-Taikkyi motor road leading to the project was built with great difficulty with the co-operation of division, district and township authorities and the Tatmadaw. Construction of the dam was a mammoth task. High technology was required to build the power plant. At the opening ceremony, Lt-Gen Tin Oo said, "The emergence of the Zaungtu multipurpose project has brought about the taming of Bago river, the currents of which are very wild during the rainy season. This is not only a hydroelectric project but one that will supply water for agriculture and prevent cities, villages and cultivated lands from flooding." There are two 10-MW turbines at Zaungtu station and water is being supplied to over 36,000 acres through the Zaungtu diversion weir. The building of the dam has also brought about convenient transport along Bago river. It is said that the annual volume of water flowing in the river is about 6.5 million acre-feet. Zaungtu dam can catch only five percent of the total water volume. The annual total volume of water flowing along the rivers in the nation including the Ayeyawady, the Chindwin, the Thanlwin and the Sittaung is over 870 million acre-feet. According to a survey, 40,000 MW could be generated at 267 different places. At present only about 400 MW are being generated by hydroelectric plants. The Zaungtu project alone cost about K 4,357 million including foreign exchange and it took about six years to complete the project. Efforts are now being made to complete the Paunglaung, Monchaung and Thaphanseik projects.

Reuters, 23/03/00. [not available on-line]

Myanmar has opened a new 20-MW hydroelectricity plant, bringing the country's power supply to 750 MW, officials said. The plant in Bago township is about 95 miles (150 km) north of Yangon. Implementation of the project began in January 1994, and it cost a total of US\$21.21 million plus K4,300 million (\$13.23 million). Equipment for the plant was imported from China. Myanmar's electricity supply has increased from 400 MW in 1988. But the official said only 15pc of Myanmar's population of more than 48 million had access to electricity. Myanmar has only harnessed about one percent of its total hydropower potential. Three major hydropower projects are due to be completed over the next two to three years, adding another 385 MW.

WPD, 06,07/04/93. <http://www.ibiblio.org/obl/docs3/BPS93-04.pdf>

Work on the Zaungtu hydro-electric project and dam was launched together with the inauguration of the related 39-mile Bawnatgyi-Zaungtu-Taikkyi road on 15/03/93. The project, which will generate 5 MW and irrigate 30,000 acres, is 36 miles north of Bago.

WPD, 14,23/03/93. <http://www.ibiblio.org/obl/docs3/BPS93-03.pdf>

Reference to an article by Soe Myat on the Zaungtu hydro-electric power station, a new project in Bago division.

WPD, 02/01/93. <http://www.ibiblio.org/obl/docs3/BPS93-01.pdf> [doc p 48]

Special Projects Implementation Committee receives a report on on the Zaungtu hydel power project to be carried out in Bago township.

Start 00

ZAWGYI NO 2 HYDROPOWER STATION LAUNCHED

NLM, 17/03/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nln/n000317.htm>

Zawgyi hydel power station No 2 in Yaksauk [Lawsauk] township was commissioned into service with an address by SPDC Secretary No 2 Tin Oo. The power station is connected to the Zawgyi dam which is located about 28 miles north of Yaksauk town.

There are now three hydel power plants on Zawgyi Creek. The first, Tatkyi station, is located about five miles north-east of Yaksauk. It can generate about one megawatt of electricity. The second, known as No 1 Zawgyi hydel power station, also in Yaksauk township can generate about 18 MW. The power generated by these stations is supplied to the Taunggyi region through the national power grid. Power generation by No 2 station will depend on the amount of water to be released for irrigation. The project gives priority to agriculture.

Lt-Gen Tin Oo said that dams have been built for irrigation purposes on Zawgyi creek since King Anawrahta's time. The creek originates in Shan state and flows through Kyaukse district before emptying into the Ayeyawaddy. Zawgyi Dam will supply water to crops on 11,000 acres year round, but if all acreage of mixed crops is counted, a total of 170,000 acres is being irrigated. The dam will add an additional 8,000 acres and supply power.

EPM Tin Htut said that Zawgyi No 2 is the 14th power station built in Shan state. The intake structure, filter, sluices, pressurized steel pipes and related facilities were bought from YMEC and the turbines, generators and other machinery from the China Shanghai Corp for Foreign Economic and Technological Co-operation (SFECO) of the PRC under contracts. The entire project was completed in October 1998 when test runs began. Zawgyi No 2 station is Installed with two 6-MW turbines. The station can generate 30 million kilowatt-hours of electricity annually. Power generated from Zawgyi hydel power station No 2 will be supplied to the national grid together with that generated by No 1 Zawgyi plant through a 17-mile-long, 66-KV line. The earthen dam is 2,550 feet long and 145 feet high. The estimated cost of the project was US\$18 million plus K493.3 million. But the actual cost of US\$10.1 million plus K51.41 million was less than the targeted amount.

Minister Tin Htut and SFECO Chairman Li Shun Shan formally launched the power station.

Topographic map references: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-09: Mandalay

Zawgyi No 1 power station, near Monhaing [21° 23' N, 96° 54' E], grid sq ref: 12\9, 26\4 [?]

Zawgyi No 2 dam and power station, near Indaw [21° 32' N, 96° 53' E], grid sq ref: 13/1, 26\4

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-9.jpg>

The sluice gate of the Zawgyi dam at Indaw and the large reservoir are visible on Google Earth at 21° 34' N, 96° 52' E.

Website references

Yunnan Machinery and Equipment (I & E) Co Ltd website, http://www.ymec.com.cn/cn/about_yj_1.htm

In 1992 YMEC was awarded a contract to supply three 6-MW generators for the Zawgyi-1 project. A picture of the exterior of the Zawgyi-1 hydropower station is available on another YMEC website:

http://www.ymec.com.cn/en/hpp/Project_zj.htm

Additional references

Data summary: [Zawgyi No 2](#)
[Zawgyi No 1](#)

See above: 'Kengkham multi-purpose dam' to help 'green' the Meiktila plain' (NLM: 07/08/08)
 'Myogyi multi-purpose dam' to harness waters of the Zawgyi' (NLM: 25/12/06)

NLM, 05/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-05.pdf>

Nampapaung Dam will be built on Nampapaung Creek near Matmi Village in Yaksawk township. It will irrigate about 1,000 acres of farmland and supply water to Zawgyi dam. A smallscale hydro power station will be constructed at the dam.

NLM, 17/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-17.pdf>

During a visit to the Kengkham dam site by Gen Maung Aye, he is informed by A&I Minister Htay Oo that a dam on Nampar creek will be completed ahead of the Kengkham dam project. It will supply water to the Zawgyi dam and will include a small-scale hydropower plant. General Maung Aye calls for the Nampar project to be launched as soon as possible.

NLM, 07/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-07.pdf>

Namet creek rises in Hopong township and flows north to the Dokhtawady [Myitnge] river. Plans call for the Kengkham dam on Namet creek to supply water to the Zawgyi dam through Nammelyan creek which is in the Zawgyi watershed. Thanks to the water available from the Kengkham dam, the Zawgyi dam hydropower plant will be able to increase its generating capacity from 6 to 12 megawatts. The Kengkham dam will be located about 14 miles from the Zawgyi dam. The Kengkham project was started in 2005-2006 and it is estimated it will be completed during the 2009-2010 financial year. At present, earthwork is being carried out at the site of the embankment.

NLM, 30/11/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071130.htm>

D-G Aung Koe Shwe of HPID and Pres Feng Ke of YMEC of the PRC for the purchase of materials needed for the implementation of Zawgyi No 1, Dattawgyaing and Wetwun hydropower projects. The equipment purchased will allow for the projects to proceed on time.

NLM, 06/11/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061106.htm>

EPM No 1 Zaw Min receives Chairman Feng Ke of YMEC at Wharton International Hotel in Nanning on 29 October. They discuss matters related to Shweli No 1, Upper Paunglaung, Nancho, Wetwun, Dattawgyaing and Zawgyi No 1 hydel power plants.

NLM, 16/10/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n061019.htm>

Eastern Commander Thaung Aye oversees functions of Tatgyi hydel power plant, then goes on to No 1 and No 2 Zawgyi power stations. He checks on the maintenance and supply of power of the power plants and water facilities at Zawgyi dam. No 1 station has three 6-MW generators and No 2 station has two 6-MW generators. No 2 Zawgyi plant is supplying power to Yaksawk township and Bahtoo station. Zawgyi dam is irrigating Meiktila and Kyaukse regions for agricultural purposes.

NLM, 23/09/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060923.htm>

Kengkham multi-purpose dam project will be implemented on Namat creek near Kengkham village in Yaksawk [Lawsawk] township. It will generate 6 MW and store water so that the Zawgyi dam can generate more electricity. Moreover, the water supplied by Kengkham dam, will enable the Myogyi dam, presently under construction, to generate about 30 MW and provide 990,000 acres feet of water for the greening of the Meikhtila plains. **Compiler's note:** It would appear that this represents an ambitious plan to divert water from the Nam Et in the Myitnge watershed to the Zawgyi dam at Indaw. See Google Earth for the location of Kengkham on the Nam Et and its proximity to the Zawgyi reservoir.

NLM, 09/05/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040509.htm>

General Maung Aye and party inspect Zawgyi hydroelectric power plant in Yaksawk township. EPM Tin Htut reports on the annual generating capacity at the plant. Gen Maung Aye responds that the two functions of Zawgyi dam, that of supplying water for agricultural purpose and of generating electricity need to be well co-ordinated.

NLM, 15/07/03. <http://burmalibrary.org/docs4/NLM2003-07-15.pdf>

A meeting of the SPIC held on 1 June 1994 approved the implementation of the Zawgyi dam project which is aimed at supplying water for agricultural purpose and generating electricity. With the approval of the committee, the project was carried out near Indaw Village 28 miles north of Yaksauk town. The 2550-foot-long and 145-foot-high facility with water storage capacity of 500,000 acre feet benefits 110,000 acres of farmland. Two 6-MW generators now generate 30 [million] kilowatt hours of electricity all year round. Zawgyi Dam was built in 1994-95 and completed in 1997-98 spending K 1,600 million. On 31 March 1997, General Than Shwe commissioned the dam into service.

NLM, 16/06/99. www.myanmargeneva.org/99nlm/n990516.htm

Gen Maung Aye and SPDC Secretary No 2 Tin Oo visit the Zawgyi reservoir and power station in Indaw village. EPM Tin Htut and Project Manager U Ba Si report on progress. Zawgyi reservoir hydroelectric power project is being implemented for irrigation and power generation. Station No 2 will have two 6-MW turbines. Operations at Zawgyi Station No 1 started up in October 1998. It is supplying power to Aungthabye sub-power station.

NLM, 16/08/98. <http://www.myanmargeneva.org/98nlm/n980816.htm>

Gen Maung Aye and SPDC Sec'y No 2 Tin Oo inspect Zawgyi hydel power project in Yaksauk [Lawksawk] township. The project is being implemented by MEPE near Indaw Village, 28 miles north of Yaksauk town on Zawgyi creek. They view the installation of machinery and construction of the control room and main station. A fruit basket is presented to Zhang Jiming for the technicians of the Shanghai Co who are engaged on the project. Zawgyi dam was commissioned in May 1997. The hydel power project, will generate 30 million kWh of electricity annually. Efforts are being made to complete the hydel power project in September.

NLM, 25/06/95. [not available on-line]

Gen Maung Aye inspects Zawgyi hydro-electric power project, 18 km north of Lawksawk. It is the largest hydro project ever undertaken by MEPE.

Lwin Hein Aung, NLM, 20/02/94. www.ibiblio.org/obl/docs3/BPS94-02.pdf

Zawgyi creek area is to become brilliant with light, according to this by-line article which is not available online.

NLM, 10/0793. <http://www.ibiblio.org/obl/docs3/BPS93-07.pdf> [doc p 13]

A letter of intent concerning the Zawgyi hydro-electric power project was given by MEPE MD Thaung Sein to YMEC GM Lin Zaiyou in Yangon.

COMBINED CYCLE POWER PLANT IN [AHLON](#) TOWNSHIP OPENED

MIC, 15/09/99. [not available on-line]

The combined cycle power plant (Ahlon) of MEPE was commissioned into service on 14 September. The ministry is building more natural-gas-powered plants, hydel power plants and combined cycle power plants to meet the nation's growing power demand. Power consumption at present is 750 MW, up over 200pc from 330 MW in 1988. Plans are being laid for more power projects as indicated by a rise in power consumption.

The EPM reached an agreement with Marubeni Corp on 24 March 1997 to install two combined cycle power plants, each with 54-MW capacity, at Ahlon and Hlawga. The combined cycle power plants do not need to burn extra fuel but generate power by recycling waste heat from nearby gas-powered plants.

The combined efforts of Myanmar, Japanese and German engineers made it possible to complete the building of the plant and installation of machinery by 31 July 1999, three months ahead of the targeted date in October 1999. Test-run of the plant was completed in August and the plant started to supply power to the national grid on 1 September 1999. The initial cost estimate of the project was US\$27.71 million and K680 million. The actual cost in local currency was K649.77 million.

Senior MD Tadashi Nishio of Marubeni Corp which supplied the machinery explained matters related to the plant. It uses waste heat from three 33-MW gas-fired turbines at the Ahlon station which is generating 350 million kWh of electricity annually.

Compiler's note: A slightly different version of this article was published in NLM on 15/09/99 and is available at www.burmalibrary.org/NLM/archives/1999-09/msg00014.html

Additional references

Data summary: [Ahlon](#)

NLM, 12/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-12.pdf>

Inspection of the natural gas-fired power plant in Ahlon township. Report on the condition of the machinery in the 33 kV-switchyard. EPM No 2 Khin Maung Myint checks the "speedtronic control card, the control room and speedtronic turbine". [A photo of the switchyard at the Ahlon station is included in the print edition of NLM.]

NLM, 06/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-06.pdf>

EPM No 2 Khin Maung Myint reports to the SPIC that major repairs to the generators in the Hlawga, Ywama, Ahlon and Thakayta gas-fired power plants in Yangon and at the Kyunchaung, Mann and Shwedaung gas-fired power stations.

NLM, 19/04/09. <http://www.burmalibrary.org/docs07/NLM2009-04-19.pdf>

At the Ahlon gas power plant, Deputy Minister Win Myint is briefed by Deputy Chief Engineer Win Aung on the supply of natural gas and on the use of natural gas and diesel in generating power.

NLM, 12/03/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080312.htm>

Electricity is being generated at full plant capacity after the installation of the new gas turbine at the Ahlon power plant. The steam-powered turbine at the plant is operated through a computer controlled system. Arrangements have been made for the repair of the old turbine rotor.

NLM, 25/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080225.htm>

Chief engineer Than Lwin and factory manager Than Naing Oo briefs EPM No 2 Khin Maung Myint on the substitution of a new turbine rotor and major repairs on No 3 Turbine.

NLM, 12/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080212.htm>

No 3 gas turbine still under maintenance. There are three gas turbines and two recycle steam turbines altogether at the station.

NLM, 22/08/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070822.htm>

One of three natural gas-powered turbines at the Ahlon station broke down. In spite of the breakdown, the station has received over 10 million cu ft of natural gas and generated 40 MW. Experts will be involved in repairing the turbine.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#).

In May [September?] 1999, EPM inaugurated a 50-MW steam set at the Ahlone combined-cycle plant. The steam cycle equipment was built by Marubeni Corp under a contract signed in March 1997. Two HRSGs of NEM design built by Kawasaki Heavy Industries are installed along with a turbine from ABB, each string behind three Frame 6B machines supplied in 1996 by European Gas Turbines.

NLM, 26/04/05. <http://www.myanmar.gov.mm/Article/Article2005/April05/April26a.htm>

NLM, 27/04/05. <http://www.myanmar.gov.mm/Article/Article2005/April05/April27a.htm>

Myanmar launched its first-ever drive to distribute electricity to the people in the post-independence period with the use of two coal-fired power plants — a coal-fired power plant (30 MW) in Yangon [Ahlon], and the other in Ywama. The turbines could generate 10 MW each.

Myanmar Times, 23/09/02. [not available on-line]

Repairs to transformers at Ahlon power station will result in another 100 MW being available to Yangon from 02/09/02. Six downtown townships: Botataung, Kyauktada, Lanmadaw, Latha, Pabedan and Pazundaung have been receiving uninterrupted supply since 18/09/02.

MyaBuzz: 16/09/99 [not available on-line]

Marubeni Corporation, Kawasaki Heavy Industry of Japan and ABB of Germany contributed machinery and technical assistance for the new power plant inaugurated in Yangon's Ahlone district 14/09/99.

Kawasaki Plant Systems, [undated]. www.khi.co.jp/kplant/english/products/PowerPlant/01.html

In 1997 Kawasaki was awarded a turnkey contract to install an F6-3 GE steam turbine as a combined cycle add-on to MEPE's natural gas turbine plant at Ahlone [in Yangon]. The contract was completed in 1999 raising the total installed capacity at the plant to 154 MW.

NLM, 14/04/95. <http://www.ibiblio.org/obl/docs3/BPS95-04.pdf> [document, p89]

Two natural gas-powered generators, with a capacity of 66 MW, built at a cost of K 437.3 million by MEPE, were inaugurated in Ahlon township. They will supply power to the Yangon grid.

NLM, 21/10/94. <http://www.ibiblio.org/obl/docs3/BPS94-10.pdf> [document, p24]

An agreement was signed by MEPE MD Thaung Sein and M. Bernard Mouzimanoff of European Gas Turbines of France. The latter will supply the machinery for the 100-MW power plant near the main power sub-station in Yangon. It will be built in seven months and go on line in May 1995.

NLM, 10/06/94. <http://www.ibiblio.org/obl/docs3/BPS94-06.pdf> [document, p29]

A contract was signed between MEPE and European Gas Turbines SA (GEC Alsthom) of France represented by Richard Bergart, for the import of equipment for three 33-megawatt gas turbines to be built in Ahlon Power Station. They will use natural gas from the Aphyauk gas field and go on-line in December. Another 100 megawatt power station will be built later.

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COMBINED CYCLE POWER PLANT LAUNCHED AT HLAUGA

Reuters, 02/05/99. <http://www.burmalibrary.org/reg.burma/archives/199905/msg00047.html>

Myanmar's EPM has launched a \$28.3 million joint-venture thermal power plant in an effort to ease the country's acute power shortage. The official Myanmar News Agency said the 54-MW combined cycle power plant at Hlauga, 20 km (12 miles) north of the capital Yangon, was inaugurated on Saturday by EPM Tin Htut. Japan's Marubeni Corp built the plant.

MNA quoted Tin Htut as saying Myanmar's current daily power consumption had reached 750 MW against 330 MW in 1988. He said the country's existing eight natural gas power stations and six hydro-electric plants were producing a combined 680 MW a day.

Myanmar's power shortage, aggravated by reduced water levels in hydro-electric dams, has forced Yangon to ration power, and the capital's residents have received an average of 10 hours of electricity daily over the past year.

Additional references

Data summary: [Hlauga](#)

NLM, 25/10/10. <http://www.burmalibrary.org/docs09/NLM2010-10-25.pdf>

EPM-2 Khin Maung Myint visits the Hlauga power station of MEPE and inspects the extension to the control building and the switch yard of the power station, then on to the natural gas power plant where he checks on

six boiler tubes. He is briefed on personnel affairs, condition of the machines and supply of electricity and maintenance work.

NLM, 06/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-06.pdf>

EPM No 2 Khin Maung Myint reports to the SPIC that major repairs to the generators in the Hlawga, Ywama, Ahlon and Thakayta gas-fired power plants in Yangon and at the Kyunchaung, Mann and Shwedaung gas-fired power stations.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#).

In May 1999, MEPE inaugurated a 50-MW steam set at the Hlawga combined-cycle plant. The steam cycle equipment was built by Marubeni Corp under a contract signed in March 1997. Two HRSGs of NEM design built by Kawasaki Heavy Industries are installed along with a turbine from ABB, each string behind three Frame 6B machines supplied in 1996 by European Gas Turbines.

NLM, 08/05/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070508.htm>

Chief Engineer U Nyunt Aung briefs EPM No. 2 on conversion of UXL MOPS System of Boiler Control to Centum CS 3000 System at the Hlawga power station. Station Manager Thein Zaw reports on collection of gas, running the station at full capacity and supply of power.

NLM, 04/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nml/n070104.htm>

At Hlawga gas turbine factory, the manager briefs EPM No 2 on natural gas, generation of electric power, and consumption of electricity. Deputy Chief Engineer Nyo Win of YESB reports on requirements of electricity at No 3 Steel Mill, and Chief Engineer Tun Aye on the supply of power through the 66kV power line from Hlawga gas turbine and the 33kV power line from Ywama power station. No 3 Steel Mill Manager Col Tin Soe reports on supply of electricity for iron casting.

NLM, 04/08/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nml/n060804.htm>

EPM No. 2 is briefed on power supply and decline in voltage by MD San Oo of MEPE at Hlawga Sub-power Station. Maintenance tasks underway at Bank 1 transformer of the gas turbine, Work on the new 230-kV Thakayta-Thanyin power line is ongoing, as well as the extension of the 66-kV line in the switching yard of the gas turbine.

Myanmar Times, 23/09/02. [Issue 134 of MT is not available on-line]

A new supply of natural gas to the Hlawga power station in Mindalardon township has enabled it to increase output to 100 MW. This means the Hlawga plant will no longer have to rely on diesel to generate power. The pipeline has doubled the amount of gas supplied to the city. It is connected to line which carries gas from the Yadana field to Thailand at Kanbawk in Tanintharyi division. The pipeline extends to Kyaukse, where it supplies natural gas to a number of industrial projects. The decision to increase gas supplies to Yangon followed an agreement between the ministries of energy and electric power aimed at improving the power supply in the capital. Four generating plants that serve Yangon are equipped with a total nine gas-powered turbines that can produce 260 MW.

Myanmar Times, 16/09/02. [Issue 133 of MT is not available on-line]

Up to the present the Hlawga power plant has been supplied with natural gas piped from the Apyauk field discovered in 1993.

Kawasaki Plant Systems, [undated]. www.khi.co.jp/kplant/english/products/PowerPlant/01.html

In 1997 Kawasaki was awarded a turnkey contract to install an F6-3 GE steam turbine as a combined cycle add-on to MEPE's natural gas turbine plant at Hlawga. The contract was completed in 1999 raising the total installed capacity at plant to 154 MW.

NLM, 23/01/96. <http://www.ibiblio.org/obl/docs3/BPS96-01.pdf> [document, p 39]

Gen Than Shwe attended the commissioning of the Hlawga natural gas power station. The station, built by European Gas Turbines (GEC Alsthom) of France, was completed in 10 months at a total cost of K430 million. The two turbines installed will provide 66 MW to the Yangon and national power grids. A third

turbine will be completed by February 15th. Myanmar's annual power consumption has been rising by 15-20pc a year.

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GENERATION, DISTRIBUTION, CONSUMPTION OF ELECTRICITY IN MYANMAR

World Bank, Myanmar: An Economic and Social Assessment (Draft version), 18/08/99, pp 100 – 103.

The power sector comes under the EPM. MEPE, a state enterprise, has a legal monopoly on all aspects of the business. Supply is severely constrained, resulting in significant load shedding and requiring most investors to provide their own electricity generating facilities. Prices have been increased recently in an effort to better manage demand. Only about 20pc of the population has access to electricity, according to MEPE. This may be overstated, however, since MEPE has only one million customers. Even if one were use an average household size of six, no more than 12.5% of the population would have electric power in their homes. Most customers are metered, and MEPE estimates that only about 25pc of the meters are seriously defective. This compares favorably with the situation in most parts of Africa and South Asia where meters are comparatively rare and those that are in place do not work.

Drought hit electricity generation hard in 1998/99 and hydro output was almost cut in half compared with the previous year. Consumption was flat, however; according to MEPE aggressive action was taken to stem losses. Unit costs are low, due to low marginal costs of running hydro and cheap gas; but prices are even lower, and the big difference between the two in 1998/99 is due to increased diesel purchases. MEPE results should improve this fiscal year as they get the full benefit of the significant tariff increase.

Table 6.4 Generation, Consumption and Losses of Electricity, 1994/95 to 1998/99

	1994/95	1995/96	1996/97	1997/98	1998/99
Generation	3,632	3,763	4,130	4,834	4,107
(millions of kWh)					
- Hydroelectricity	1,659	1,596	1,622	1,700	902
- Steam	79	63	59	215	229
- Gas	1,852	2,061	2,409	2,866	2,922
- Diesel	42	43	40	53	54
Consumption	2,258	2,325	2,532	2,788	2,722
(millions of kWh)					
Domestic	983	972	1,089	1,206	1,119
Industrial	863	876	876	914	949
Hospitals, offices	302	340	393	473	511
Schools					
Other	70	74	76	83	89
Departmental Use	40	63	98	112	104
Losses	1,374	1,438	1,598	2,046	1,335
(millions of kWh)					
Losses (percentage)	37.8	38.2	38.7	42.3	32.5
Unit sales price	0.92	1.28	1.31	1.38	1.48
(K per kWh)					
Unit cost (K per kWh)	0.61	0.78	0.83	1.22	2.07

Source: Department of Electric Power

Over half of MEPE's installed capacity is gas-fired, although shortages of gas have forced MEPE to use more expensive liquid fuels in recent years. Peak demand hit about 750 MW in 1998/99 when drought reduced available hydro-electric capacity. As a result, the strain on MEPE's facilities has increased significantly. Several measures have been taken to re-balance the system. MEPE will commission two new 54-MW combined cycle gas turbines in 1999. More importantly, as of 1 March 1999, MEPE raised its top rates from K2.5/kWh by ten times, to K25/kwh. However, this rate applies only to non-government users and leaves the rates for state enterprises, government depts and religious buildings far below cost. State

enterprises, for example, pay only K0.5/kWh. Foreign exchange earners pay US\$0.08/kwh under the new rates. The new rates are the first tariff increase since 1994. MEPE says this tariff increase cut peak hot season demand in Yangon from 330 MW in 1998 to 300 MW in 1999.

Table 6.5: Installed Power Generation Capacity in Myanmar, 1999

Type of Capacity	Integrated Network	Isolated	Total	Percentage
Hydro-electric	307.00	33.32	340.32	32.76
Gas Turbine (32 units)	508.10	35.89	543.99	52.36
Steam turbines	34.50	31.10	65.60	6.31
Diesel	16.22	72.74	88.96	8.56
Total	865.82	173.05	1,038.87	100.00

Source: MEPE

MEPE has 385 MW of hydro capacity in the early stages of construction by Chinese firms, which could be on-line in three to four years. Progress on these projects cannot be confirmed, and it is not clear how these are being financed.

Faced with a difficult financial situation, MEPE has begun to restructure the Myanmar electric power sector. Electricity distribution in the townships that make up downtown Yangon is now being run by the Cho Cho group, under a medium-term management contract which has been running since 1996 and extended once. Cho Cho, for its efforts, receives K 0.15 per kWh on collections, but does not have capital investment obligations. MEPE also turned to private groups to supply diesel fuel for its gas turbines. They were paid K25 per kWh generated with the fuel. This arrangement lay behind the recent tariff increase and reflects the difficulty that MEPE can have in securing fuel supplies through the normal channels.

MEPE has also been active in creating what essentially profit centers within its distribution and retail supply operation. Management control has been devolved to the local distribution area in a total of 22 townships in Yangon, Mandalay and other areas. While MEPE continues to pay base salaries, the profit center gets to keep a margin of K0.15 per kWh, which is paid out in the form of employee bonuses.

A process similar to municipalization is also underway, with some isolated systems being transferred to township councils. In these cases MEPE supplies the diesel to run the generators, but otherwise all operations and employees are the responsibility of the local authorities.

References for rates and financing of electric power projects ([ELOV008A](#))

See above: 'Electricity [rates raised](#), subsidies for civil servants dropped' (AP: 15/05/06)
 'Special privileges alleged in electricity distribution system' (NCGUB: 21/05/01)
 'Experts differ over how to finance improvements in power supply' (MT: 11/12/00)
 See below: 'Myanmar reels under [huge electricity price hike](#)' (AFP: 03/08/99)

References for municipally-operated power supply in township centres ([ELOV008B](#))

Compiler's note: Since the re-organization of the electric power ministry in 2006, responsibility for power supply in rural townships not served by the national grid appears to have been spun off by MEPE and put into the hands of municipal power supply committees that make arrangements to purchase and maintain the generators and distribution systems in township centres and other large towns. These committees are also charged with the responsibility of financing and collection of revenues for these networks. Township electrical engineering offices maintained by MEPE would still appear to be responsible for the technical operation of these local systems. Ongoing references indicate that village electrification committees (VECs) still continue to play a role in developing, operating, managing and maintaining isolated rural electrification schemes in smaller communities ([ELSF021](#)).

NLM, 01/06/09. <http://www.burmalibrary.org/docs07/NLM2009-06-01.pdf>

The urban area of Gwa town in Arakan state is illuminated in the evening. U Myint Han, chairman of the town power supply committee, explained that the committee had purchased a 250-kVA Hino generator worth K 15.6 million and a fuelwood-fired gasifier worth K 22.2 million.

NLM, 07/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-07.pdf>

Myebon township in Arakan state is spread out over 44 large islands and 76 smaller ones and has a land area of 942 square miles. The township consists of 140 villages divided into 51 village-tracts and Myebon town with nine wards and a population of 15,000 and 2,000 households. In Myebon town the Township Power Supply Committee works together with the Township Electric Dept in operating a diesel generator which supplies power from 7pm to 10pm daily. The electricity is being supplied to the local people with the use of 583 electric meters and 73 lamp posts. The committee has installed two-foot-long florescent lamps at the township jetty.

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Final Report: Volume 1: Summary*, p14, September 2003

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1)

The central urban areas of townships that are not on the national grid system are supplied with power by local isolated networks powered by diesel generators and/or small hydros. MEPE operates 456 diesel generators and 30 small hydros for rural electrification through these independent power systems. Diesel generators are operated for 3 hours a day due to the limitation of fuel budget. Since the operating costs of these local power systems cannot be met by operating revenue, the costs are covered by remittances from MEPE headquarters.

References for other state ministries involved in electric power production (ELOV008C)

World Bank. *Burma: Issues and Options in the Energy Sector*, (WB Report No. 5416-BA: June 1985), p 63.

<http://www->

wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/1999/09/17/000009265_3970723102606/Rendered/PDF/multi_page.pdf

Presently [in 1985], the EPC [Electric Power Corporation] power supply system (which provides about 80% of total power generated consists of three main interconnected systems as well as a large number of small isolated stations. The remaining 20% is produced by captive power plants owned by Mining Corporations 1 and 2, the Myanma Oil Corporation (MOC), the Petrochemical Industries Corporation (PIC), the Foodstuff Industries Corporation, other industrial corporations, and corporations under other ministries.

Tin Maung Maung Than. "Burma's Energy Use: Perils and Promises". *Southeast Asian Affairs* 1986. (Singapore: Institute of Southeast Asian Studies, 1986), p 84.

Apart from the generating plants under the [state-owned] Electric Power Corporation, there are also generating plants run by various state-owned industries for their own use. The capacity of these generating plants is nearly 211 MW at present.

Tin Maung Maung Than. *State Dominance in Myanmar: The Political Economy of Industrialization*. Singapore, ISEAS: 2007), p385.

Although the national grid was supplied by the MEPE under the Ministry of Energy, state agencies under 23 other ministries also produce electricity for their own use. In fiscal year 1997/98 (the last year of published data) the combined generating capacity installed by those agencies was equivalent to 35% of MEPE's total capacity and the corresponding electricity production was equivalent to some 14% of that produced by MEPE.

For information on power plants operated by the Ministry of Agriculture and Irrigation, see the key article and references under "Mini hydropower plants planned for rural areas" below. For information on power plants

operated by the Ministry of Mines in the Namtu area where the Namtu – Bawdwin mines are located, see the editions of the New Light of Myanmar for the following dates: 13/01/98, 12/09/02, 28/02/05, 25/02/06.

The Ministries of Defence, Energy and Industry-1 and Industry-2 each have dozens of factories and other facilities throughout the country which either generate their own power or have back-up facilities to cover for load-shedding by MEPE. For example, note the following reference to the Energy Ministry's urea plant at Sale in NLM for 22/12/08. "Minister for Energy Brig-Gen Lun Thi on 16 December inspected No (1) Fertilizer Factory (Sale) in Sale, Magway Division. The minister called for boosting production of fertilizer, and technological measures for regular operation of the factory. He observed the production line, and granted assistance for regular supply of electric power and natural gas for the factory." The Energy Ministry may also operate a gas-fired generating plant at [Chauk](#). Electric power for the large oil refinery at Thanlyin opposite Yangon is apparently supplied by a steam generating unit at the facility which is currently being replaced. ("Minister for Energy Brig-Gen Lun Thi inspected the installation of a 4.5 MW steam turbine generation unit at the oil refinery of Myanma Petrochemical Enterprise in Thanlyin and presented a fruit basket to the foreign technician team." NLM, 19/08/09.)

Generally speaking, however, little information is available about the generating facilities operated by these ministries.

See also: ['Mini hydropower plants planned for rural areas'](#) (MT: 08/08/05)
['Co-op Department assisting villages with power supply'](#) (MT: 04/08/03)
['Private operators meet consumer need for alternative power service'](#) (MT: 03/02/02)

MYANMAR REELS UNDER [HUGE ELECTRICITY PRICE HIKE](#)

AFP, 03/08/99. www.burmalibrary.org/reg.burma/archives/199908/msg00336.htm

Myanmar is reeling under a 1,000pc power price rise imposed in recent months which has forced people back to coal stoves even as the ruling junta tries to modernise the country, Yangon residents said. Residents are expressing horror at the soaring price of electricity, which has jumped from K2.5 (US\$0.42 dollars at the official exchange rate) per unit to K 25 in the past two months. The price hike is aimed at encouraging thrifty use of the crumbling electricity grid, which is plagued by daily blackouts affecting thousands of homes.

The price rise has hit low-paid public servants the hardest. One public employee was presented with an electricity bill worth his entire annual salary of K12,000. One kyat is worth around six dollars at official rates, but on the thriving black market the currency changes hands at more than 350 to the greenback.

"We are totally dependant on cheap locally made electric stoves, but now we discover that they consume huge amounts of electricity," one housewife told AFP. "We've thrown away the electric hotplate and have gone back to wood-charcoal cooking, which is time-consuming," she said. The cost of wood-charcoal and gas has skyrocketed as residents search for cheaper alternatives to electricity. Many businesses and shops have tried to sidestep the price rises by turning to small diesel generators, which belch fumes and smoke into the city streets.

Electricity has been subsidised by the military government at a huge loss, which the junta can ill afford as it struggles to revive the economy. Diplomats say Myanmar's economy has descended into a crisis brought on by an investment drought triggered by Asia's financial turmoil and Western sanctions imposed to punish alleged human rights abuses. The investment shortage means there is little cash for desperately needed spending on antiquated infrastructure.

Additional references

See above: ['Electricity rates raised, subsidies for civil servants dropped'](#) (AP: 15/05/06)
['Special privileges alleged in electricity distribution system'](#) (NCGUB: 21/05/01)
['Experts differ over how to finance improvements in power supply'](#) (MT: 11/12/00)

'Generation, distribution, consumption of [electricity in Myanmar](#)' (World Bank: 18/08/99)

INVITATION FOR FOREIGN INVESTMENT IN ELECTRIC POWER SECTOR

Myanmar government website official information, [undated, circa 1998]. [not available on-line]

Section 66. Electric power: Much emphasis and priority is placed on the development of the electric power sector because of its vital importance to the nation's social and economic development.

Section 67. Although Myanmar has an abundance of hydropower potential, other sources of power generation such as gas-based generation systems should also be developed on a parallel basis to meet the base load power requirement for the short term, and peak shaving purposes for the longer term. Section 68. The [Electric Power] Ministry invites foreign participations for joint development of the following major hydropower projects which are under various stages of implementation and planning:-

Project	State or Division	Capacity (MW)	Remarks
Nam Mae Sai	Shan	8.2	Under implementation on BOOT basis by May Flower Co Ltd - a local company entrusted by MEPE
Nam Kok	Shan	150	Under feasibility study by NEWJEC Inc, assigned by a developer group of Japanese and Thai companies
Zaungtu	Bago	20	Under construction
Yenwe	Bago	16.2	Feasibility study completed
Kun	Bago	84	Under feasibility study by a Chinese company
Pyu	Bago	65	Under preliminary study
Kabaung	Bago	30	Preliminary study completed
Paunglaung	Mandalay	280	Under construction
Yeywa	Mandalay	600	Pre-feasibility study completed
Baluchaung 3	Kayah	48	Feasibility study completed by NEWJEC Inc of Japan
Thaukyegat	Kayin	150	Pre-design report completed
Bawgada	Kayin	160	Preliminary study
Hutgyi	Kayin	300	Under study for development by a developer group of (Thanlwin) Japanese and Thai companies
Thaungyin - Moei III	Kayin	250	Office study
Thaungyin - Moei II	Kayin	120	Office study
Thaungyin - Moei I	Kayin	70	Office study
Bilin	Mon	240	Feasibility study completed
Tamanthi	Sagaing	1,200	Pre-feasibility study
Khlongkra	Tanintharyi	130	Office study

Section 69. Electric generation had increased from about 2,226 GWH in 1988/89 to about 4,000 GWH in 1996/97. The peak demand also increased from about 332 MW in 1988/89 to about 680 MW in 1996/97 showing doubling of demand in 8 years. The average annual growth is about 15 percent, but an increase in the annual growth rate to about 20% is yet to be expected due to the current trend in the industrial and commercial sectors.

Section 70. The Ministry of Energy, since early 1994 welcomes private sector participation in the power sector. Investment opportunities include taking-over of existing generation, transmission and distribution facilities from MEPE on mutually agreed terms and conditions as well as in building new power plants, transmission and distribution facilities either on BOT or joint venture basis. Since then MEPE had been discussing with several interested parties private participation in various areas of the power sector. Section 71. The Myama Industrial Development Committee (MIDC) formed by Myanmar government started with ambitious plans which include establishment of 14 industrial zones in the areas crucial for industrial

development. Investment for power supply facility within the said industrial zones on IPP basis can be discussed with MIDC and MEPE.

Section 72. MoU between the Government of the Union of Myanmar and Kingdom of Thailand for power sales of about 1,500 MW by the year 2010 from Myanmar to Thailand was signed in July 1997 in Bangkok. Committees for both sides were formed for efficient implementation of the power purchase program in accordance with the said MOU. This MOU will open up more investment opportunities in power sector especially within the Thanlwin and Mekong river basin.

Section 73. The Ministry of Energy has been emphasising the possibility of exporting electric power as a value-added product by constructing a 1,500-MW gas turbine generation plant in Tanintharyi division using the present and future discoveries of natural gas from the Myanmar Offshore areas. Interested parties from the short-list during the conceptual discussion stage were invited by MEPE to put up their proposal as to how they could proceed for realization of the said project.

Section 74. Apart from Thailand, the Myanmar Ministry of Energy is also discussing with the interested parties for export of electric power to India which has indicated a willingness to purchase it.

Section 75. As Myanmar is a member of both the Greater Mekong Subregion (GMS) countries and also of ASEAN regional cooperation among member countries will also open up bright investment opportunities in the present and future power sector.

Additional references

See above: 'Foreign [consultants for private hydro](#) projects' (MT: 26/11/07)

'More inputs needed to power a [hydro future](#)' (MT: 04/06/01)

See below: 'Burma eyes [private power producers](#)' (Nation: 13/02/96)

Myanmar Snap Trade Directory, [undated, circa 1999]. <http://www.myanmarsnap.com/investment07.asp>

Myanmar has an abundance of hydropower potential of more than 100,000 MW and huge reserve of offshore natural gas. Development of hydropower involves high capital costs and long lead time for construction in contrast to gas turbines and combined cycle power plant. In order to meet future demand hydropower has to be developed on long term basis and gas turbines will have to be built as a stop-gap measure. The abundance of hydropower potential enables Myanmar to consider development of hydropower projects not only for domestic power supply but also for export to the neighbouring countries. The Ministry invites foreign participation for the development of the following major hydropower projects which are under various stages of implementation and planning:-

Project	Capacity	Remarks
Paunglaung	280 MW	Detailed engineering design completed. Tunnels under construction by Kajima and NEWJEC. Contract signed with YMEC of China for construction of electro-mechanical developments and financing.
Yeywa	600 MW	Preliminary study has been completed. Nippon Koei is doing the feasibility study, to be completed by end of 1999
Mone	75 MW	Contract signed with CITIC of China
Thaparseik	30 MW	Contract signed with CITIC of China
Tamanthi	1,200 MW	Prefeasibility study
Kun	84 MW	Feasibility study completed by China Nat'l Agricultural Machinery Corp
Pyu	65 MW	Under preliminary study
Kabaung	30 MW	Under preliminary study
Bilin	280 MW	Preliminary report completed by Nippon Koei. Feasibility study to be undertaken
Nam Kok	60 MW	Feasibility study with Marubeni, MDX, Ital-Thai developers. To be developed mainly for export to Thailand
Baluchaung No 3	48 MW	Feasibility study completed by NEWJEC
Thanlwin (Ywathit)	3,500 MW	Office study
Thaukyegat	150 MW	Pre-design report completed. Feasibility study to start
Bawgata	160 MW	Preliminary study

Thanlwin (Hutkyi)	400 MW	Prefeasibility study proposed by Marubeni/NEWJEC-led consortium. To be developed mainly for export to Thailand.
Tanintharyi	600 MW	Preliminary study by Nippon Koei under negotiation To be developed for export to Thailand

SOUTH KOREAN CONSORTIUM WINS ELECTRICAL SUPPLY CONTRACT

Korea Herald, 29-05-97. [not available on-line]

A consortium of three Korean general trading companies (GTCs) has won a \$15 million contract to supply electrical machinery and equipment to Myanmar [Burma], company officials said yesterday. In what the officials said is another case of strategic alliance among domestic competitors, Hyundai Corp, Daewoo Corp and LG International Corp will jointly supply electric wires, transformers, insulators, circuit breakers and street lamps to the south-east Asian country by December.

Representatives of the consortium signed the contract with MEPE in Yangon Thursday. The contract will be financed with the low-cost loans from the Korean government's Economic Development Cooperation Fund (EDCF), said an official at Daewoo Corp. "It's a good illustration of domestic trading giants developing overseas markets through mutual co-operation," said the official. The three companies plan to go all out to secure more business opportunities in Myanmar and neighboring countries.

It is the second Myanmar project for Daewoo, which supplied \$5 million worth of power transmission and distribution equipment to the country in 1995, the company official said. Daewoo was the largest Korean exporter to Myanmar with \$40 million last year, followed by Hyundai's \$16.5 million and LG's \$8 million, he added.

POWER PURCHASE DEAL BETWEEN THAILAND AND BURMA ON THE WAY

Pichaya Changsorn, Nation (Bangkok), 27/05/97.

www.burmalibrary.org/reg.burma/archives/199705/msg00507.html

Thailand is scheduled to sign an MoU in July with Burma for the purchase of 1,500 MW of electricity by the year 2010, Minister Sompong Amornvivat of the PM's office, said. It will be the first direct power purchase agreement between Thailand and its western neighbour. But Thailand signed MoUs with Laos in 1993 and 1996 for the purchase 1,500 MW of power by 2000 and 1,500 MW by 2006, respectively.

The announcement followed a visit by PM Chavalit Yongchaiyudh and Sompong, who is responsible for energy affairs, to Rangoon about three weeks ago. "This broad policy framework and scope for bilateral co-operation in the power sector will be formalised in an MoU to be signed by the two governments in July," Sompong said. In the medium term, he said, the programme will concentrate on power purchases from small projects which are relatively easy to develop such as Nam Kok. Over the long term, the programme will more fully utilise the potential of resources such as the Salween river in Burma, for example.

According to the National Energy Policy Office (NEPO), potential projects in Burma for electricity supply to Thailand include the 150-MW Nam Kok project to be developed by the consortium of MDX Plc, Italian-Thai Development Plc and Marubeni of Japan, and the 400-MW Hutgyi project on the lower Salween river.

Preliminary studies of 196 hydro-electric projects by the Burmese junta indicate a potential for generating 38,000 MW, while the country's total technical potential for energy production is estimated at 100,000 MW, NEPO said. Previously, the Petroleum Authority of Thailand signed contracts to purchase natural gas from Burma's two gas fields, which are scheduled to supply power plants in Ratchaburi from mid-1998 and 1999, respectively.

With insufficient indigenous resources, Thailand's energy master plan has adopted its resource-rich neighbouring countries, including Malaysia, Cambodia, Burma, Laos, China and Indonesia, as sources of gas and electricity. The minister said preliminary discussion has also taken place with officials of Yunnan province in China. "It is envisaged that Thailand will buy 1,200 MW from China's Jinghong project towards the end of the next decade," Sompong said. MDX and Yunnan Electric is undertaking a feasibility study for the hydro electric Jinghong project. Located 400 kilometres from the Thai upper North border, the Jinghong dam is expected to supply 1,200 MW out of its total 1,500 MW output to Thailand.

The Asian Development Bank estimates Yunnan has a hydro-electric power generating potential of 90,000 MW, comprising 40,940 MW from the Jinsha river, 22,260 MW from Lancang river, 13,900 MW from the Nujang river and 12,900 MW from tributary river projects.

As for Laos, EGAT has signed power purchase agreements for the 210-MW Nam Theun-Hinboun project and concluded power tariff talks on two other projects, namely the Houay Ho (143 MW) and Hongsa Lignite (608 MW). It is also negotiating with the developers of the Nam Hgum No 3 (460 MW) and Nam Ngum No 2 (615 MW) projects. The National Energy Policy Council is scheduled to approve the draft power purchase agreement for the Houay Ho project at its next meeting on June 2.

Additional references

BKK Post, 18/01/99. <http://www.ibiblio.org/obl/reg.burma/archives/199901/msg00272.html>

Burma wants to purchase power from Thailand through a counter-trade deal, possibly starting from the end of 2001. The issue of Rangoon buying at least 100 MW was discussed last Wednesday in Rangoon by Thai and Burmese energy authorities. Viravat Chlayon, governor of EGAT, said both EGAT and MEPE agreed to pursue studies on the purchase. EGAT has to investigate whether it is economical to invest heavily in building transmission lines to the Burmese border and what sort of goods Rangoon can offer as payment for the power sale. EGAT welcomed the proposed sale to Burma as it would help Egat reduce its excess generating capacity. The surplus capacity is expected to soar to more than 50% in 2001. For Burma, purchasing power from Thailand is easier than finding finance to build new power plants. Burma has a generating capacity of merely 1,000 MW, 13 times less than Thailand. Results of the studies would be presented in March when both parties are scheduled to meet again.

Myanmar government website official information, [undated, circa 1998]. [not available on-line]
Section 77. An MoU between the Government of the Union of Myanmar and Kingdom of Thailand for power sales of about 1,500 MW by the year 2010 from Myanmar to Thailand was signed in July, 1997 in Bangkok. Committees for both sides were formed for efficient implementation of the power purchase program in accordance with the said MOU. This MoU will open up more investment opportunities in the power sector especially within the Thanlwin and Mekong river basin.

See above: 'Myanmar, Thailand begin work on [controversial Tasang](#) dam' (AFP: 05/04/07)

[Tribe's home](#) to be a valley of the dammed' (London Times: 22/03/06)

'Hydropower Dept and EGAT ink agreement on [Hutgyi](#) project' (NLM: 10/12/05)

See below: '[Power trading](#) in the Greater Mekong Sub-region (GMS)' (Appendix 14)

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BURMA EYES PRIVATE POWER PRODUCERS

U Myo Myint, Nation (Bangkok), 13/02/96

<http://www.ibiblio.org/obl/reg.burma/archives/199602/msg00138.html>

Electricity utilization in Burma has been increasing every year. Increases in the annual growth rate of up to 20pc are expected due to the market oriented economic policy adopted by the government that encourages development in the industrial, agricultural and commercial sectors. Until now, the electricity sector has been run solely by the state owned MEPE. To meet the rapid growth in electricity demand, the government alone cannot contribute the needed investment. Consequently, local and foreign investors are invited to

participate in wholly-owned or joint ventures with MEPE in its gradual turn toward commercialization of the power sector.

MEPE, under the Ministry of Energy, is fully responsible for the generation, transmission, distribution and sale of electricity within Burma. It includes investigation, planning design and project implementation. The head office of MEPE is located in Rangoon. There are six departments; Planning, Hydro-electric Construction, Operations, Materials Planning, Finance and Administration.

The present electricity requirements of the country are fulfilled by generation from hydro-power and thermal power consisting of gas turbines, steam turbines and diesel generating sets. Electricity generation in Burma has increased from about 2,676 GWh in 1991-92 to about 3,647 GWh in 1995-96. The average annual growth rate was about nine per cent.

Gas turbine generating sets have been installed in the national grid system (i.e., the interconnected system) as a stop-gap measure before major hydro-electric power stations, with their long lead times, become operational. The first gas turbine power station at Kyunchaung was completed and commissioned in 1974.

Recently, two new gas turbine power stations, each with an installed capacity of three units of 33 MW, were installed in Rangoon to meet the growing demand for electricity. The first gas turbine station located in Ahlone was commissioned in April 1995 and has been generating its full installed capacity since the end of May 1995. The second gas turbine station, located in Hlawga, was commissioned in January 1996. Plans have been made by MEPE for installation of combined cycle plants in both of these stations. Completion is scheduled for the 1997-98 fiscal year. The installation of a combined cycle plant (34.9 MW) at the Thakayta gas-turbine generating station, which has an initial installed capacity of 57 MW is also underway and completion is expected by the year 1996-97.

In areas of supply from isolated generating stations, the sources for electricity are mostly diesel power stations, micro-mini hydro-electric power stations and a few medium capacity gas turbines and steam power stations. The majority of these are operated as isolated rural electrification stations and only a few operate as central stations distributing to neighbouring towns and villages.

As mentioned earlier, the peak load within the grid system is about 610 MW at present. However, there are lots of housing projects, industrial zones, agricultural and commercial sectors waiting for power supply. The demand from these could amount to 430 MW for a total potential demand of around 1,000 MW. This is expected to grow at an annual rate of 20pc toward the year 2000. But for case study, a conservative growth rate of 10pc per annum is applied.

Burma is blessed with abundant water supply resources within its territorial area of about 677,000 sq km, over half of which is highland bisected by north-south trending mountain ranges combined with heavy rainfall from the southwest monsoon. The highest hydro potential lies in the Chindwin, Irrawaddy, Sittoung and Thanlwin river basins. According to preliminary studies, the major hydro-power resources are about 37,000 MW, of which about 25,000 MW are of large scale while the remainder are of medium and small scale. The total developed capacity of these renewable energy hydro power resources, existing as well as under implementation, is about 316 MW only. This is less than one per cent of the country's potential, leaving the remaining 99pc still available for implementation of their electricity generating capacity by both the government and private sectors.

There is also a number of promising sites for hydropower developments which are of such magnitude that the economic feasibility of exploiting them for the domestic market alone may not be adequate. Those along the border with Thailand are under consideration for energy export. Extensive basin studies of the hydropower sites along the Thanlwin river should be undertaken in order to make the best use of water resources available in the sub-region.

Besides hydropower potential, Burma is estimated to have total coal resources of 200 to 230 million tonnes in numerous deposits, mostly of sub-bituminous rank, and mainly in the northern regions. Presently, there are only two mines in production. The underground Kalewa coal mine and the open-cut Namma coal mines

are producing about 12,900 tonnes per year and 25,810 tonnes per year respectively. The Kalewa deposits are the only significant ones for future coal development at the present time. The highly volatile content and good burning characteristics make it ideally suited for pulverized fuel of flautist bed boiler operations for power generation. A mine mouth electricity generation plant of about 200 MW is estimated from preliminary studies, but detailed exploration to determine the reserves in place is essential before such a project could go ahead. Namma Coal mine, however, is a short term operation, lacking reserves for any major expansion.

In early 1994, permission for the private sector to participate in the power sector or to implement activities jointly with the government was introduced. The Kalewa coal deposit is available for private sector investment. Due to its highly volatile content and good burning characteristics it is ideally suited to certain types of boilers for power generation. However its easily friable nature and the limited feasibility of transporting the coal over long distances mean that the power generating station would need to be located close to the Kalewa mine.

Natural gas offers the most exciting area in the Burmese energy scene. The present limited on-shore gas reserves will be sufficient only for the two 100-MW gas turbine power stations in Rangoon. MEPE is willing to operate these two power stations in a joint-venture with a foreign investor. Substantial investments are also needed to convert the two new 100-MW stations as well as older gas turbine power plants to combined cycle operations. This would add some 200 MW to their generating capacity. Discussions have already been held with several interested foreign companies to form a joint venture for the 100-MW gas turbine power plant in Ahlone. However, the prevailing low tariffs in local currency and the limited number of customers who pay in foreign currency has held back the commercialization process.

Compiler's Note: At the time of writing, U Myo Myint was assistant chief engineer of MEPE.

Additional references

ASEAN Centre for Energy, [circa 2001].

http://www.aseanenergy.org/energy_sector/electricity/myanmar/private_sector_part.htm

Information provided by MEPE: In early 1994 permission was given for the private sector to participate in the power sector or to implement activities jointly with the government. Since then MEPE has been in discussions with several interested parties, both local and foreign, about private participation In various areas of the power sector. However, the low tariffs in local currency and the small number of consumers paying in foreign currency have served as draw-backs to the commercialization process. The tariff was increased in September 1994 for the first time in 40 years. It was raised fivefold from K0.50 to K2.5 per kWh for domestic users and K3.0 per kWh for commercial and industrial users. The tariff in foreign currency for foreign and export-oriented companies is US\$0.08 per kWh. Even after this increase, the tariff in local currency is well below the commercial rates needed to make power generation profitable. Recently the tariff was further raised from K2.50 per kWh to K25 per kWh for commercial and industrial consumers and for domestic users who use above 200 kWh per month. Pursuant to the increase in tariff, many local and foreign companies have showed great interest in private participation in the power generation sector. For the time-being only the following local companies are involved with investments in the power sector on a BOOT (Built-Own-Operate-Transfer) basis: (1) Golden Triangle Co Ltd will build a coal-fired power station with two 6-MW generators in Tachileik township; (2) Buga Co Ltd will build a hydropower station in Waingmaw township near Myitkyina with two 12-MW generators.

See above: 'Invitation for foreign investment in electric power sector' (GUM: circa 1998)

See also: Tin Shein and Kyaw Kyaw, "Private participation in Myanmar's power sector", in *Energy for Sustainable Development*, 3, no 6 (Mar 1997), pp 97-101.

<http://www.esd-journal.org/esdonline/pdf/esdv3n6/myanmar.pdf>

YADANA GAS WILL FIRE ELECTRIC POWER PLANTS IN MYANMAR

Myanmar Perspectives: September 1995

<http://www.myanmar.gov.mm/Perspective/persp1995/9-95/yad.htm>

MOGE has established joint ventures with foreign firms such as Total of France, Unocal of the U.S. and PTTEP of Thailand. A project to export natural gas to foreign countries will commence at the end of 1998. The Yadana natural gas wells are in the M-12 and M-6 offshore blocks in the Mottama sea between 15° 17' N and 95° 10' E. The field is 460 km south-west of Yangon city and 90 km from the nearest coast. The location of the field was established by survey data analysis in 1982. Market developments made it feasible to establish a joint-venture operation with Total of France in July 1992.

The Yadana wells are based in a deposit of 6.7 billion cu ft natural gas of which 5.7 billion cu ft can be exploited. It is planned to exploit 650 million cu ft of natural gas daily. Of this amount, 525 million cu ft will be taken up by PTT for export to Thailand through a 420-km-long, 36-inch diameter pipeline. The sale of natural gas to Thailand will begin in 1998 and last for 30 years. By exploiting 5.7 billion cubic feet of natural gas from the Yadana wells, MOGE will earn US\$450,000 daily. Over the 30-year period MOGE will earn a total of US\$4,900 million.

The remaining 125 million cu ft of natural gas extracted daily from the Yadana field will be available for consumption within Myanmar. Of this amount, 105 million cu ft will be used in a 200-MW power generating plant that will supply electricity to a fertilizer plant producing 1,750 metric tons daily. The other 20 million cu ft of natural gas will be used by a 65-MW power generating plant at Kanbaw that will supply electricity to Mon and Kayin states and Tanintharyi division. The estimated cost of this project is about US\$600 million. As of the 31st August 1995, a total of 35 proposals from various nations have been received for projects related to the use of the Yadana gas in Myanmar.

Additional references

See above: 'More [gas to be diverted](#) from Yadana for national use' (MT: 14/01/08)

'[Pipeline to solve](#) electricity shortages' (MT: 16/09/02)

See below: 'Use of [Yadana gas for power generation](#) and industry: Chronology' (Appendix 6)

Additional references to a domestic oriented gas-turbine power plant in Kanbaw

Unocal Corporation, 22/04/96. www.secinfo.com/drdbh.91Bu.htm

The Yadana project has a socio-economic development component specifically designed to provide job opportunities, improve living standards and promote viable, long-term economic development for villages in the pipeline region. Yadana gas may also fuel a possible 75-MW power plant in southern Myanmar. Together, these projects will provide significant economic benefits for a country that is heavily agrarian and short on energy supplies.

MIC, 21/07/97. <http://www.burmalibrary.org/reg.burma/archives/199707/msg00388.html>

Energy Minister Khin Maung Thein attended the cornerstone laying ceremony for a natural gas power station in the Kanbaw region and the installation of a 66-kV power line from Kanbaw to Dawei. The Kanbaw power station will use natural gas from the Yadana field to supply electricity to Dawei, Kanbaw and environs as well as the Ye and Myeik regions.

MIC, 22/08/97. <http://www.ibiblio.org/obl/reg.burma/archives/199708/msg00246.html>

MEPE signed an agreement with Genting Power Holdings Ltd of Malaysia to generate and distribute power in the Kanbaw region of Yebyu township at the Ministry of Energy on 20 August.

UN Mission of the Myanmar government, Geneva website information, [undated, circa mid-1998].

<http://mission.itu.ch/MISSIONS/Myanmar/t&b/gas-oil.html>

The Yadana natural gas field will produce 650 million cu ft/day of natural gas of which 525 million cu ft will be sold to Thailand with effect from July 1998. The remaining 125 million cubic feet of natural gas will be utilized within Myanmar for power generation and production of chemical fertilizers. Twenty million cu ft of natural gas will be used to operate a 36-MW generating plant that will provide power for the Ye, Kanbaw, Dawei and Myeik regions. MEPE and Genting Power Holding Ltd of Malaysia signed an agreement for this plant on 20/08/97.

U.N.O. Consultant Geotechnical Engineering Group, website info, [undated, circa 1999].
http://www.consultantgeotech.net/our_project.htm

U.N.O. carried out a geotechnical survey for a gas turbine power station at Kanbauk in Yebyu township, commissioned by MEPE.

Total Myanmar, *Yadana: An Industrial Development Project in Myanmar*: 2002

http://www.total.com/static/en/medias/topic521/TFE_2002_en_myanmar.pdf

Report of the socio-economic program: Nine villages in the pipeline corridor to Thailand have been supplied with electricity.

Corporate Engagement Project: *Field Report: Third Visit: Yadana Gas Transportation Project: Nov-Dec 2003*.

<http://www.cdainc.com/publications/cep/fieldvisits/cepVisit09MyanmarBurma3.pdf>

One of the continuously recurring wishes of people interviewed both in the pipeline corridor and in Yangon is to have more access to electricity. Several people in Yangon expressed their frustration that the pipeline serves to “give away the natural resources we so badly need ourselves.” The shortage of electricity and of gas for cooking are repeatedly mentioned as putting a heavy burden on people’s lives. At the same time, people see little benefit from the revenues generated by the pipeline or from the export of the gas to Thailand. In the pipeline area, one option open to Total and its partners would be to discuss with the Myanmar government the revamping of an electrification scheme. There is an electrical reticulation system designed and partially constructed to provide power to some communities in the pipeline corridor and beyond. Electricity poles have been constructed and a site is still available for a small power plant. Completing this installation would provide an improvement to the quality of life for people well beyond the pipeline corridor. On the other hand, if the government limits the provision of electricity only to some villages in the corridor, it may cause jealousy from villages that do not get power. Total could discuss with the government the options available to install, operate and maintain a gas turbine in the area. This would be an opportunity for the government to demonstrate a project where gas revenue is re-invested in a way that improves the quality of life for many people. **Compiler’s Note:** According to its statement of purpose, “the objective of the Corporate Engagement Project (CEP) is to provide managers with clear ideas about how their work with communities relates to the broader sociopolitical environment and to develop practical management tools for supporting stable and productive relations in the societies where corporations work. CEP field visits are undertaken to help corporations gain new insight into the positive and negative impacts of their daily activities on the local and national context.” Clearly, such projects are engaged in under contract with the companies themselves.

Corporate Engagement Project, *Field Report, Fourth Visit: Yadana Gas Transportation Project: April 2005*

<http://cdainc.com/publications/cep/fieldvisits/cepVisit16MyanmarBurma4.pdf>

If not used for another purpose, by the end of 2005 Total will have to hand over a base camp in Kanbauk which currently houses contractor staff. Ideas that were mentioned as alternative purposes for the camp include offering the facility to an NGO that wants to establish a vocational training center for people with physical disabilities. The NGO currently offers two-week courses and wants to expand activities due to the success of the program, if the camp could be supplied with gas and a turbine (which are both technically feasible), the facility could become the only public place in the region that has a reliable power supply. It could serve as a business development area for entrepreneurs needing electricity (ice making, welding, etc).

Total Myanmar, *A Sustained Commitment*, 2006.

http://burma.total.com/en/publications/sustained_commitment.pdf [document, p 27]

Another issue is energy. Although the pipeline region has no collective electricity grid, power is provided in some areas by solar panels financed by the project’s social program, or by generators that some villagers have acquired. The lack of access to energy hampers agricultural product processing operations. A variety of options is being considered to remedy this situation.

Additional references to a mega-sized, export-oriented gas-turbine power plant in Kanbauk

National Energy Policy Office of Thailand, *Electricity Supply Industry Reform and Thailand Power Pool*, November 2000. <http://www.eppo.go.th/power/FF-E/pw-reform-1-main-E.html>

On 4 July 1997, the governments of Thailand and the Union of Myanmar co-signed an MoU on power purchase from the Union of Myanmar. Under the MoU, both parties will promote and co-operate in the power project development in Myanmar in order to sell 1,500 MW of electricity to Thailand by 2010. To give effect to this, each government has appointed a committee to implement the project and to negotiate in detail the principles agreed upon in the MoU. Following the committee's meetings, the Myanmar side has offered to sell electricity from four projects to Thailand, namely: 1) the Nam Kok project, with an installed capacity of 42 MW and a transmission line routing via the Mai Sai district in Chiang Mai province; 2) the Hutgyi project, with an installed capacity of 300 MW and a transmission line routing via the Mai Sod district in Tak province; 3) the Tasang Project, with an installed capacity of 3,300 MW and a transmission line routing via the Mai Aye district in Chiang Mai province; 4) the Kanbauk project, with an installed capacity of 1,500 MW and a transmission line routing via the Muang district (Ban Huay Nam Khao) in Kanchanaburi province.

NEWJEC website information. [undated, circa 2000] www.ecfa.or.jp/english/pdf/newjec.pdf
In 1998/99, NEWJEC carried out a feasibility study for a combined cycle gas-turbine project (1,500 MW) at Kanbauk. The study was commissioned by the Myanmar government and EGCO, a subsidiary of Thailand's EGAT. NEWJEC, a subsidiary of the Kansai Electric Power Co Inc in Japan, specializes in engineering services of various kinds for power projects.

Myanmar Snap Trade Directory, [undated, circa 1999]. <http://www.myanmarsnap.com/investment07.asp>
An MOU between the Government of the Union of Myanmar and the Kingdom of Thailand for power sales of about 1,500 MW by the year 2010 from Myanmar to Thailand was signed in July 1997 in Bangkok. Committees for both sides were formed for efficient implementation of the power purchase program in accordance with the MoU. This will open up investment opportunities in the power sector in the Thanlwin and Mekong river basins and transmission interconnection between the countries in the region. With the discovery of more gas reserves in the offshore blocks of the Gulf of Moattama [i.e., Yetagun], MEPE is discussing possible construction of a 1,500-MW combined cycle plant in the Dawei-Kanbauk area with PEA and EGAT of Thailand. and. Pre-feasibility study of this project had already completed by a consortium of Thai companies led by EGCO in co-operation with the Myanmar EPM.

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[Start90s](#)

[THAI LOGGING FIRM STRIKES DEAL FOR HYDROPOWER DAMS](#)

Sasithorn Ongdee, Nation (Bangkok), 24/01/94.

<http://burmalibrary.org/reg.burma/archives/199401/msg00067.html>

Onk Mining and Construction Co (ONK), a little-known Thai logging firm with business interests in Burma, has landed a deal with Rangoon to build hydro-electric dams, roads and a port at a combined cost of Bt17.5billion (US\$700 million), according ONK chairman Krin Pongpatchote. The recently signed MoU calls for the implementation of four projects. Two are for building hydropower dams at Nam Ruak and Nam Kok in eastern Shan state having a capacity of 25 MW and 100 MW respectively. The third is for a road between Kengtung and Mong Yai and fourth is for the construction of port at Thilawa near Rangoon.

The dam projects will require a combined investment of about Bt10 billion (US\$ 400 million). The Nam Ruak dam with a catchment area of 900 sq km will irrigate 16,000 h and supply 25 MW of electric power. The Nam Kok dam with a catchment area of 2.920 sq km will irrigate 64,000 h and supply 100 MW to both Burma and Thailand. It will take about 6-8 years to complete construction of the two dams. Krin said Rangoon is expected to sign the joint venture agreement with the company by March of this year. Both sides are still negotiating details of the agreements. The Shan State Development General Trading Co Ltd, a state-owned firm in Burma, will be responsible for the dam projects. It has already issued a letter of intent for ONK to undertake construction.

Krin said his company will hold the majority stake in the two dam projects. Japanese trading giant Kanematsu (Thailand) Co Ltd, Works Consultant and Service Corp, First Federal Banking Corp and American Product Distribution Co (Wisconsin) have been invited to hold shares in the dam projects. Should

they become partners, they will be expected to provide capital, machinery and specialists to implement the construction, with each holding an equal stake.

Burma will buy 10pc of the electricity generated by both dams; the rest will be sold to the EGAT. ONK has held talks with the EGAT governor and other officials on the planned sale of electricity to Thailand. Last week, EGAT agreed in principle to buy the power, according to Krin. Both sides will conduct field trips to the sites to survey possible power transmission routes across the border.

Earlier other Thai companies such as Loxley (Bangkok), West Group and firms affiliated with Thai politicians approached Rangoon with similar deals, but none was successful, Krin claimed. Although ONK Mining and Construction is not well-known in Thailand, it is an active firm in the international logging business. Registered in Thailand with a capital of Bt500 million, it was originally a building contractor. The company now has five or six subsidiaries, mostly involved in logging in Burma.

Additional references

Shan Herald, 13/03/04.

http://www.shanland.org/environment/2004/opening_survey_on_the_kok_begins.htm/

A preliminary examination of the headwaters of the Kok river has been undertaken as a result of the recently signed MoU on the damming of the Kok and the Maesai rivers. On 04/03/04 a party including soldiers of IBs 49 and 43, accompanied by 18 elders from Monghsat went to the Hpala mountains where the Kok originates. Many photos were taken at Ho Namkok (the Kok's head) and later at a 20-meter-high waterfall.

Ranjana Wangvipula, Bangkok Post, 25/02/04. www.searin.org/Th/SWD/SWDnE15.htm

Thailand and Burma have signed an MoU that authorizes a joint study of the feasibility of damming two rivers they share for irrigation. The planned dams would create reservoirs on Burmese soil where the Kok and Sai rivers originate and enter Thailand in the northern provinces of Chiang Mai and Chiang Rai respectively. Natural Resources and Environment Minister Praphat Panyachatrak said the project would benefit thousands of sq km of farmland in both countries. The study may include a plan to build hydro-electric dams. Environmental activist Nikom Putta, of the Chiang Mai-based Ping watershed management project, warned that northern forest areas faced a problem of rapid soil erosion, causing sediment to accumulate in dams at a higher rate than at other dams and reducing their lifespan. Chainarong Sretthachau, director of the South-east Asia Rivers Network, said construction of the dams would impact adversely on minority groups in Burma. He suspected the plan was linked to power plant projects supported by a Japanese electric power development company that had pushed for construction of dams on the Kok, Kra, Moei, Sai and Salween rivers near the border between the two countries.

Images Asia – Terra, *Report on Status of Salween (Thanlwin) Dam Plans*, Nov 1999.

www.ibiblio.org/obl/docs/SW03.htm

According to a leaked EGAT document entitled 'Status of the Hydropower Projects to be implemented for Power Export to Thailand', dated 24/12/98, the Nam Kok hydropower project will be located about 64 km south of Mong Hsat in eastern Shan state and about 5 km north of the Thai-Burma border. A feasibility study carried out by NEWJEC Inc. for MDX, Italian-Thai Development and Marubeni was expected to be available by the end of December 1998. A draft version of the feasibility report indicates the installed capacity was set at 42 MW, and expected production at 230 million kWh annually. The financial feasibility of the project was evaluated as marginal due to the unfavourable topographical and geological conditions of the dam site.

NEWJEC Inc, [undated, circa 1999] www.ecfa.or.jp/english/pdf/newjec.pdf

In 1997/98, NEWJEC Inc, a subsidiary of Kansai Electric Power Co of Japan, carried out a feasibility study of the 55-MW Nam Kok hydro-electric power project, commissioned by an IPP (Independent Power Producer group).

Nation (Bangkok), 27/05/97. <http://www.ibiblio.org/obl/reg.burma/archives/199705/msg00507.html>

Thailand is scheduled to sign an MoU in July with Burma for the purchase of 1,500 MW of electricity by 2010. According to the National Energy Policy Office, potential projects in Burma to supply electricity to

Thailand include the 150-MW Nam Kok project to be developed by the consortium of MDX Plc, Italian-Thai Development Plc and Marubeni of Japan, and the 400-MW Hutgyi project on the lower Salween.

NLM, 15/09/96. <http://www.ibiblio.org/obl/docs3/BPS96-09.pdf> [document, p 49]

Developer Group, a joint endeavour of Marubeni Corp of Japan, MDX Group of Thailand, and Italian-Thai Development Co signed a contract with MEPE, represented by MD Zaw Win, to conduct a feasibility survey of the 200-MW Namkok hydroelectric power project near Monghsat.

APPENDICES

LAWPITA POWER PLANTS AND ASSOCIATED DAMS (Appendix 1)

The information available about the hydropower facilities at Lawpita in Kayah state (Karenni) and the Moebye and Dawtacha dams has been divided into five sections:

- A)** Brief Chronology of the Lawpita power stations and associated dams;
- B)** Selected passages from Part II of the report 'Dammed by Burma's Generals' published by the Karenni Development Research Group;
- C)** Information taken from the websites of Japanese corporations engaged in projects related to the Lawpita power plants;
- D)** Reference material from various publications related to the power plants at Lawpita arranged in reverse chronological order;
- E)** Documents related to the controversy surrounding a Japanese loan for repairs to the generating facilities at Lawpita Plant No 2 in 2001-02.
- F)** Selected passages from 'Baluchaung No. 2 Power Station Renovation Project', a post evaluation report of the generator renovation project at Lawpita No 2 in 1989-90, published in May, 2002.

Additional references

See above: 'Agreement on [four hydro projects signed with Datang](#)' (PRC Commerce: 15/01/10)
'[Biluchaung No 3](#) hydropower project moving ahead' (NLM: 14/02/09)
'[Tribe's home](#) to be a valley of the dammed' (London Times: 22/03/06)

A) Brief [Chronology of the Lawpita](#) power stations and associated dams (adapted from 'Dammed by Burma's Generals')

Year	Important Events
1950	Planning begins for Lawpita falls hydropower project as part of Japanese war reparations
1954	Japanese government approves the budget for the project. Feasibility and design studies begin
1960	Lawpita Hydropower Plant No 2 opened; three generators with total capacity of 84 MW
1962	Construction of Moby Dam begins but is halted because of the military coup Villages are ordered to move but most do not comply.
1966	Construction of Moby dam resumes; 2,000 workers brought from central Burma
1970	Construction of Moby dam completed
1970-72	Eight thousand households in Pekhon township forced to move as reservoir fills up
1974	Second phase of Plant No 2 completed Total generating capacity boosted to 168 MW
1981	Loan agreement signed with Japan to construct Lawpita Plant No 1
1984	Design studies for project to construct facilities related to Plant No 1
1986-94	Renovation of Plant No 2 undertaken with Japanese assistance
1988-92	Datawcha dam linked to Plant No 1 built
1992	Plant No 1 is completed; it has two generators and a total installed capacity of 28 MW.

- 1994-95 Feasibility study undertaken for Baluchaung hydropower project No 3 (48 MW)
- 1999-00 Studies determine further repairs to turbines at Plant No 2 necessary
- 2001 News that Japan will provide aid amounting to ¥3.5 billion (\$28.6 million) for rehabilitation of turbines at Plant No 2 stirs public discussion
- 2002 Official announcement by Japan of a grant of ¥626 million for repair work at Plant No 2
Loan is tied to release from house arrest of NLD leader Daw Aung San Suu Kyi

Topographic map references: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-01: Pyinmana Moby dam, just north of Mong Pai [19° 44' N, 97° 05' E], grid square reference: 10\9, 26\6
Datacha dam, near Datacha [19° 39' N, 97° 16' E], grid square reference: 10\8, 26\8
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-1.jpg>

Google Earth clearly shows the Moby dam sluice gate and barrier at 19° 46' 42" N, 97° 05' 27" E, the Dawtacha dam (not so clearly shown) at 19° 38' 53" N, 97° 17' 17" E, the No 1 Lawpita power station at 19° 38' 55" N, 97° 17' 26" and the Lawpita No 2 penstocks and power station at 19° 38' 15" N, 97° 18' 04". The map titled Impact from the Lawpita Hydropower Project on page 34 of *Dammed by Burma's Generals* gives a bird's eye view of the four locations in stylized form.
http://www.burmacampaign.org.uk/reports/Damned_by_Burma%27s_Generals.pdf [doc p 44]

B) Selected passages from 'Dammed by Burma's Generals', Part II, pp 25-49

Karenni Development Research Group, *Dammed by Burma's Generals: The Karenni Experience with Hydropower Development From Lawpita to the Salween*, March 2006.
http://www.burmacampaign.org.uk/reports/Damned_by_Burma%27s_Generals.pdf

The first large hydropower project in Burma was built on the Balu river at Lawpita Falls in Karenni State nearly fifty years ago without any consultation with the Karenni people. The Balu *chaung* flows out from Inle lake in Burma's Shan state; it is a tributary of the Pawn river, itself a tributary of the Salween, one of the great rivers of Asia. Before the hydropower project, the the Balu *chaung*, moved down sometimes swiftly, sometimes gradually, into the deeply cut valley of the Pawn river some 670 m below. The Lawpita falls a series of spectacular cascades in three groups of waterfalls was the most spectacular part of the descent of the Balu *chaung*. The waterfalls and rapids are spread out over a total of 19 km with some sections dropping long distances off oddly carved and encrusted limestone formations. The wider area around the falls features caves, sinkholes and high limestone escarpments. The natural beauty of the falls has been largely lost as a result of the construction of the dams and the diversion of the bulk of the water flow.

The idea of harnessing the natural drop of Lawpita falls for the production of hydropower was initiated in 1950 in accord with a bilateral war reparation agreement between Japan and Burma. Lawpita was the first large-scale hydropower project in the country and to this day the plants remain one of the most important sources of electricity for central Burma. Despite its name, Plant No. 2 was the first power station to become operational. It was built in two stages each consisting of the installation of three 16-MW generators that operate on a rotational basis to produce 168 MW of power. It is located on the highest of the cascades of Lawpita Falls, some 40 km south-east of the Moby dam. Both plants are known locally as "Lawpita Plants No 1 and No 2", while internationally they are known as "Baluchaung I and II."

Moby dam was built on the Balu *chaung* in order to divert water to the hydropower plants. The dam -- 11 meters in height according to some who worked on its construction -- is on the border of Karenni and Shan states. Nearly all the reservoir lies inside Shan state. It stretches south from Inle lake about 60 km and has an average width of three to five km, covering a total area of approximately 207 sq km -- almost 25% bigger than Inle lake itself. Water is diverted from the reservoir to the plants in order to generate power.

An article in the state-owned newspaper Bo Tahtaw of 21 June 1969, explained: "When the Lawpita project is expanded, the aim is not only to utilize the power stations but also to give water to over 25,000 acres of fallow lands for agriculture. This project will also create work for the people of Moby and Kayah State." These visions and promises have not been realized. Far from bringing development to the Kayah people, the utilization of water for the power plants has caused water shortages and robbed local farmers of control

over a vital resource. The authorities have made it clear that power generation is more important than farmers' needs.

After the construction of Plant No 2, farmers were not permitted to draw sufficient amounts of water from the Balu *chaung* with traditional water scooping wheels, particularly when water levels were low. This low-tech system of irrigation had been used for generations and when it was cut off, crop production was severely impacted and the traditional patterns of subsistence farming were shattered. Power station engineers determined the supply of river water without consulting local farmers and residents. These decisions were made by engineers from different sections of the plant, according to how much water they needed for efficient electricity generation. The mechanical and irrigation engineers would submit their proposed [water] management solutions to the authorities. The order would then come from the BSPP [Burmese Socialist People's Party] forbidding the farmer or villagers use of water upstream from the plant. Electricity for Rangoon and Mandalay came first, the local villagers and farmers came second.

Occasionally, the release of dam water also causes crops to be flooded. Unnatural and unseasonal flooding occurs when the dam water is released in the rainy season, destroying crops already planted. Flooding of rice farms is an expected annual event -- the flooding helps irrigate the newly planted rice crops. But recent floods are anything but natural. They correspond to the decision of the authorities' to open the gates of Moby Dam further upstream on the Balu *chaung*. Combined with natural flooding during the rainy season, the excess of water flow in the river overflows the banks of the river and floods nearby farms downstream. The authorities do not consult with the farmers about this, or give any notice when they intend to open the gates.

To conserve water in the dry season and regulate water flow, construction of a second dam, the Dawtacha, began in 1988. Water was diverted to the Dawtacha reservoir for use at the power plants. The farms below the reservoir were deprived of water and those above it were flooded. Six hundred acres of farmland around Dawtacha village were flooded, and 2,000 acres of farmland in small villages above the reservoir became fallow due to the lack of water. This has now been turned into a vast landmine field. The Dawtacha dam, smaller than the Moby, was built in order to store water closer to the power plants for better flow control. Plant No 1 is located close to Plant No 2, but receives water from Dawtacha dam and has an installed capacity of 28 MW.

The residents below Moby dam used to catch fish by blocking the waterway and swilling out the water, using meshed bamboo traps and bamboo nets. The Inthas, Shans, Kayahs, and Kayans who lived above the Moby dam were well equipped with motorized fishing boats and fishing nets. They made a reasonably good living from fishing before the dam was built. Plenty of fish such as banded and short-headed snakehead, eels, carp, featherback and different kinds of catfish were commonly found in the river. But about five years after the construction of the dam, the fish catch fell off and the numbers engaged in the fishery started to decline. A villager from Kwa Long (upstream of the dam and five kilometers from Pekhon) explained that before the dam all fifty households in his whole village had fishermen. One person could get up to 40 viss (64 kilograms) of fish per day, but presently there were only two fishermen in the whole village and they could only manage to catch 4 or 5 viss (6.5-8 kg) of fish in a day. Villagers also complain that there is a bad smell in the reservoir and that some fish are diseased.

Before the power station was built residents could freely forage in the surrounding forests. But after work began Burma Army soldiers ordered the locals to make their homes in prescribed areas and their movements were restricted. Most submitted to the regulated lifestyle without complain, but after a time military units made them move to new locations alleging security concerns. Some grappled for their livelihood by cultivating small plantations, peanuts, and dry farm plots along the Lawpita-Lawdalay road. Others, deprived of farm plots, had to turn to relatives in distant villages for support as their own farm plots were covered with landmines. Many had to pay for permits from the authorities to cultivate farm plots at some distance. Eventually, for many, it became too difficult to survive and they fled to Thailand

Contrary to promises made when the power stations were built, most of Karenni state inhabitants still receives no electricity. A 402-km-long high voltage transmission line carries the power produced to Rangoon, while another 400-km-long high voltage line runs to Mandalay. There are seven villages in

Mahtawkhu tract and thirteen in Lawpita tract, both close to the hydropower plants. These villages lie within the security zone of the plants, but no one has bothered to provide them with electricity. Only three towns -- Loikaw, Demawso, and Pruso -- are scantily supplied with power and rural areas have no access. The power supplied to the towns exists in name only; the military bases, government offices, officers' flats, and businessmen's houses receive full supply, ordinary people have to be content with a low voltage line.

When the Moby dam was built, many households in the area were evicted to make way for workers' barracks, staff quarters and equipment storage areas. Two thousand workers -- primarily laborers from central Burma but also including Burmese, Japanese, Swedish, and UN engineers -- were brought into the area and provided with housing. After the dam was finished the authorities distributed the land belonging to the Karenni farmers to the migrant workers who had been engaged on the construction project. The former owners received no compensation. It was later learned that the authorities had promised the laborers from central Burma ownership of farmlands in Karenni state. Some locals only learned what was going on when water from the reservoir started to approach their villages. According to local sources, the infill of the dam reservoir in 1972 caused the displacement of over 8,000 families in Pekhon township. No compensation was offered for the loss of lands or livelihood. For homes, the fixed sum of 327 kyat was offered. Most people reportedly refused the payment in anger; the phrase "only enough to pay for the stairs" was commonly heard. An anti-dam construction committee made up of local leaders formed in 1963. They wrote several complaint letters and met with officials, but the only thing they received were threats of arrest. Finally, the group formed the Kayan New Land Party which became an armed resistance in 1964.

In 1961, after the first stage of Plant No. 2 was completed, the Burma government stationed IB No 54 in Loikaw and built up its numbers to between 700 and 1,000 soldiers. Military camps were stationed in the towns of Loikaw, Demawso, Pruso, Pasaung and financially viable areas such as the Mawchi tin and tungsten mine and the Lawpita power plants. At the time, the Karenni resistance forces virtually dominated the rural regions, causing the Burmese government much apprehension for the security of the towns and the power plant. This in turn led to increased human rights abuses by Burma Army troops.

Eventually, five hundred Burma Army troops were stationed at Lawpita in 1974 to guard Plant No 2 and the pylons for the power line. About 400 residents from the Lawpita village tract were evicted to make way for the battalion base. The evicted villagers were not told where to move to; they had to resettle in nearby villages on their own. In time, as the number of staff employed at the plant grew and other labourers came to work there, the land they needed for cultivation was expanded and the land available for long-time residents was cut back, forcing many to move to other locations.

Karenni farms were also confiscated without compensation during the 1980s to make way for the construction of Plant No 1. Local farmers sent petitions to the authorities but to no avail. These arbitrary measures caused deep resentment and led to sporadic attacks on the high voltage cable pylons. Skirmishes broke out between Karenni and Burma army troops around the power plants. KNPP forces regularly attacked security forces at the power plants during the 1980s until the Burma army evacuated villages around the stations and planted landmines in the area.

Landmines were also planted at the base of every high voltage transmission pylon so that armed groups could not destroy them. Villagers near the pylons had to provide fencing for areas around the base of the pylons. They were and still are forced to cut brush in the area around the transmission line. Many civilians have lost their limbs and lives due to the explosion of landmines planted around the power plants and lines. As of 2001, 30 civilians had been killed and another 50 injured by landmine explosions in the Lawpita region.

Compiler's note: The pdf version of this report has many excellent pictures, maps and charts.

C) Information from the websites of [Japanese corporations](#) involved in the planning and construction of the Lawpita power plants

NEWJEC Inc www.ecfa.or.jp/english/pdf/newjec.pdf

- Baluchaung No 1 Hydropower Project (28.8 MW)
Design, Supervision and other services, contracted by OECF, 1984-1992
 - Baluchaung No 2 Hydropower Project (168MW)
Other services, contracted by OECF, 1990-1994
 - Baluchaung No 3 Hydropower Project (48MW)
Feasibility study contracted by MEPE, 1994-1995
- N.B. 'Other' could include sector study, basic design, project Formation, evaluation
OECF = Overseas Economic Co-operation Fund (Japan)

Nippon Koei Co Ltd <http://www.n-koei.com/english/profile/index.html>

- Balu Chaung No 2 Hydroelectric Power Development: 1st Stage Power:
Run-of-river type, net head 425.2 m, 84,000 kW, 235 GWh/year T/L: 230/132 kV, 770 km
Responsible for study, detailed design, construction supervision, operation, maintenance
1954-1964
- Balu Chaung No. 1 Hydroelectric Project:
Installation of 28 MW at No 1 power station to increase system capacity, supply of 200 GWh per annum hydropower to existing system, improvement of the existing output of No 2 power station to 168 MW, 146 GWh.
Responsible for detailed design, construction supervision
1984-1992
- Rehabilitation of Baluchaung No. 2 Hydropower Plant
The project aims to improve power generation efficiency of Baluchaung No 2 Hydropower Plant, which supplies 20% of the nation's electricity. The rehabilitation work consists of replacing and repairing severely deteriorating facilities and machinery such as transformers, supplementary machinery of turbines and control panels. Responsible for basic design. 2001-2002.

Marubeni http://www.marubeni-powersystems.com/business/epc_plant/en_baluchang.html

- Baluchaung No 2 Hydropower
This is Marubeni's first project in the overseas market. Baluchaung No 2 hydropower plant accounts for about 24pc of the annual electricity production in Myanmar. The power plant and three of six generators were installed in 1960 with postwar reparations from Japan; the other three were installed by Myanmar in 1974. If the plant were left in its present condition it would have to cease operations due to damaged water turbines or fires caused by insulation failure. The plant was partly renovated with a loan extended by Japan in 1986; rehabilitation work was completed in 1992 on first three generators, on the second three, in 1994 2001-2002.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)

In September 2001, Tokyo Electric Power Co and Nippon Koei, a Japanese engineering company, were awarded a modernization contract for the Hitachi Pelton turbine/generator (T/G) sets at Baluchuang-2 (6 X 28 MW).

Compiler's Note: See entries below from the Working People's Daily (10/08/92) for other Japanese companies involved in work on the Lawpita plants.

D) References to the [Lawpita hydropower plants 1 and 2](#) and dams in on-line journals

Data summary: [Balu No 1](#)

Data summary: [Balu No 2 \(2nd\)](#)

Data summary: [Balu No 2 \(1st\)](#)

Working People's Daily, 05/07/92. <http://www.ibiblio.org/obl/docs3/BPS92-07.pdf>

The Dawtacha diversion dam of the No 1 Baluchaung hydel power station in Lawpita, Loikaw township. was inaugurated July 1st. Begun in 1987, the project includes a 36-foot-high, 1,736-foot-long earth dam, a four-

mile-long, 22-foot-high, 15-foot-wide concrete canal, 6,647 feet of 13-foot steel pipes and 527 feet of 6 to 12 foot steel pipes, and two 14-megawatt power engines. The new station will produce 28 MW.

WPD, 10/08/92. <http://www.ibiblio.org/obl/docs3/BPS92-08.pdf>

Biluchaung No 1 hydroelectric power plant was inaugurated in Kayah State on 09/08/92 in the presence of Energy Minister Khin Maung Thein, SLORC Secretary-2 Tin Oo, Japanese ambassador Tomoya Kawamura, Pres T. Nishigori of Newjtec Engineering, GM O Inaba of Mitsubishi Corp., Pres T Yamato of Sakai, Sr GM Y Uebori of Kajima, Project Manager Hla Maung and others. The plant, begun in 1987, has two 14-MW turbines.

WPD, 02/01/93. <http://www.ibiblio.org/obl/docs3/BPS93-01.pdf> [doc p 48]

Special Projects Implementation Committee receives a report on the Balu Chaung No. 3 hydel project to be carried out in Loikaw township.

Article authored by DTS entitled 'Burma's electricity problems' published in April 1999

<http://www.burmalibrary.org/reg.burma/archives/199904/msg00395.html>

Lawpita machine needs water flow of 1,600 cu ft/sec to produce 196 megawatts

NLM, 27/10/99. www.myanmargeneva.org/99nlm/n991027.htm

Gen Maung Aye inspected the power plant at Baluchaung No 2 hydel power project at Lawpita. Officials reported on rainfall of Loikaw and its surrounding areas, inflow of water to Moebye reservoir and Innlay lake and storage capacity of the two water bodies, power generation of Baluchaung No 1 and No 2 hydel power plants, the condition and maintenance of the plants, and efforts being made to improve the inflow of water to the reservoir. EPM Tin Htut explained systematic arrangements being made for durability of the power plants and staff welfare programmes. Commander Maj-Gen Maung Bo and Minister Maj-Gen Nyunt Tin explained tree plantation and related tasks in beautifying Innlay lake.

Mizzima, 06/02/03. www.mizzima.com/archives/news-in-2003/news-in-feb/06-feb03-06.htm

Due to the shortage of rainfall in Kayah state in the last rainy season, run-off has fallen causing the generators at Lawpita power station to slow down. It is expected that the wattage will continue to decline this year. Because of drought conditions over the past 3 years, only one of the three generators at Lawpita hydro-power plant could operate and wattage has declined up to 50% of total output.

NLM, 11/05/03. <http://www.myanmargeneva.org/03nlm/n030511.htm>

Forestry Minister Aung Phone reports on the forest and wildlife conservation project within the 20-mile-stretching area of Inlay Lake and on measures being taken to prevent forest extraction and extension of farmland in the 20-mile area surrounding Inlay Lake. Deputy Ag & Irrig Minister Ohn Myint reports on the prevention of silt in the creeks which flow into the lake [and] conservation of the water resource in order to supply water to Lawpita hydel power plant. Inlay Lake supplies water to Moebye Dam which controls the flow of water to the Lawpita power plant.

NLM, 05/07/03. <http://burmalibrary.org/docs4/NLM2003-07-05.pdf>

Lt-Gen Aung Htwe of the MoD inspects the Moebye Reservoir where he is briefed on the supply of water from the reservoir. He gives instructions on storing the desired amount of water and arrangements for the supply of the required amount of water to the Belu Creek Hydel Power Station.

NLM, 28/04/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040428.htm>

At Moebye dam, Brig-Gen Taung Aye oversees power supply facilities at the dam. He is briefed on the storage of water and water supply tasks. The dam facilitates water supply to 19,942 acres of farmland.

Democratic Voice of Burma, 23/04/05. <http://six.pairlist.net/pipermail/burmanet/20050425/000683.html>

The SPDC claims that the KNPP [Karenni National Progressive Party] insurgents mined an electric power pylon on the grid linking Lawpita hydropower station and Toungoo. The report published in the Myanmar Alin on 23 April failed to give details on why the pylon was mined and where it was located. Foreign Affairs Director Saw Doh Hsay of the KNPP said the explosion had occurred near Tower 130 close to the border of Toungoo township. He said the Lawpita hydropower station had been in service for more than half a century

without the Karenni people having the right to use the electricity. Those who live in the vicinity of Lawpita still had to rely on lamps and candles, while the Burmese military junta had been supplying electricity to benefit major industries in Rangoon and Mandalay.

Aye Aye Win: AP: 04/01/06 www.irrawaddy.org/article.php?art_id=5335

A shortage of funds, lack of rainfall and rising demand for energy have resulted in frequent power cuts in Rangoon, disrupting livelihoods and affecting the economy. The city of five million needs 450 MW of electricity daily, but generating capacity at present stands at only 385 MW. An official of the Electric Power Dept said electricity rationing could last until June, a month after the monsoon rains set in. He said the generators at the Lawpita hydroelectric plant could not operate at full capacity due to lack of rainwater in the reservoir. Other generators have broken down and cannot be repaired for lack of funds. Shortage of natural gas has shut down some gas-powered generators. Lawpita, located 210 miles (350 km) north of Rangoon is an important source of electricity for city.

Khun Sam, IRROL, 15/03/06. http://www.irrawaddy.org/article.php?art_id=5559

An environmental impact report has condemned Burma's proposed dam projects on the Salween River, warning that vast tracts of land and thousands of Karenni villagers would be at risk if the projects were to proceed. The report, *Dammed by Burma's Generals*, was prepared by the Karenni Development Research Group (KDRG) -- a Mae Hong Son-based forum comprising nine civil society groups -- and raises serious concerns about the potential impact of the projects, particularly in light of previous experience with the Lawpita hydropower plant in Karenni State. A spokesperson for the group, Aung Ngeh, cited the Lawpita hydroelectric plant -- built in the 1960s -- as an illustration of the likely problems to be faced as a result of future projects on the Salween River. He challenged the claims by Burma's military junta that Lawpita had successfully increased energy and irrigation output, claiming to the contrary that Lawpita had been responsible for forced displacement, electricity and water shortages, increased militarization, human rights violations, and an increase in landmine installations to protect the site from attack by ethnic rebels. The KDRG report claimed the Lawpita project caused flooding over 200 square kilometers and the loss of an estimated 12,500 homes and farms, with the majority of people who lost their homes not receiving any compensation from the government.

NLM, 23/06/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060622.htm>

Brig-Gen Thaung Aye, Forestry Minister Thein Aung, EPM No 1 Zaw Min and Loikaw Station Commander Hla Myint Shwe and officials inspect storage of water, functions of the water intake building, valves of the sluice gate and supply of water to No 1 Power Plant at Dawtacha dam near Loikaw. Biluchaung No 1 power plant is equipped with two 14-MW generators and generates 200 million kWh annually, supplying Toungoo, Yangon, Kalaw, Thazi and Mandalay through No 2 Power Plant (Lawpita). They also inspect operations at Biluchaung No 2 power plant which has six 28-MW generators and produces 1,200 million kWh annually. The electricity is supplied to Yangon, Kalaw, Thazi, Mandalay, Taunggyi, Loikaw, Moebye, Dimawhso, Pruhsu and other townships through Toungoo and Hlawga sub-power stations. The party also views Moebye Lake and the valves and supply of water to the Lawpita power station.

NLM, 18/02/07. www.myanmargeneva.org/07nlm/n070218.htm

Lt-Gen Kyaw Win of the Ministry of Defence and party arrive at Baluchaung No 1 hydro-electric power station (Lawpita) on the right bank of Balu Creek, about 10 miles south-east of Loikaw and inspect operations at the station. They also visit Baluchaung No 2 hydro-electric power station (Lawpita) about 14 miles east of Loikaw. The manager of the station reports that the plant is generating at full capacity. Measures are taken to ensure machinery repair within 4 or 5 hours of any breakdown. Baluchaung No 2 station was built in 1960 and is the biggest in the country. It can generate 1,200 million kWh annually. Baluchaung No 1 station was built in 1992 and it can generate 200 million kWh annually.

Japanese Embassy in Myanmar, 01/06/07.

www.mm.emb-japan.go.jp/profile/english/press/2007-06-01.htm

The Grassroots Grant Assistance Scheme (GGA) has granted US\$151,646 for two humanitarian assistance programs in Thai-Myanmar border areas. One of the projects is for the construction of a water supply system in the Moebye village tracts in Shan state. It includes the area where the Kayan National Guard (KNG) has partial autonomy. Because of a long-lasting war fought in the area, this is one of the least

developed regions in Shan state. At present, the Moby Village tracts have a population of 10,000. There are only ten wells in the area and the people are forced to draw water from the Balu river. The quality of water is not safe for drinking and it is hard on the women and children who have to carry it from the river every day. Local residents launched a water supply project to improve the situation but lacked the financial resources to bring it to fruition, so the project stalled. The committee applied to for grass roots assistance for their project. Considering the dire water situation and the importance of improving the lives of ethnic minorities who have made peace with the government and returned to legal fold, the Japanese government decided to fund the project.

Myanmar Times, 04/06/07. www.mmtimes.com/no369/n002.htm

A statement released by EPM No 2 on May 23 said the country's total electric power capacity is 1,542 MW, but the amount being generated was 782 MW. The hydropower stations have a combined output of 738 MW but have been operating at 58.8pc of capacity because of low water levels in the reservoirs. During the summer season, only the Lawpita hydropower station near Moebwe dam in Kayah state was able to operate at full capacity. Nine natural gas turbines, which have a combined capacity of 450 MW, were operating at 42pc of capacity.

Kyaw Thu, Myanmar Times, 27/08/07. <http://www.mmtimes.com/no381/n009.htm>

Two towers used to transmit power to the national grid were destroyed and a third damaged in an attack by anti-government insurgents [in Thandaung township?] in Karen state on August 14. Explosives were used to destroy towers 206 and 208, and nearly knocked down tower 205. Yangon lost 90 MW due to the destruction of the lines, according to an official of YESB. Some of the shortfall in power supply had been overcome by increasing the supply of natural gas to turbines in Yangon. "We have been getting an additional 6.1 million cu ft of gas per day from the Energy Ministry, so we have been able to increase the output from the gas turbines to partially compensate for the power lost by the explosions," the official said. It will take "at least one week" to repair the towers because they were located in a remote, mountainous region where heavy rain and mudslides can hinder work. The reduction in power supplies has forced YESB to supply power to township according to a rotating system. The townships have been divided into three groups, with two groups receiving 18 hours of electricity and one group getting 12 hours on a given day.

NLM, 01/08/08. <http://www.burmalibrary.org/docs5/NLM2008-08-01.pdf>

Pylon no. 206 near Yado village in Leiktho [tract in Thandaung township] along the 230-kVA Lawpita-Toungoo transmission line was damaged and collapsed as a result of a landmine explosion at 10.40pm yesterday. The mine was planted by KNU insurgents. The Myanma Electric Power Enterprise is supplying electricity to the grid through the Lawpita-Kalaw-Thazi line in order not to disrupt the supply of power. Authorities have urged the people to remain vigilant and to come forward in timely fashion with information about terrorists [who do things like this].

Network Media Group, 20/08/08. [translated from Burmese]

http://www.salweenwatch.org/index.php?option=com_content&view=article&id=175:karenni-villagers-forced-to-guard-electric-towers&catid=34:news&Itemid=56

Residents of seven villages in the Dawplodu village tract of DeMowSoe [Dimawhso] township in Karenni state have been forcibly recruited by Loikaw-based LIB 427 to guard the towers along the power lines between the Lawpita hydroelectric power station and Rangoon and Mandalay. The Karenni villagers have to guard the towers 24 hours every day. According to information officer Kugay of the Karenni Social Welfare and Development Centre the order to guard the transmission towers went into effect starting on August 14, 2008. "Each village has to guard two electric towers, with two people per tower, every 24 hours. The villagers have to bring their own rice packs and necessary things such as a stick and knife." In previous years, villagers were forced to fence the electric power transmission towers and landmines were planted around under the towers, but villagers have never been asked to guard like this, said Kugay. The order was given following an explosion in July which destroyed one of the towers on the [Rangoon] line. When government soldiers arrived to investigate, they were ambushed by troops of the Karenni National Progressive Party (KNPP).

NLM, 14/09/08. <http://www.burmalibrary.org/docs6/NLM2008-09-14.pdf>

Inspection of the water storage facilities at Moebye Dam. [A photo of the sluice gate is included in the print edition of NLM.]

NLM, 06/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-06.pdf>

On 15 May 2007, a project to establish an industrial ward [in Loikaw] was launched by driving stakes, cutting down wild plants, installing power lines and constructing infrastructural buildings. So far, the ward has over 60 industries such as a bean grinding mill, an edible oil mill, a plastic factory, iron foundry, sawmill, and paper mill. . . . Almost all the mills and factories can operate round the clock owing to the supply of electric power from Lawpita hydropower station.

NLM, 16/11/08. <http://www.burmalibrary.org/docs5/NLM2008-11-16.pdf>

At the co-ordination meeting (1/2008) of the Special Projects Implementation Committee in the office of the Commander-in-Chief (Army), EPM No 1 Zaw Min gave a brief account of six completed projects, 22 ongoing projects and 15 hydropower projects that call for the approval of the Committee. [Among the the fifteen are] the Bilu Creek No 3 hydropower project (48 megawatts) in Bago [sic] division.

NLM, 01/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-01.pdf>

The gas pipelines of the Yadana natural gas project have been under maintenance since 24 January. So, production [of electricity at natural-gas fired plants] has fallen to some extent. In the meantime, power supply was increased from hydroelectric sources to cover demand. But on 26 January, some KNU and KNPP terrorists blasted towers 220 and 222 of the Lawpita-Toungoo grid near Thaukyaykhat creek, so the supply of electricity available is limited and the regions concerned will have to share. Efforts are being made to restore regular power supply as soon as possible.

NLM, 10/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-10.pdf>

A file photo of the exterior of No. 1 Bilu Chaung hydropower plant on the right bank of Bilu creek, 13 miles southeast of Loikaw is included in the print edition of NLM. The plant is said to generate 200 million kWh of electricity annually.

NLM, 14/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-14.pdf>

Accompanied by varrous generals and government officials, Prime Minister Thein Sein arrived at Lawpita village where they were welcomed by departmental officials of the Hydropower Generating Enterprise on Feb 10. At the construction site of Biluchaung No. 3 Hydropower Project, the PM heard reports by Col Zaw Min of Electric Power Ministry No 1 on the implementation of the Biluchaung hydropower projects and on the progress being made on Biluchaung No 3 project. At Biluchaung No. 2 Hydropower Plant, the Prime Minister and party were welcomed by Managing Director U Kyi Tha of Hydropower Generating Enterprise and staff. The PM viewed generating of turbines in the control room. [Photos of the control room and switching yard at Biluchaung No 2 power station are included in the print edition of NLM.]

E) Documentation related to the controversy surrounding [Japanese aid](#) for repairs to the generating facilities at Lawpita Plant No 2 in 2001/02.

Jiji Press (Japan), 05/04/01. [unofficial translation]

<http://www.burmalibrary.org/reg.burma/archives/200104/msg00028.html>

It is revealed on 4th April that the Japanese government is to provide aid for repairing an old power plant in Myanmar. It will be executed within the year and total 3.0 billion yen to 3.5 billion yen. (\$24 million to \$28 million.) It will be the largest aid since the beginning of Japanese sanction against the country in 1988. Japan wants to use the aid to support a move of national reconciliation, that is, resumption of the "political dialogue" between the junta and opposition groups led by Ms. Aung San Suu Kyi.

Tetsu Hakoda, *Translator's Note on Japanese Aid to Burma*, Burma Net News, 08/04/01.

<http://www.burmalibrary.org/reg.burma/archives/200104/msg00028.html>

The Baluchaung hydroelectric power plant in Kayah state was built in 1960 using Japanese war reparations funds for Burma. In 1981, Japan gave loans of 16 billion yen [to fund the construction of Baluchaung No 1 plant] and 3.53 billion yen in 1986 for repairs to Baluchaung No 2 plant.

A Japan Times story covered the matter of a new loan for repairs to Baluchaung plant no 2 on 14th February 2001 under the headline 'Japan readies fresh ODA for Myanmar.' It reported that Japanese government sources had said that Japan would consider carefully the timing of any overseas development assistance for the Baluchaung power project at the same time as it kept a close watch on political developments in Burma and on international circumstances surrounding the south-east Asian country. The Jiji report shows that Japanese government has stepped up its procedures with regard to the aid. The Ministry of Foreign Affairs is also deeply involved in the decision making process.

The issue was raised four months ago in Sankei Shimbun, a Japanese rightwing newspaper. It reported on 18 December that in January 2000 JICA had sent a mission of inquiry to Burma that carried out research on the Baluchaung power plants for three months. The mission report urged the necessity of emergency repair work. If not carried out, it said "the power plants will not work properly in the near future." Japan had been trying to present the assistance to the SPDC as humanitarian aid. However, the project had been stopped in the face of the political deadlock in Burma, the article said. Sankei reported that the Yugoslav government had estimated the costs of the repair project at US\$33 million last year. A source reported that Yugoslavia and the SPDC had reached basic agreement on the aid at the beginning of December. Sankei, well known for its extremely hostile attitude to China, worried that the Chinese government would give financial support to Yugoslavia using Japanese ODA funds provided to China, since Yugoslavia didn't seem to be able to finance the project completely by itself.

It's not certain that China will provide funds to Burma through Yugoslavia. However, the airing of the issue does seem to reflect concern on the part of some anti-Chinese policy makers in Japan. These government officials and MPs have been very sensitive to China's growing influence in Burma. Some Japanese assistance in Burma, such as the meeting held last December to support structural reforms for the Burmese economy, has been provided for the purpose of lessening China's influence in Burma. The Sankei article ended with an expression of nationalist antagonism to China: "If Japan ignores this matter, it is possible that hydroelectric plants build by Japanese aid will carry another nation's flag and China will snatch away the benefits resulting from Japanese aid."

Anyway, it is clear that the Japanese government is heading for the first fresh aid to the junta since 1998. At that time, they justified assistance for upgrading the runway at Mingaladon airport in Rangoon as a form of 'humanitarian' aid, needed to secure passenger safety. Ironically, All Nippon Airways (ANA) pulled out of Burma in March 2000 and now there are no direct flights between Rangoon and Kansai or Narita. The Japanese government is trying the same maneuver that it used in 1998. It is using the term 'humanitarian assistance' for the Baluchaung repair project and saying that the aid will stimulate a move towards 'political dialogue' between the NLD and SPDC, the exact content of which is still not known.

Nobody knows where the 'dialogue' will lead to. The international community is watching the current situation with cautious optimism. For example, the EU is sticking to its sanctions policy. ILO sanctions are still on because of the SPDC's complete failure to tackle forced labor problems. In addition, there are still a lot of problems in the border area. The number of refugees and IDPs fleeing from the SPDC offensive against ethnic forces, the killings, rapes, forced labor, forced relocation and other serious human rights abuses are on the increase. It is hardly possible to say that SPDC is really heading for true national reconciliation. It is really the policies and concrete activities of the junta that make 'humanitarian' assistance necessary for people both inside and outside Burma. The Japanese government must review its project-oriented involvement in Burma based on the plentiful evidence of the SPDC's failure to tackle almost all kinds of problems in Burma. It must first urge the junta to stop human rights abuses against its people and to release all political prisoners, including Daw Suu Kyi.

Central Committee, Karenni National Progressive Party, *Statement regarding the plan of the Japanese Government plan to provide US\$24 million to the SPDC to repair Lawpita hydro-power plant and to build another power plant at Lawpita, Karenni State, 24/04/01.*

<http://www.burmalibrary.org/reg.burma/archives/200104/msg00004.html>

1. The present Lawpita hydropower plant was built in 1952 by Japanese engineers. It was paid for using Japanese war indemnity funds. Despite being located inside Karenni State, successive military regimes in Burma have never allowed Karenni civilians to use the electricity. The power plant distributes its electricity to the rest of Burma, in particular to the country's two largest cities, Rangoon and Mandalay.
2. Since the SPDC took over, seven villages have been forcibly moved out of the Lawpita area and 10,000 anti-personnel landmines have been laid there. The mines in this massive field have caused death and injury to numerous Karenni villagers and tens of hundreds of cattle belonging to the villagers.
3. Should the proposed extension to the Lawpita power plant go ahead, more dams will be built which will destroy tens of thousands of acres of farmland and even more people living on the Karenni-Shan border will become homeless.
4. Due to the abnormal weather patterns in 1998, lakes and rivers, including the Mang Pai Dam, dried up. Since the Bilu river, the main source of water for the Lawpita power plant, went dry there was not enough water to power the generators. In order to obtain more water for the power plant, the SPDC blocked all the streams and irrigation on which Karenni farmers depend for their farms. As a result Karenni farmers faced a shortage of water on their farms and crops failed and even essential consumption needs were not met.
5. The SPDC is now facing a shortage of electricity, since the Lawpita power plant does not produce as much electricity as it did in the past, due to the shortage of water from the Bilu river.

The SPDC has met with NLD leaders to gain help from international community. The SPDC will be able to solve many political and economic difficulties it is facing, if the Japanese government helps to repair the Lawpita power plant and build another power plant. The SPDC will continue to violate basic human rights, once all the difficulties it is facing are met. In reality the sanctions imposed by the international community against the SPDC and the shortage of electricity in Burma serve to put pressure on it.

The Japanese Government will automatically break these sanctions, if it funds the building of a new power plant or repairs the original plant.

The KNPP requests that plans to rebuild or repair the Lawpita Dam be stopped. Due to the past history of SPDC action in this area we believe there will be no benefit to local people and numerous disadvantages. Should the plans to build it go ahead, we believe that it will only serve to further entrench and empower a government that holds no regard for the people of Burma.

Thomas Crampton, International Herald Tribune, 26/04/01.

www.ihf.com/articles/2001/04/26/burma_ed3_.php

To support secret talks between opposition leaders and Rangoon's military government, Japan has quietly approved the largest grant aid package since Burma's ruling generals cracked down on pro-democracy demonstrations in 1988. The move, which breaks a long-standing de facto ban on bilateral international assistance to Burma, took place in consultation with the United Nations and the United States.

Sources familiar with the progress of the United Nations-brokered talks in Rangoon said the grant, which sets aside ¥3.5 billion (US\$28.6 million) for reconstruction of turbines in a hydropower dam, was intended to serve as a tangible reward to the military government for having kept open a dialogue with the opposition leader Daw Aung San Suu Kyi.

Rehabilitation of the Baluchaung dam was agreed to earlier this month and quietly announced during a little-publicized visit to Tokyo by Burma's deputy foreign minister, Khin Maung Win. The dam, in eastern Kayah province, was built by Japan in the 1960s as part of war reparations. Japanese consultants will leave for

Burma in the next few weeks to draw up a feasibility study. The agreement was not announced in Burma's official press and went unnoticed by many observers, including Rangoon-based diplomats.

The reconciliation talks started last October at the prompting of a new UN special envoy, Razali Ismail. "This is a very significant move by Japan," a Rangoon-based source said. "Japan has been trying to keep it quiet yet cooperate with Razali to reward progress for the talks." Mr. Razali overcame years of stalemate to start talks between Daw Aung San Suu Kyi and leaders of the military junta. The talks remain secret, but some of the government's more virulent propaganda against Daw Aung San Suu Kyi has eased. In another hint of progress, the Burmese government earlier this month let in an envoy from the UN human rights office for the first time in five years.

Dr Thaung Htun, Representative for UN Affairs, NCGUB, [at the Tokyo Press Club], 21/05/01.
<http://old.ncgub.net/Views/Statement%20made%20by%20Dr.%20Thaung%20Htun.%20Representative%20for%20UN%20Affairs.%20NCGUB%20may%2021.%202001.htm>

We are quite concerned about the recent approval of the grant of ¥3.2 billion to fix the turbines at the Lawpita power station and the Baluchaung dam. We were told that the assistance is "humanitarian" because it will help lower the price of electricity and make it more accessible to the poor and will help prevent accidents and the blackouts which are having a serious impact on hospitals.

Let me explain about Japan's grant for the hydroelectric power plant in Lawpita. The refurbishment of the Lawpita hydroelectric power generation plant alone is not enough to resolve the power problem in Burma. Even with full power generation of 180 MW from Lawpita, an increase in output of 27pc, Burma's power generation would only be about 620 MW -- way below the current national demand of more than 1,200 MW.

What is more disturbing is the current electricity distribution system in Burma and figuring out ways to increase the power supply to to the people it is intended to reach. The current electricity distribution incorporates a system of special privileges and priorities that is discriminatory to ordinary citizens. Selective groups of people or certain categories enjoy reduced tariffs or simply pay no tariff at all at the expense of ordinary consumers. The electricity shortage is but one symptom of the socioeconomic crisis that can be attributed to a government that lacks transparency and accountability and is unresponsive to the needs of the people.

Compiler's Note: The entry: '[Special privileges](#) alleged in electricity distribution system', provides details about the system referred to by Dr Thaung Htun in his presentation. It was handed out at the media conference.

Mekong Watch, *Japan, Development, Environment and Human Rights in Burma/Myanmar: Examining the Impacts of ODA and Investment: Public Symposium Report*, Tokyo, December 15, 2001.
<http://www.mekongwatch.org/english/documents/burmareport-screen.pdf>

A major portion of the Japanese war reparations to Burma was used for construction of the Baluchaung hydroelectric power plant in Karenni (Kayah) state. Another portion was used for the so-called 'four major industrialization projects', including production of light and heavy vehicles, farm machinery and electrical machinery. These projects began in 1962 and lasted until 1988 and changed in character from projects associated with war reparations to 'quasi-reparations'. Official Development Assistance (ODA) in the form of yen loans replaced war reparations in 1968. Grant aid was started in 1975.

Excerpt from remarks by Teddy Buri, exiled MP-elect for Karenni State at the Tokyo Press Club. Baluchaung was the first power plant built by the Japanese with war reparation money, but the electricity produced there goes to power industries in central Burma. Not only are local Karenni people unable to enjoy the electricity, but they also have to provide unpaid labor. They have to carry water, look for firewood, and

guard the power pylons and power lines. Why do they have to guard them? Because Karenni State, my state, is a militarily contested area. We have the Burmese troops there, as well as the Karenni resistance troops. They are often fighting. It is because of that that the villagers have to guard the pylons and power lines.

This hydropower plant is so old that it needs renovation, so the Japanese government is bent on giving this 3 billion yen to renovate it. If this plant is renovated, more security will be needed. There will be a bigger presence of the military then. With a bigger military presence, more forced labor will be demanded of the people. They certainly won't be able to return to the villages they were relocated from.

Before giving aid, the Japanese government should place some conditions that there will be no forced labor, conditions that the money is used in a way that is transparent and accountable. The grant should be used as a lever to ensure that the talks between Aung San Suu Kyi and the regime make some progress. Unless there is progress in the talks, this ODA should not be extended to the Burmese generals. Otherwise the money will go to expand the army that is used to suppress the people.

Kyodo: 25/02/02 http://findarticles.com/p/articles/mi_m0WDQ/is_2002_Feb_25/ai_84260071

Myanmar Foreign Minister Win Aung said Friday that Japan's stalled grant aid of \$26 million to repair an ageing hydroelectric power station in his country was "nothing" in comparison with national pride. Win Aung said Japan is reluctant to help Yangon repair the Baluchaung power station in Lawpita in Kayah state. Instead he praised China, saying, "A friend in need is a friend indeed," though he stressed that China has provided "no big loan" to Myanmar and has invested little in the military-ruled country. Japan has urged Myanmar's SPDC to engage in dialogue with the opposition NLD and the party's pro-democracy leader Aung San Suu Kyi. Japanese officials have suggested that the anticipated grant is one of the elements that keeps the way open for Japan to communicate with Myanmar's leaders. Win Aung said the dialogue between Myanmar's junta leaders and the NLD "will move forward." He declined to give any clue about the dialogue contents but said he is satisfied with the momentum of the talks. He neither confirmed nor denied a report that the SPDC's Gen Than Shwe held discussions with Suu Kyi on 22/01/02.

Ministry of Foreign Affairs, Japan, *Grant Assistance to Myanmar for Rehabilitation of Baluchaung No 2 Hydropower Plant*, May 10, 2002. www.mofa.go.jp/announce/announce/2002/5/0510.html

1. The Government of Japan decided to extend emergency assistance of up to 628 million yen to the Union of Myanmar for the project: 'Rehabilitation of Baluchaung No 2 Hydro Power Plant'. Notes to this effect were exchanged on May 10 in Yangon between Mr. Shigeru Tsumori, Japanese Ambassador to Myanmar, and U Soe Tha, Minister for National Planning and Economic Development of Myanmar.

2. Myanmar has been suffering from a chronic power supply shortfall caused mainly by the shortage of fuel for thermal power plants and problems with existing power generation equipment. Since 1990 the situation has been so serious that the country needed to cut off the power supply for six to twelve hours a day.

The Baluchaung No. 2 Hydro Power Plant is the largest power plant in Myanmar with an installed capacity of 168 MW. It accounts for about 24pc of the total annual electricity production in the country. The power plant and three of six generators were installed in 1960 using postwar reparations from Japan. The remaining three were installed by Myanmar in 1974. The plant was partly renovated with a loan extended by Japan in 1986 that kept it in operation. If the plant were left in its present condition it would be necessary to close it down completely owing to damage caused to the water turbines or fires caused by insulation failure. This would have an enormous impact on the daily life of people in Myanmar.

In this situation, the Government of Myanmar formulated a rehabilitation project and requested grant assistance from the Government of Japan to procure materials and equipment to repair heavily damaged

parts such as water turbines, generators and electrical transformers, replacing part of the equipment and adding electric lines.

3. The project will prevent serious accidents in the plant and will enable the distribution of a stable power supply needed by the people of Myanmar.

4. The Government of Japan welcomes the lifting of the restrictions on the movements of Daw Aung San Suu Kyi on May 6. Japan supports Myanmar's efforts for democratization and nation building, and from this point of view has decided to extend this grant assistance.

Aye Aye Win, AP, 10/05/02. <http://www.highbeam.com/doc/1P1-52906942.html>

Japan said Friday it would give Myanmar's military government 628 million yen to renovate the Baluchaung No. 2 Hydro Power Plant in Kayah state, in what appears to be a reward for freeing democracy leader Aung San Suu Kyi from house arrest. The grant will pay for the restoration of six generators and related substation equipment. Last month, when it became clear that Suu Kyi was going to be released soon, Japan pledged 792 million yen for the purchase of medical equipment for Yangon hospitals. Japan eased its attitude in late 2000 when the junta began closed-door reconciliation talks with Suu Kyi. She was released Monday after 19 months of confinement at her lakeside villa. Myanmar rations electricity, and blackouts lasting up to three days are common in Yangon and across the country. Last year, Japan had said that rehabilitating the Baluchaung plant would cost 3 billion yen. It is not clear if Japan is planning to give more money to foot the bill.

E) Selected passages from 'Baluchaung No 2 Power Station Renovation Project'.

Japan Bank for International Co-operation, *Baluchaung No 2 Power Station Renovation Project: Myanmar*, pp 1-7, May 2002. http://www.jbic.go.jp/english/oec/post/2002/pdf/070_full.pdf

This is a post evaluation report of the long-term results of the renovation of the generators at Lawpita No 2 carried out by Japan in 1989-90. The field survey for the post evaluation was carried out in Sept 2001. The results of the evaluation anticipate the second renovation project that was officially approved in May 2002.

By 1987 the total net generation capacity at Baluchaung No. 2 Station was 142 MW, while total rated capacity was 168 MW. The renovation project in 1989-90 restored all six units to 28 MW, and total capacity to 168 MW. By the time of the post-evaluation in Sept 2001 the net generation capacity had been reduced to 157 MW.

Through the 1980s, growth in electricity use in Myanmar remained low. In an effort to improve public welfare and to promote industrial development, the government placed a high priority on the development of power resources. In the fifth 4-year Economic Development Plan (1986-1989), it decided to increase power supply through the construction of a hydroelectric power plant. During the 1990s the total demand for power nearly doubled; from 1,500 GWh in 1987, it shot up to 3,000 GWh in the year 1999. This trend in power demand is evidence of the relevance of this project.

Table 1: Electric Power Installation Capacity (Unit:MW)

Fiscal Year	1985	1990	1992	1993	1994	1995	1996	1997	1998	1999
Hydel	226	258	289	291	299	317	327	328	340	360
Total	684	804	807	809	837	982	1033	1042	1055	1196
Hydel %	33	32	36	36	36	32	32	31	32	30

The volume of actual net production in Baluchaung No 2 from fiscal year 1987 to FY 2000 is shown in Table 3. The average volumes from 1987 to 1992, and from 1993 to 1997, were 920 and 1,197 GWh, respectively. Thus the renovation project is considered effective.

Table 3: Net Production in Baluchaung No. 2

Fiscal Year	Net Production (GWh)	Output Capacity (MW)	Utilization Factor %
1987	908	142	73.0
1988	828	142	66.6
1989	864	142	69.5
1990	943	142	75.8
1991	1013	142	81.4
1992	963	145	75.8
1993	1172	156	85.8
1994	1190	164	82.8
1995	1224	168	83.2
1996	1192	168	81.0
1997	1205	165	83.4
1998	631	162	44.5
1999	672	161	47.6
2000	1219	158	88.1

The utilization factor, which includes such elements as demand, on-stream and rain, is calculated using the following formula: Utilization Factor = (Net Production) / (Output Capacity x 365 x 24). In 1998 and 1999, the utilization factor was very low due to severe drought.

Table 4: National Firm Power and Peak Load

											Unit: MW		
Financial Yr	87	88	89	90	91	92	93	94	95	96	97	98	99
Firm Power	407	407	383	356	356	384	399	411	609	623	613	622	706
Peak Demand	359	332	373	407	430	460	483	485	581	680	750	845	897
Balance	48	75	10	-51	-74	-76	-84	-74	28	-57	-137	-223	-191

The Baluchaung No. 1 and No. 2 power stations have a generation capacity of 28 (14 X 2) MW and 168 (28 X 6) MW, respectively. Of this, 120 MW of electric power is transmitted to Yangon and 60 MW to Mandalay.

Impact

Improvement in public welfare and well-being is closely linked to industrial development, in Myanmar as in any other country. This is commensurate with per capita consumption of power, which as can be seen in Fig. 4, rose nearly 50% from 1985 to 1997. The increases in demand for industrial, commercial and household sectors shown in Fig. 1 also reflect trend. The renovation project contributed to this trend.

No adverse impacts on the environment or on local residents have been reported by either the Myanmar Electric Power Enterprise or Baluchaung No. 2 Hydro-Electric Power Station.

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Appendix 2

BILIN RIVER HYDROPOWER PROJECT: NOTES

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NE 47-09: Pegu

Bilin dam and power station, 16 miles north of Bilin [17° 14' N, 97° 15' E], grid sq ref: 8\1, 26\8 [?]
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-9.jpg>

Data summary [Bilin](#)

NLM, 26/11/10. <http://www.burmalibrary.org/docs09/NLM2010-11-26.pdf>

An MoU was signed with Asia World Co Ltd on the Bilin hydropower project. It will be developed through the B.O.T system.

NLM, 21/07/10, <http://www.burmalibrary.org/docs09/NLM2010-07-21.pdf>

Work on the Bilin project (280 megawatts) in Mon state and Dayai Creek (25 megawatts) in Kayin state is due to launched soon.

NLM, 31/12/09. <http://www.burmalibrary.org/docs08/NLM2009-12-31.pdf>

The Bilin hydropower project is listed on a chart of projects yet to be implemented. It will have a generating capacity of 280 MW and is expected to produce 1512 million kWh annually.

NLM, 30/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060730.htm>

Plans are under way to implement 15 hydel power projects such as the Bilin hydel power plant in Bilin township that can generate 140 MW for the first phase and 140 MW for the second phase.

NLM, 12/11/99. <http://mission.itu.ch/MISSIONS/Myanmar/99nlm/n991112.htm>

At a meeting of SPIC, EPM Tin Htut presented feasibility studies on the implementation of the 600-MW Yeywa hydel power project in Patheingyi township, the 150-megawatt Thaukyekhat hydel power project in Thandaung township and Bilin hydel power project with two stages, each of 140 MW, in Bilin township.

Source of information MEPE?, [n.d.]

www.aseanenergy.org/energy_sector/electricity/myanmar/future_electricity_projects.htm

Nippon Koei CL prepared preliminary report for the 280-MW Bilin hydropower project with estimated annual production of 756 million kWh.

NLM, 24-03-97. [on-line reference not available]

Chairman Woo Choong Kim of Daewoo Corp of the Republic of Korea signed an MoU with MEPE to undertake a feasibility study of the Bilin hydel power project on Bilin *chaung*, 16 miles north of Bilin town.

Nippon Koei Co Ltd website info, [n.d.]. <http://www.n-koei.com/english/profile/index.html>

From 1994 to 1996, Nippon Koei Co Ltd, a Japanese technical assistance consulting firm, carried out a review of the existing study and a survey from technical and economic viewpoints of the feasibility of a hydropower dam and generating plant on the Bilin river. The plan was for a 700-MW facility that would produce between 800 and 1,000 GWh annually with 2005 as the target year of completion.

WPD, 15/09/90. <http://www.ibiblio.org/obl/docs3/BPS90-09.pdf>

SPIC, chaired by SLORC V-C Gen Than Shwe, met to review hydel power and energy projects. Projects in the immediate future include the Biluchaung hydro-electric power project No. 1 in 1992 (28 MW) and the Mann thermal generation project in 1993 (72 MW). Later projects planned include: Saing Din hydroelectric project in Buthidaung township, Paunglaung hydropower project in Pyinmana township (280 MW) at a cost of K 4,250 million (US\$ 410 million) for power, and K 135 million (US\$ 14 million) for irrigation of 40,000 acres; Bilin hydel power project in Mon State (240 MW) at a cost of K 2,590 million (US\$ 245 million); Kun hydropower project in Pyu township (84 MW), Yenwe multipurpose dam project in Kyauktada township (16.2 MW) and irrigation of 40,000 acres.

World Bank, *Burma: Issues and Option in the Energy Sector: Report No 5416-BA*, June 1985, p.18.

www.wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1999/09/17/000009265_3970723102606/Rend/INDEX/multi_page.txt

A 240-MW scheme on the Bilin River appears to be one of the best hydroelectric prospects for relatively early development. The estimated construction cost for Bilin is US\$227 million (1981 prices) which is lower

than for Paunglaung, primarily due to the smaller dam size. Firm power would be greater owing to the much larger water storage at Bilin. Mean annual energy production is estimated at 880 GWh. However, the multi-purpose nature of the project, which is only at the preliminary study stage, raises substantial uncertainties as to the relative economics of Paunglaung and Bilin. The project status of Bilin should be upgraded to the same level as that of Paunglaung to allow comparison of the economics of the two projects.

Appendix 3

DAGYAING CREEK HYDROPOWER PROJECT IN HLAINGBWE TOWNSHIP: NOTES

Topographic map reference: Thailand: 1:250,000: Series L509, U.S. Army Map: NE 47-10: Li
The Dayaing hydropower project, 5 mi north-east of Paingkyon [17° 02' N, 97° 59' E], grid sq ref: 18\9, 3\9
http://www.lib.utexas.edu/maps/ams/indochina_and_thailand/txu-oclc-6535632-ne47-10.jpg

Data summary: [Dayaing](#) creek

NLM, 21/07/10. <http://www.burmalibrary.org/docs09/NLM2010-07-21.pdf>

Work on the Bilin project (280 megawatts) in Mon state and Dayai Creek (25 megawatts) in Kayin state is due to be launched soon.

NLM, 31/12/09. <http://www.burmalibrary.org/docs08/NLM2009-12-31.pdf>

The Dayaingchaung hydropower dam is listed on a chart of projects yet to be implemented. It will have a generating capacity of 250 MW [a printing error, should be read as 25 MW] and is expected to produce 87 million kWh annually.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%20Country%20Report%20Tin%20-%20Myanmar%20-%20Presentation.pdf

The Dayaing hydropower project with a planned capacity of 25 MW is expected to generate 88 million kWh annually. It is currently in the planning stage and will be carried out by the HPID.

NLM, 30/07/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060730.htm>

EPM-1 Zaw Min informs the Electric Power Development Project Work Cte that plans are underway to implement the 25-MW Dayaingchaung hydel power plant in Hlaingbwe township along with 14 others.

Karen Human Rights Group, 11/02/06. <http://www.khrg.org/khrg2006/khrg06f1.pdf>

During 2005, Pa Kah village about 5 km east of Dta Greh (Burmese: Pyaingkon) received a visit from the officers of LID No 22 headquartered in Pa'an. They informed the villagers that a hydroelectric power dam would be built across Dta Greh river at Oo Wih Hta just outside the village. Both the villagers and a local contingent of the DKBA cease-fire group in the area are opposed to the dam, but feel they can do nothing to stop it. To clear the site, the authorities enlisted local people who were paid them K1,000 per day. However, the villagers feel this was done to win their co-operation and that when more labour is required later they will probably have to work without payment. [Compiler's Note: Pa Kah (Hpagat) appears to be 8 km north of Paingkyon on topographic maps of the area. Name of the river is shown as *Dayaing chaung*.]

NLM, 21/01/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060121.htm>

The 15-MW Dayaingchaung (Paingkyon) hydel project will be implemented in Hlaingbwe township.

NLM, 08/02/05. <http://www.ibiblio.org/obl/docs2/NLM2005-02-08.pdf>

Kayin state PDC Chairman Khin Kyu reports on geographical surveys conducted for power supply through Dakyaing creek in Hlaingbwe township.

NLM, 28/12/04. <http://www.ibiblio.org/obl/docs2/NLM2004-12-28.pdf>

Announcement at a SPIC meeting chaired by Gen Than Shwe that Dayaing creek (Paingkyon) hydel power project will be built 12 miles east of Hlaingbwe in Kayin state. A 25-MW generator that is expected to generate at least 10 MW [?] will be installed.

Appendix 4

GAS-FIRED POWER [PLANTS OF THE AYEYAWADDY VALLEY](#): NOTES

Tin Maung Maung Than, "*Burma's Energy Use: Perils and Promises*" in *Southeast Asian Affairs* 1986, (Institute of Southeast Asian Studies, 1986), p. 73. [not available on-line] Appendix 4

Industrial use of natural gas started in Burma with its utilization as feedstock for the nation's first fertilizer plant at Sale in 1971. Rapid development of the gas fields resulted in a quadrupling of production between 1973/74 and 1983/84, corresponding to a yearly average growth rate of nearly 15pc. The rapid growth of natural gas in the decade could be attributed to the increasing demand for its use, not only in fertilizer production, but also in the production of electricity by gas-turbine generators. Demand for these uses as well as for other downstream petrochemical projects undertaken at the start of the 1980s may have been the reasons for the optimistic annual plan targets set in recent years -- targets which were not realized in actual production. Plan fulfilment ratios were equally disappointing for natural gas as for petroleum. However, it is likely that production from the newly developed fields in the Irrawaddy delta and the Prome/Htantabin area would significantly increase the natural gas supply well above Burma's present needs. Further development of natural gas may be constrained mainly by infrastructure problems and financial limitations on potential downstream projects rather than by resource inadequacy as such.

Tin Shein and Kyaw Kyaw, "Private participation in Myanmar's power sector", in *Energy for Sustainable Development*, 3, no 6 (Mar 1997), p 99.

<http://www.esd-journal.org/esdonline/pdf/esdv3n6/myanmar.pdf>

Natural gas for [the five] gas turbine units is produced by three grid systems of on-shore gas fields. The first grid system comprises the Chauk and Ayadaw fields, capable of producing 510,000 m3/day, which is just sufficient for the Kyunchaung power station and fertilizer plant. The second grid system comprising the Mann and Htauk Shabin fields is capable of supplying 570,000 m3/day which is more than the requirement of Mann power station. The third grid system comprising the Myanaung, Pyay and Apyauk gas fields is capable of supplying 3.27 million m3/day with reserved surplus capacity of 850,000 m3/day for Hlawga power station. This system supplies gas to Myanaung, Shwedaung, Ywama, Tharkayta, Ahlone and Thaton power stations, as well as two chemical plants and two cement factories.

(A) References to the [Kyunchaung](#) gas power plant

Compiler's note: The Kyunchaung gas-power station and a nearby urea fertilizer plant are located close to the Ayadaw natural gas field, south-west of Pakokku, opposite Nyaung-U on the Irrawaddy. Gas pipelines connect it to the Chauk and Lanywa oil and gas fields about 20 km farther south and to the Kyaukkhwet/Letpando oil and gas field some 80 km to the northeast in Myaing township. The Ayadaw field has been exploited for over a hundred years. There are no recent production reports. The Kyaukkhwet/Letpando field was first drilled in 1974 and after fits and starts began producing on a large scale in 1999. In 2005, along with the nearby Thakyitaung/Sabei oil and natural gas field, it was reported to be producing 1,400 barrels of crude oil and 20 million cubic feet of natural gas per day.

Data summary: [Kyunchaung](#)

NLM, 06/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-06.pdf>

EPM No 2 Khin Maung Myint reports to the SPIC that major repairs to the generators in the Hlawga, Ywama, Ahlon and Thakayta gas-fired power plants in Yangon and at the Kyunchaung, Mann and Shwedaung gas-fired power stations.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)
The 54-MW power plant at Kyunchaung uses simple-cycle gas turbines.

NLM, 17/11/06. <http://mission.itu.ch/MISSIONS/Myanmar/06n1m/n061118.htm>

EM Lun Thi inspected No 2 Fertilizer Plant (Kyunchaung) at Kyunchaung. At the briefing hall of the factory, Factory Manager U Htay Aung reported on production of the fertilizer factory and Liquefied Petroleum Gas Plant (Kyunchaung), and the factory manager of Gas Turbine (Kyunchaung) of Ministry of Electric Power No 2 on collection of natural gas and supply of electricity.

NLM, 25/04/05. <http://www.ibiblio.org/obl/docs3/NLM2005-04-25.pdf>

At the natural gas power plant (Kyunchaung), Lt-Gen Ye Myint heard a report on matters related to the power plant. The power plant was installed with three dual fuel gas turbines that can generate 18.1 MW. The plant produces 475,668 million kWh a year to supply electricity to factories in Sale, Wazi, Kyunchaung and Nyaungbingyi as well as Pakokku, Yezagyo, Monywa, Salingyi, Yinmabin and Pale townships.

ECFA, late 2004. http://www.ecfa.or.jp/japanese/act-pf/H16/minkatsu_Myanmar_Eng.pdf

Current electric power requirements by the Monywa copper mine of 20 MW are being supplied by Kyunchaung gas power plant.

Soe Myint, "Oil and Gas Supply, Processing and Refining in Myanmar", in *Asean Energy Bulletin*, First Quarter, 2002, p. 10. http://www.aseanenergy.org/download/aeb/aeb_1st_2002.pdf

Following the introduction and widespread use of gas turbines for power generation in the world power industry, the commercial utilisation of natural gas began with the establishment of the first gas turbine unit at Kyunchaung in the central Myanmar area in the early 1970's. More effective utilisation, through production of value added products, was launched in 1970 with the start up of the Sale urea fertilizer factory in the same region.

NLM, 17/10/01. www.myanmargeneva.org/01n1m/n011017.htm

At the Kyunchaung gas power plant, EPM Tin Htut is briefed on generation of electricity at Nos 1 and 2 power plants and the repair of No 3 power plant.

Ministry of Energy website information, [undated, circa 2000]. http://www.energy.gov.mm/MOGE_1.htm

Letpando, Kyaukkwet and Ayadaw natural gas fields are connected by 10"-pipe for 44.5 miles and a 14"-pipe for 9 miles. Ayadaw and Lanywa natural gas fields are connected by a 10"-pipe stretching 23 mi, the Lanywa and Chauk fields by a 6"-pipe that stretches 1 mi, and the Chauk field to Sale by an 8"-pipe that stretches for 13 miles.

Ministry of Energy website information, [undated, circa 2000]. www.energy.gov.mm/MEP_1.htm

The Kyunchaung gas-turbine power station has an installed capacity of 54.30 MW.

NLM, 03/10/97. <http://www.burmalibrary.org/docs6/NLM1997-10-03-text.pdf>

Gen Than Shwe and his entourage helicopter to Kanma Sanpya village in Pakokku township where they were taken to the site of a small-scale natural gas power station project designed to operate on natural gas produced at the Kyaukkwet natural gas field in neighbouring Myaing township. Power generated at the station is to be supplied from Kamma to Myitchay, Myaing, Pauk, Letpando, Kyaukkwet and neighbouring villages. The senior general Than Shwe gives suggestions on regional development and presents cash awards to the project personnel. (**Compiler's note:** This project does not seem to have taken root, perhaps because the limited supplies of natural gas in the area were needed for other purposes)

Nation (Bangkok), 13/02/96. www.burmalibrary.org/reg.burma/archives/199602/msg00138.html

The first gas turbine power station at Kyunchaung was completed and commissioned in 1974.

(B) References to the [Myanaung](#) gas power plant

Compiler's note: The Myanaung gas power plant is located close to the town of the same name on the lower Irrawaddy river about half way between the large regional cities of Pyay and Hinthada. Its gas supply is sourced from the nearby Myanaung oil and gas field and the Shwepyitha field, 14 miles away. Reports in recent years from these older fields indicate that natural gas production on both has fallen to combined total of 2 to 3 million cf/d. The gas is also needed for a cement mill in Kyangin eight miles north-east of Myanaung. Additional gas for the two plants and a methanol plant at Seiktha is now provided by the Pyitaungtan field on the east bank of the Irrawaddy. In 2000, two of the turbine-generator sets at Myananug were removed and installed at the Thaton plant leaving the Myanaung plant with a reduced capacity of 34 MW.

Data summary: [Myanaung](#)

Turbineman's Log, October 2009.

<http://turbinemanlog.blogspot.com/2009/10/rustic-myanmarat-work-site.html>

[My] work site is at Myanaung MEPE Power Station which is situated at the town of Myanaung, north of Yangon, and a back-breaking 8-hour journey by van. The Power Plant with a maximum output of less than 40MW, is powered by 2 sets of Hitachi Frame 5 Gas Turbines running on Mark 1 controls, i.e. on valves! Due to lack of foreign exchange and UN embargo, they have been running the GTs without any routine maintenance, so only breakdown maintenance is done. (Compiler's note: There are three dozen photos on this site documenting repairs to the ageing turbine at the Myanaung plant, accompanied by a breezy commentary written by the obviously foreign engineer who supervised the operation. A map shows the location of Myanaung. Another set of photos shows the rustic location of Myanaung.)

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)
The 68-MW power plant at Kyunchaung uses simple-cycle gas turbines.

NLM, 30/05/05. http://www.myanmar.gov.mm/NLM-2005/may/enlm/May30_h2.html

Energy Minister Lun Thi checks repairs on the gas pipeline that connects the Pyay oil and gas field with the Seiktha methanol plant on the opposite bank of the Ayeyawady river. The 10-inch-diameter pipeline was laid in November 2004. It pipes 1.5 million cubic feet of gas daily for Kyangin Cement Plant and Myanaung Natural Gas Power Plant.

NLM, 20/05/04. <http://mission.itu.ch/MISSIONS/Myanmar/04nlm/n040520.htm>

The Myanaung and Shwepyitha oil and gas fields are now producing 502 barrels of crude oil and 2.361 million cu-ft of gas a day.

NLM, 06/08/02. <http://mission.itu.ch/MISSIONS/Myanmar/02nlm/n020806.htm>

Minister for Electric Power checks on the repair of generators at the Myanaung power plant

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, "Memo on Interviews/Field Surveys in Villages for Rural Electrification: February 2001 - November 2002", of the Study on Introduction of Renewable Energies in Rural Areas in Myanmar, September 2003. http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159779&volno=000000000&filename=11734175_03.pdf&seqno=3

One of the interviews conducted by a JICA field team describes a visit to the MEPE office in the city of Hinthada on the lower Ayeyawaddy river. The MEPE township office has a staff of 50. MEPE is reported to be supplying 1.7 MW to the city of 50,000 of whom 8,000 are consumers of electric power provided by MEPE. There are an additional 300 industrial customers. According to the memo, load shedding occurs between 05:00 and 23:00 for 3 hours a day. **Compiler's note:** It is doubtful that Hinthada is receiving its electric power supply from Yangon as reported by the Japanese visitors. It is more likely that the city receives its supply from the Myanaung station about 80 km north of Hinthada to which is connected by a 66-kV transmission line, as shown in the MEPE power grid map on p 9 of the final report of the Study.

Win Kyaw Oo, Myanmar Times, 01/10/01. <http://www.myanmar.gov.mm/myanmartimes/no83/>
 Dept of Electric Power D-G Thein Tun said an upgrading project at the Thaton station would increase its output from 18 MW to 51 MW. The upgrade has involved the transfer of equipment from a station at Myanaung.

NLM, 17/08/00. [http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n000817.htm#\(2\)](http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n000817.htm#(2))
 Myanaung gas power plant supplies power to Kyangin cement plant

Minister of Energy website information, [undated, circa 2000]. http://www.energy.gov.mm/MOGE_1.htm
 The Myanaung and Shwepyitha oil and gas fields are connected by a 10-inch-diameter, 14-mile-long pipeline; Kyangin is connected to the Myanaung field with an 8-inch-diameter, 13.5-mile-long pipeline, Seiktha and Kyangin by a 10-inch-diameter, 9-mile-long pipeline, and Seiktha and the Pyitaungtan oil and gas field by a 10-inch-diameter, 9-mile-long pipeline across the Irrawaddy.

Ministry of Energy website information, [undated, circa 2000]. www.energy.gov.mm/MEP_1.htm
 The gas turbine power station at Myanaung has an installed capacity of 67.65 MW.

Salween Watch, November 1999. <http://www.ibiblio.org/obl/docs/SW03.htm>
 The Myanaung gas power plant was finished in 1975 and upgraded in 1984.

John C. Wu, *The Mineral Industry of Burma*, [1995]. <http://www.ibiblio.org/obl/docs2/MIB1995.pdf>
 Production of natural gas from the Aphyauk gasfield, near Taikkyi in the lower delta of the Ayeyarwady rose to 2.12 million cu m/d in 1995 from 1.1 million cu m/d in 1994. Natural gas production from the Aphyauk gas field will be raised further to 2.8 million cu m/d when a 224-km pipeline network is completed in 1996. The new pipeline will supply natural gas to power plants at Ywama and Myanaung, a cement plant at Kyangin, and a methanol plant at Seiktha.

Hitchachi Gas Turbine Supply List, [n.d]. <http://www.power-hitachi.com/member/pdf/GTSupply0202.pdf>
 The company supplied the Burma Electricity Supply Board with a 16,250 kW MS5001 EUPG 197 gas turbine for its power plant in Myanaung in 1975

(C) References to the [Mann](#) gas power plant

Comiler's note: Very little public information is available about the Mann gas-fired electric power station. Together with an LPG extraction facility it is located at Minbu across the Irrawaddy river from the regional city of Magway. A 14-inch-diameter gas pipeline connects the two plants to the Htaukshabin and Kanni oil and gas fields a few miles to the south and to the Mann field a few miles to the north of Minbu, respectively. Recent reports indicate that the Mann field is producing about 4 - 5 million cf/d and the Kanni/Htaukshabin field about 9 -10 million cf/d. As shown in Table 2 of the JIBC evaluation report below, this would appear to be fairly consistent with the levels maintained over the past twenty years.

Data summary: [Mann](#)

NLM, 06/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-06.pdf>
 EPM No 2 Khin Maung Myint reports to the SPIC that major repairs to the generators in the Hlawga, Ywama, Ahlon and Thakayta gas-fired power plants in Yangon and at the Kyunchaung, Mann and Shwedaung gas-fired power stations.

NLM, 12/1/08. <http://203.81.72.132/newspaper/1211newsn.pdf>
 Manager Khin Mar Nyo at the Mann natural gas-fired plant briefs EPM No 2 Khin Maung Myint on measures to supply power. Work on the 132-kV, 90 MVA, sub-power station for the transmission line that will connect the Kyee-ohn Kyee-wa power plant [under construction] with the Mann (Minbu) station is underway, as is work on the 230/66/11-kV 100 MVA Okshitpin sub-power station and the 132/66/11-kV, 45 MVA Sedoktara

sub-power station. The minister is also briefed on developments with regard to the 132-kV Kyee-ohn Kyee-wa - Mann power circuit, the 132-kV Namhsan [Namzang] - Pinpet power circuit, the 230-kV Shwetaung - Okshitpin power circuit, and the 230-kV Meiktila-Taungdwingyi power circuit. The minister views stockpiles of electrical appliances for each project in the Mann station compound.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)
The 37-MW power plant at Mann uses simple-cycle gas turbines.

Japanese Bank for International Co-operation, *Myanmar Integrated Liquefied Petroleum Gas Project (Phase I-Part 2) (Phase II)*, p 4, October 2002. www.jbic.go.jp/english/oec/post/2002/pdf/074_full.pdf

According to the Myanmar Petrochemical Enterprise, no improvement in the supply or content of natural gas supply can be expected, because the Mann gas field which provides natural gas to the liquid petroleum gas (LPG) extraction plant at Minbu is being depleted. Under these conditions, it is unforeseeable that the target volume of producing LPG 30,000T/Y will be accomplished in the future.

Table 2: Gas Supply Volume and Gas Composition

Table 2: Gas Supply Volume and Gas Composition

	Appraisal	Actual												
Fiscal Year	Plan	1987-	1988-	1989-	1990-	1991-	1992-	1993-	1994-	1995-	1996-	1997-	1998-	1999
	-1982	88	89	90	91	92	93	94	95	96	97	98	99	2000
Volume	24	14	14	14.1	14	14	13.2	13.1	14.6	15.3	14.8	15.6	15.4	13.7
mmcf/d														

Ministry of Energy website information, [undated, circa 2000] http://www.energy.gov.mm/MOGE_1.htm

The Kanni and Htaukshabin oil and gas fields are connected by a 14-inch-diameter gas pipeline that runs 17 miles north to the Mann field. From the Mann field a 10-inch-diameter pipeline goes farther north for 59 miles to the Lanywa field where it connects to a pipeline across the Irrawaddy to the Chauk field.

Ministry of Energy, [undated, circa 2000] www.energy.gov.mm/MEP_1.htm

The Mann gas turbine power station has an installed capacity of 36.90 MW.

Salween Watch, November 1999. <http://www.ibiblio.org/obl/docs/SW03.htm>

The Mann gas power plant was finished in 1980.

NLM, 26/03/98. <http://mission.itu.ch/MISSIONS/Myanmar/98nlm/n980326.htm#07>

EPM Tin Htut visits the Mann LPG plant, oil-field and natural gas-fired electric power station.

WPD, 15/09/90. <http://www.ibiblio.org/obl/docs3/BPS90-09.pdf>

SPIC, chaired by SLORC V-C Gen Than Shwe, met to review hydel power and energy projects. MEPE will increase power supply to 721.46 MW in 1992-94, when the Biluchaung hydro-electric power project No 1(28 MW) comes on-line in 1992 and the addition to the Mann thermal generating station (72 MW) comes on-line in 1993, Firm capacity will then be about 562.91 MW.

Tin Maung Maung Than, "*Burma's Energy Use: Perils and Promises*" in *Southeast Asian Affairs* 1986, Institute of Southeast Asian Studies, 1986, p 84. [not available on-line]

Among the gas turbine power stations commissioned in recent years, those at Mann, Ywama and Prome, which had been started in fiscal 1978/79, were financed partly by loans and grants (mainly for turbo-generators and control/switching elements) from the United Kingdom.

(D) References to the [Shwedaung](#) (Pyay) gas power plant

Compiler's note: The Shwedaung gas-fired electric power station is located in the town of the same name about eight miles south of the regional city of Pyay (Prome). It is the largest of the four gas power plants in the Irrawaddy valley and supplies electricity to state-owned and defence factories across the river at Sinda, Htonbo and Nyaungchaydaung in Paduang township, as well as to the industrial area in Pyay. Originally, it drew much of its gas supply from the Pyitaungtan field, 22 miles to the south, and from the Tantabin field across the Irrawaddy in Kyangin township. In the nineties it benefited from the discovery of gas on the Apyauk field in Taikkyi township farther south. Like the gas-turbine plants in Yangon, it is now increasingly dependent on gas from the Yadana field in the Andaman sea.

Data summary: [Shwedaung](#)

NLM, 06/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-06.pdf>

EPM No 2 Khin Maung Myint reports to the SPIC that major repairs to the generators in the Hlawga, Ywama, Ahlon and Thakayta gas-fired power plants in Yangon and at the Kyunchaung, Mann and Shwedaung gas-fired power stations.

Platts Myanmar Country Energy Profile, [mid-2007]. For access information, see [Power Profile](#)
The 80 MW power plant at Shwedaung uses simple-cycle gas turbines.

NLM, 10/01/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n070110.htm>

EPM No 2 Khin Maung Myint visits the Pyay gas-fired power station in Shwedaung township where the manager briefs him on input and distribution of electricity, the importance of maintaining the generators, and input and output lines in the switching yard. Arrangement are being made to link the 230-kV Toungoo-Oakshitpin and the 230-kV Shwedaung-Oakshitpin cable lines. This should make it possible provide extended distribution of electricity to No 1 Steel Mill of MEC near Kyaukswegyo Village in Aunglan township.

NLM, 25/08/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060825.htm>

EPM No.2 Khin Maung Myint looks into the gas turbine plant at Shwedaung. He checks the control room and switching yard and urges officials to keep up full supply power to No 3 fertilizer plant in Kyaw Swa.

Ministry of Energy website information, [undated, circa 2000]. http://www.energy.gov.mm/MOGE_1.htm
The Shwetaung plant is connected to the Pyitaungtan field by a 10-inch-diameter pipeline. A parallel 14-inch line extends 37 miles from the Pyitaungtan field to Titut a few miles north-east of Pyay.

Ministry of Energy website information. [undated, circa 2000]. www.energy.gov.mm/MEP_1.htm
The gas turbine power station at Shwedaung has an installed capacity of 54.30 MW.

Salween Watch, November 1999. <http://www.ibiblio.org/obl/docs/SW03.htm>
The Shwedaung gas power plant was finished in 1982.

John C. Wu, *The Mineral Industry of Burma*, [1995]. <http://www.ibiblio.org/obl/docs2/MIB1995.pdf>

Production of natural gas from the Aphyauk gas field, near Taikkyi in the lower delta of the Ayeyarwady rose to 2.12 million cu m/day in 1995 from 1.1 million cu m/d in 1994. Natural gas produced from the 10 wells on the Aphyauk gas field was piped to Yangon and Pyay for power generation at Thaketa and at Shwedaung, near Prome.

Tin Maung Maung Than, "Burma's Energy Use: Perils and Promises" in *Southeast Asian Affairs* 1986, Institute of Southeast Asian Studies, 1986, p 84. [not available on-line]
Among the gas turbine power stations commissioned in recent years, those at Mann, Ywama and Prome, which had been started in fiscal 1978/79, were financed partly by loans and grants (mainly for turbo-generators and control/switching elements) from the United Kingdom.

(E) References to a gas-fired power plant at [Kanma](#)

Compiler's Note: A reference to this rarely mentioned gas-fired plant appears in a list of electric power stations operated under the aegis of the Ministry of Electric Power No 2 in an NLM article dated 15/05/09.

<http://www.burmalibrary.org/docs07/NLM2009-05-15.pdf> The plant is reported to have been opened in 1998 and to have an installed capacity of 8.72 MW. Kanma is a large village in Pakokku township and appears to be on the natural gas pipeline between Kyaukkhwet/ Letpando oil and gas field in Pauk township and the Ayadaw field in Pakokku township. Kanma is located on the road stretching north from Myitche in Pakokku township to the town of Pauk.

A reference to a project to establish a small gas-fired power station at Kanma Sanpya village in the Pakokku district appeared in NLM on 03/10/97. After visiting Shwetantit irrigation pump project in Pakokku township, General Than Shwe and an official entourage "helicoptered to the small-scale natural gas power station project in Kamma Sanpya Village. They were welcomed there by Minister for Energy U Khin Maung Thein, Managing Director of Myanma Electric Power Enterprise U Zaw Win and personnel, members of Red Cross and Auxiliary Fire Brigades, pupils, members of USDA and local people. Minister U Khin Maung Thein and Managing Director U Zaw Win briefed them on the project for establishment of a small-scale -power- station -to be run with natural gas produced from Kyaukkhwet Natural Gas Field and programmes for power supply from Kamma to Myitthay, Myaing, Pauk, Letpando, Kyaukkhwet and neighbouring villages."

<http://www.burmalibrary.org/docs6/NLM1997-10-03-text.pdf> After a visit to the Letpando oil field in Pauk township in the Pakokku district, on 05/01/98, Energy Minister Lun Thi was reported to have "attended to the needs at a natural gas-powered station near Kamma Sanpya village, Pakokku township."

<http://myanmargeneva.org/98nlm/n980108.htm>

The Kanma power plant does not appear on recent maps showing the location of generating and sub-power stations in Myanmar (see [Annex 1](#) below). It does not appear in a list of nine operating gas-fired power stations included in an article in NLM on 15/01/11. <http://www.burmalibrary.org/docs11/NLM2011-01-15.pdf> But the following news item appears to indicate that a project to link the power station at Kanma with the national grid is underway. "With a view to implementing projects to supply electricity, EPM-2 is undertaking national grids such as installation of . . . the 9.5-mile-long 66-KV power line from the Kyunchaung-Pakokku 66-KV power line (near Myitthay) to Kanma . . ." <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

Data summary: [Kanma](#)

(F) References to a thermal power plant at [Chauk](#)

Compiler's Note: A map drawn up by a Japanese team that conducted research on the application of renewable energy sources in Myanmar indicates that there is a 14-MW thermal power generating station at Chauk ([ELPG003C](#)). This plant is not mentioned in reports of the electric power ministries. It could be a generating station fuelled by natural gas produced in the Chauk field and operated by the Energy Ministry to serve its projects in the area. ([ELOV008C](#)). The Chauk gas turbine station is also shown on the grid system map that was included in the evaluation report of the Sedawgyi hydropower project. See Map 1 below.

Data summary: [Chauk](#)

Appendix 5

[DIESEL-OPERATED GENERATING PLANTS IN MYANMAR: NOTES](#)

Compiler's note: Diesel-operated generating plants are an important source of power in many of the towns and larger villages across the country. As indicated below, there were over 900 of these state-owned diesel-fueled plants operating throughout Myanmar in 2006. The total amount of electric power they generated by diesel plants has not varied greatly over a 35-year period. However, the number of privately operated diesel-fueled generating plants at factories, workshops, commercial establishments, hotels and in the suburban areas of large cities has ballooned over the last decade to compensate for the frequent brown-outs and failures in the national system. Rising prices for diesel combined with the recent cutbacks in fuel subsidies in Myanmar are bound to have a heavy impact on the use of electricity throughout the country.

References

Tin Maung Maung Than, "Burma's Energy Use: Perils and Promises" in *Southeast Asian Affairs* 1986, Institute of Southeast Asian Studies, 1986, p 83. [not available on-line]

Although the strategy [outlined in the government's economic plan] for satisfying long-term power requirements envisaged large-scale hydro-electric schemes integrated to irrigation projects, because of the long lead times and high capital costs of such projects, mini-hydroelectric power plants and thermal generation plants (employing gas turbines and multi-fuel steam generators) have been set up as short-term measures to satisfy the rising demand for electricity. Small diesel generating plants have also been employed in off-grid locations to cater for local requirements (see Table 6).

Table 6
Generation of Electricity by Units under the EPC
(In millions of kWh)

Budget Year	1971/72	1975/76	1979/80	1983/84	1985/86**
Total electricity*	619	760	1080	1674	2321
Hydroelectricity	475 (77%)	532 (70%)	725 (67%)	993 (59%)	1024 (44%)
Thermal	71 (11%)	36 (5%)	37 (4%)	72 (4%)	77 (3%)
Gas turbine	1 (-)	127 (16%)	263 (24%)	549 (33%)	1150 (50%)
Diesel	73 (12%)	66 (9%)	56 (5%)	60 (4%)	79 (3%)

**Rounding errors may result in differences between the total figures and the sums of its components.

**Provisional figures; subject to revision in later years (usually downwards).

ASEAN Centre for Energy, [undated, circa 2000].

www.aseanenergy.org/energy_sector/electricity/myanmar/future_electricity_projects.htm

According to statistics submitted to the ASEAN Centre for Energy by MEPE, diesel power plants had an installed capacity of 24.97 MW in stations connected to the national grid in fiscal 1999-2000 and 40.42 MW in isolated stations. The combined total capacity of 65.39 MW amounted to 5.57% of national generating capacity and they produced 56.30 million kWh, roughly 1.25% of all the electricity generated by MEPE power plants.

JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan, *Study on the Introduction of Renewable Energies in Rural Areas of Myanmar: Final Report: Volume I: Summary*, September, 2003, pp 8, 10, 11.

<http://lvzopac.jica.go.jp/external/library?>

http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=000000000&filename=11734100_01.pdf&seqno=1

In the remote areas not covered by the national grid, the township centres are supplied by MEPE through local systems connected to diesel generators and/or small hydro-electric generators. It is often inefficient to extend the distribution network from the grid to these rural areas because of low population density and the dispersal of the centres far from the grid. MEPE currently operates 456 diesel generators and 30 small hydro-electric systems in rural areas not covered by the grid. Diesel generators are operated for only 3 hours a day due to budget limitations. Where revenues are insufficient, these are supplemented by remittances from MEPE. Battery lighting was introduced when kerosene disappeared from the market during the oil crisis of 1973. Before that kerosene lamps were the main source of lighting for farm households. Now many battery charging stations powered either by the grid or by small diesel generators operate on a commercial basis countrywide. Small diesel generators are also used for a single household or fed to several neighbouring households.

NLM, 22/01/06. <http://www.ibiblio.org/obl/docs2/NLM2006-01-22.pdf>

Small, medium and heavy diesel-used power plants are being built in the regions which are far from the national grid and border areas. In addition to these facilities wind-powered power plants, waste heat recovery power plants, bio-fuel used power plants and bio-diesel used power plants are being built to fulfil the electricity needs. In 1988, the state-owned electric power company had 621 diesel power plants. By 2006 there were 944 diesel operated generating plants.

Country Report Myanmar on Infrastructure Development with a focus on Public Private Partnerships (PPP) (ESCAP: July 2007), p 27. http://www.unescap.org/ttdw/ppp/reports/Myanmar_6july2007.pdf

According to the Border Areas Developments programme, 199 towns and villages which are outside the National Grid System were electrified by 265 diesel generating sets with an installed total capacity of 8.8 MW.

Alfred Oehlers, *Behind Burma's Fuel Price Rise*, IRROL, 22/08/07. http://www.irrawaddy.org/article.php?art_id=8318

To fully understand the pressures behind the [recent] increase in fuel prices [in Burma], it is important to consider some deeper structural characteristics of the Burmese economy and oil and gas sector. To begin, one bold fact: Burma is essentially a diesel-powered economy. We see this in the buses, trains and trucks that rumble around the country. We also see this in the dilapidated power plants that sometimes generate electricity. Most of all, we see this in the ubiquitous portable generators that exist in nearly every home, factory and shop that can afford one. For a long time now, diesel prices have been kept artificially low through subsidies. And as demand for diesel has continued to grow in tandem with an expanding economy, the amount spent on these subsidies has similarly expanded, posing an ever increasing strain on the regime's finances. In an attempt to increase the supply of diesel, the regime attempted to encourage greater crude oil output from the domestic oil industry in recent years. This has not met with great success, as onshore wells are declining in productivity (the "peak oil" phenomenon) and there are few, if any, offshore wells. In any case, sources suggest, even if higher volumes of crude could be obtained domestically, another bottleneck would have developed around the available refining capacity in Burma. Burma's ageing refineries simply cannot refine crude volumes sufficient to meet demand. These refineries, in addition, are incapable of refining crude from other sources with different sulfur content, thus ruling out imports of crude to augment domestic supplies. The only solution then, is to import diesel. And as this is usually done at spot market prices, it is an extremely costly solution. . . . [Moreover,] rising imports of diesel, gasoline and gas products at escalating prices cannot be paid for from existing gas revenues. Nor can an already weak state budget—depleted by projects such as a new capital—absorb such rising costs. The only solution is to slash the subsidies and raise fuel prices.

NLM, 28/12/07. <http://myanmargeneva.org/NLM2007/eng/12Dec/n071228.pdf>

On 22 December, EPM No 2 Khin Maung Myint visited the An township electrical engineer's office to check on power sufficiency and the distribution of electricity in the township. The minister and party inspected the maintenance of two 150 KVA diesel-powered generators and the installation of power lines. Afterwards, accompanied by Western Commander Maung Shein he went on to the Ma-i electrical engineer's office on the An-Taungup road where they inspected generators and met with service personnel.

"Myanmar Country Report on Progress of Power Development Plans and Transmission Interconnection Projects", *Fifth Meeting of Planning Working Group of the Regional Power Trade Coordination Committee, Greater Mekong Subregion* (Vientiane, 17/06/08), Appendix 4, pp 7, 9.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/PWG5-Appendix4.4.pdf>

Diesel-operated generating equipment in off-grid areas served by MEPE had an installed capacity of 35.79 MW in FY 2007-08 and produced 33.59 million kWh, roughly 0.5% of all the electricity generated by MEPE power plants.

See above: 'Chaungzon supplied with [electricity at a big loss](#)' (NLM: 29/03/11)
 'Fuel [price increase](#) impacts industrial use of electricity' (IRROL: 15/08/07)
 '[Premium rates](#) for electricity in Mon villages' (IMNA: 03/08/07)
 'Impact of [unreliable power supply](#) on industrialization in Myanmar (IDE: 10/05)
 'Proposal for [barge-operated power plant](#) at Monywa copper mine' (ECFA: Dec 2004)
 'Coping with power [black-outs in Rangoon](#)' (Mizzima News: 27-04-04)

'Sittway power company plagued by [diesel deficit](#)' (Narinjara News, 25/03/03)
 '[Private operators](#) meet consumer need for alternative power service' (MT: 03/02/02)

Appendix 6

USE OF YADANA GAS FOR POWER GENERATION AND INDUSTRY: CHRONOLOGY

Unocal Corporation, 22/04/96. www.secinfor.com/drdbh.91Bu.htm

The Yadana project is expected to supply -- through a domestic pipeline -- a proposed 200-MW power plant and a 1,750-metric-ton/day fertilizer manufacturing facility near Yangon.

Myanmar U.N. Mission, Geneva, official website, [undated, circa mid-1998].

<http://mission.itu.ch/MISSIONS/Myanmar/t&b/gas-oil.html>

The Yadana natural gas field will produce 650 million cu ft/day of natural gas of which 525 million cu ft will be sold to Thailand with effect from July 1998. Of the remaining 125 million cu ft of natural gas that will be utilized within Myanmar, 105 million cu ft will be sent to the Kyaikto area in Mon State through a 20-inch-diameter pipeline to be used [as feedstock] for a 340-MW electric power plant [and a urea fertilizer factory] that will produce 57,000 tons annually. This 3-in-1 natural gas utilization project will be jointly implemented by Total, UNOCAL and Mitsui companies.

Pennwell Petroleum Group, January 2001.

http://www.pennwellpetroleumgroup.com/Articles/Article_Display.cfm?Section=ARTCL&ARTICLE_ID=187095

According to Unocal Corp, Myanmar told a three-company international consortium known as the Myanmar Fertilizer Power Development Co (MFPD) to proceed with a long-delayed project to build a \$200 million gas pipeline from the Yadana gas field in the Gulf of Martaban, to an onshore location near the capital city of Rangoon. The MFPD partners are Unocal, TotalFinaElf SA, and Mitsui & Co of Japan. The 20-inch, 241-km gas pipeline was part of the \$750 million 'Three-in-One' project proposed in the mid-1990s under the overall development of Yadana gas. Aside from the gas line, the project included a 300-MW gas-fired power station and a 1,750-tonne/day fertilizer production facility near Kyaikto, south-east of Rangoon. The Yadana-Kyaikto gas pipeline was planned to come on-stream in early 1998, delivering up to 105 million cf/d of gas from the Yadana offshore production complex to the proposed power and fertilizer plants. The gas required for the project was part of the 125 million cf/d allotted under the 30-year domestic sale agreement that the Yadana consortium signed with Myanmar in 1995.

World Bank, *Myanmar: An Economic and Social Assessment (Draft version)*, p 100, 18/08/99. [not available on-line]

One project that could be urgently undertaken is the construction of a pipeline from the offshore Yadana gas field to [a point] near Yangon. This pipeline could deliver the 125-million cf/d of gas obligated for the domestic market from Yadana, and would make up for the decline in onshore gas production. But a dispute over the size of the pipeline has unnecessarily delayed its construction. France's Total, US Unocal, and Japan's Mitsui are partners in the joint venture that has proposed a 20-inch, \$200-million-line that would have a capacity of 220 million cf/d (290 million cf/d with compression). The government would like to build a 35-inch line with a capacity of 985 million cf/d that would have a price tag of \$400 million. There does not seem to be a sound technical or economic basis to build such a large pipeline. The government should move quickly to clear aside the obstacles to building the 20-inch line, which has already been cleared for 60pc debt financing from the Japan Export-Import Bank. Myanmar should rely on market forces to determine the size and timing of future domestic pipeline projects.

NLM, 05/06/99. <http://mission.itu.ch/MISSIONS/Myanmar/99nlm/n990605.htm>

Chairman of Myanmar Investment Commission Maung Maung Khin received GM Kim Ho Sang of Hyundai Engineering & Construction Co Ltd of Singapore they discussed development of infrastructure and opportunities in Myanmar.

NLM, 12/06/99. <http://mission.itu.ch/MISSIONS/Myanmar/99nlm/n990612.htm>

In Beijing, Deputy PM Tin Hla received V-P Bai Jiliang of Sainty International Group, Jiansu Machinery (I&E) Corp. They discussed matters relating to a 4,000-ton cement factory to be built at Mainggalay.

Korea Economic Weekly, 17/07/00. www.burmalibrary.org/reg.burma/archives/200007/msg00038.html

Hyundai Corp announced that the firm has contracted with MOGE to export 45,000 tons of steel pipe worth US\$30 million. The export amount of 20-inch pipe will be loaded from September 2000 through March in 2001. The pipe will be used to construct a gas pipeline promoted by Myanmar government. Hyundai said that it had created a consortium with Hyundai Pipe, SeAH Steel and Shinho Steel to win the supply contract through a public tender.

Hyundai Heavy Industries website, [n.d.] www.hhi.co.kr/english/IndustrialPlant/product/cementplants

Compiler's note: this reference is no longer available on <http://english.hhi.co.kr/>

In 2000, Hyundai Heavy Industries installed a KHI roller mill (330 T/H) for limestone grinding and a KHI roller mill (250 T/H) for pre-grinding of clinker at the Hpa-an [Myaingalay] cement plant.

Ministry of Energy website information, [undated, circa mid-2000]. www.energy.gov.mm/MOGE_3_2.htm

MOGE will lay a natural gas pipeline from Kanbauk in Taninthayi division to Myainggalay in Kayin state. The pipeline will transport 170 million cf/d of natural gas from the gas fields in the Moattama and Taninthayi offshore areas for use in Myainggalay. The pipeline has a total length of 183 miles and will be 20 inches in diameter. The project is targeted for testing and commissioning by August 2001.

Mon Forum Monthly, February 2006. www.rehmonnya.org/monforum2-06.php

In 2000, the Construction Ministry, the Ministry of Energy, and the South-east Military Command implemented a project to lay a gas pipeline from Kanbauk gas terminal to Myaingkalay cement factory. The construction of the pipeline started in November 2000 and took about ten months to complete. The pipeline passes through Yebyu township, the whole (south-north) length of Ye township, Thanbyuzayat township and Mudon township and part of Kyaikmayaw and Moulmein townships. From there it crosses into Pa'an township in Karen state where the cement factory is situated. In Mon state the route passes through many paddy growing farms, rubber and fruit plantations and even entire villages. Wherever the pipeline passed, the authorities and the army confiscated civilians lands, orchards, plantations and houses without payment and ordered the people to move out as quickly as possible. For example, in the Mon village of Wae-winkara in Thanbyuzayat township where the route passed by seven house the authorities ordered the families to move out and destroy their houses within three days. Soldiers from LIB No. 31 came and threatened the owners with arrest should they disobeying the order. In Kyaikmayaw township 200 acres where rubber trees were growing were confiscated without payment.

NLM, 02/04/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlnm/n010402.htm>

Lt-Gen Tin Oo and party went to the 4,000-ton cement plant project in Myainggalay where they were briefed on constructions of the plant. The 4,000-ton cement plant will produce cement using the dry process. The project started in February 1999. The plant will undergo a test-run in about December and will produce cement on a commercial scale.

Oral Intervention at the 57th Session of U.N. Commission on Human Rights, July 2001.

www.ibiblio.org/obl/docs/chr2001ngo-ciir.item10.htm

Khin Ohmar of the Catholic Institute of International Relations: According to our sources, the Burmese military confiscated lands without any compensation along a new gas pipeline construction from Thanbuzayat in Mon state to Myainggalae in Karen state. Many villages on the pipeline route have been forcibly relocated. This pipeline will bring gas from Yetagon gas field for consumption in a cement factory in Myainggalae. We were informed that forced labor is being used for the construction of the pipeline.

NLM, 03/05/02. <http://www.myanmargeneva.org/02nlnm/n020503.htm>

Three KNU terrorist insurgents blew up a gas pipeline near Thabyechaung Creek bridge on the railroad line between Hnit Kayin and Ahnin villages in Ye township on 30 April 2002. The pipeline transports gas from Kanbauk to Myainggalae. Watchman U Soe Naing and wife Daw Nyo of Kyeikkhe village sustained burns on their back from the explosion. The three KNU terrorist insurgents holding small arms arrived at the civilian

guard house near the bridge at night on 30 April. They tied up U Soe Naing and wife in the guard house, and blew up the pipeline.

DVB, 04/05/02. [not available on-line]

A gas pipeline explosion near Thabyechaung village in Ye tsp on 30 April has caused the Myainggale cement factory to close. Parts of the Moulmein-Ye-Tavoy railway were damaged beyond repair and the Thanbyuzayat-Ye-Tavoy section has been temporarily closed.

Thet Khaing, Myanmar Times, 16/09/02. [not available on-line]

Work has begun on a natural gas pipeline that is expected to ease an electricity supply shortage in Yangon within about two months. Maj-Gen Kyaw Win told a news conference the pipeline would overcome supply shortages at two gas-powered electricity generating stations on the outskirts of the capital. U Aung Koe Shwe of the EPM said the project involved extending a pipeline to Yangon from Thaton, where gas from the Yadana offshore field is used as an energy source at a cement factory. He said the extension would be linked to gas-fired generators at Hlawga and Ahlone. The two power stations need another 60 million cf/d of gas to operate at capacity. The gas will be bought from TotalFinaElf, which operates the Yadana field jointly with MOGE. According to U Aung Koe Shwe, the generators supplying electricity for Yangon are producing about 285 MW an hour, about 100 MW short of the city's needs.

Win Kyaw Oo, Myanmar Times, 23/12/02. [not available on-line]

A 20-inch diameter, 183-mile pipeline recently laid to Myainggale in Kayin state from the Total pipeline centre in Kanbawk is supplying 20 million cf/d of gas from the Yadana gas field.

Human Rights Foundation of Monland, 31/07/04

<http://www.rehmonnya.org/previousnews-detail.php?ID=22>

Local authorities in Mon State have forced hundreds of civilians who live along Kanbawk-Myaingkalay Gas Pipeline to fence the pipeline and cover it with earth to prevent attacks from rebel armed groups and protect it from flooding during the rainy season. Villagers were also required to clear grass and bushes along the pipeline. In Thanbyuzayat township, parts of pipeline were exposed by flood waters during the early monsoon in June and local authorities were so concerned about possible sabotage by the rebels that they ordered the villagers to cover these areas in order to camouflage them. At places where the pipeline crosses rivers or streams, it is totally exposed, so the local military ordered the villagers to fence the pipeline in these areas. The villagers had to find and bring the building materials themselves.

IMNA, 16/06/06. http://www.bnionline.net/index.php?option=com_content&task=view&id=411&Itemid=8

"The fireball shot up 100 feet with a frightening 'whoosh-whoosh' sound as the Kanbawk-Myaing-Kalay gas pipeline exploded on February 1. "We watched in shocked silence" said villager Myit Twe, still traumatised months later. People living within three kilometers of the explosion site smelt the gas and saw the blaze. "The boom-boom, was laced with the whoosh-whoosh. The villagers near the explosion site spent a sleepless night," added Myit Twe. Despite the flames and the smell of the gas frightening them, the families settled down because they had seen such a sight before. This was the third time such an explosion has taken place near the village, according to Myit Twe. The most recent explosion has added to the villager's woes for the local military commander has ordered them to patrol the pipeline and fence part of it that is above ground so that rebels can't cause explosions. The military has also told the people that they would have to take responsibility if the gas pipeline blew up near their village or farm again. At a meeting a few days after the pipeline exploded, the local commander threatened to kill villagers and shift the villages should there be another explosion. **Compiler's note:** A series of news items from the same agency tells of half a dozen other occasions in which explosions and major leaks have occurred along the pipeline in the six years since it was finished.

Myanmar Times, 02/10/06. [not available on-line]

Repairs have been completed on a pipeline that supplies natural gas to four power plants in Yangon. Problems along the pipeline were blamed for blackouts in Yangon. The 320-km (199-mile) pipeline carries 3.1 million cu m (110 million cu ft) of gas a day to the Ywama gas control station from Yadana gas project in Tanintharyi division.

Total Yadana website information, [undated: around the beginning of 2007].

http://burma.total.com/en/contexte/p_1_3.htm

Contractually, Myanmar is entitled to take up to 20% of Yadana's production for domestic consumption. Until recently, it was taking about 40 to 50 million cu ft per day (1.1 to 1.4 million cu m), approximately half of its entitlement. Since December 2006, it is taking 100 to 110 million cubic feet per day (2.8 to 3.1 million cu m). The gas is piped from the Yadana pipeline at Kanbauk further north to a cement factory in Myaingkalay and then to Yangon via a pipeline built and operated by MOGE.

NLM, 28/12/07. <http://mission.itu.ch/MISSIONS/Myanmar/07nlm/n071228.htm>

Natural gas production at the Yadana offshore gas field will be suspended while repairs are carried out to the production process of the field from 28 December, 2007 to 7 January, 2008. Gas-powered plants and factories are to reduce their production during the period. However, the authorities have already taken necessary measures not to affect the supply of electricity to Yangon during the period.

NLM, 28/04/08. <http://www.myanmargeneva.org/08nlm/n080428.htm>

Power generation at the Ahlon, Hlawga, Ywama and Thakayta power plants that supply electricity to Yangon will be cut to 100 MW while offshore a pipe line that provides gas to the four plants is temporarily closed down for repairs. The service interruption will last from 6 pm on 27 April to 6 pm on 29 April, the Yangon City Electricity Supply Board announced.

Anatoaneta Bezlova, IPS, 10/09/08. http://www.irrawaddy.org/article.php?art_id=16754

Although Burma ranks 10th in the world in terms of natural gas reserves, its per capita electricity consumption is less than 5pc of neighboring Thailand and China, as its government exports most of the country's energy resources.

NLM, 01/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-01.pdf>

The gas pipelines of the Yadana natural gas project have been under maintenance since 24 January. So, production [of electricity at natural-gas fired plants] has fallen to some extent. In the meantime, power supply was increased from hydroelectric sources to cover demand. But on 26 January, some KNU and KNPP terrorists blasted towers 220 and 222 of the Lawpita-Toungoo grid near Thaukyaykhat creek, so the supply of electricity available is limited and the regions concerned will have to share. Efforts are being made to restore regular power supply as soon as possible.

NLM, 14/08/09. <http://www.burmalibrary.org/docs07/NLM2009-08-14.pdf>

Energy minister Lun Thi inspects the site for laying a natural gas pipeline across the Hline river on 10/08/09. The pipeline, which is being undertaken by MOGE, will terminate at the Ahlon gas power plant. After the minister was briefed on the use of horizontal directional drilling techniques under the bed of the Hline river, he oversaw laying of the pipeline from the Ahlone bank. The 24-inch diameter pipeline is being laid at a depth of 42 feet and will reach 3,100 feet across the river. The work is a part of a project which will bring natural gas from the offshore Yadana field to Yangon.

Kyaw Kyaw Hlaing NLM, 05/06/10. Rewritten and condensed.

<http://www.burmalibrary.org/docs09/NLM2010-06-05.pdf>

MOGE has been supplying natural gas from the Yadana offshore natural gas region through a 20-inch diameter pipe that was connected from Kanbauk to Myainggale in 2000 and extended from Myainggale to Yangon in 2006. Gas supplied through a new 24-inch pipeline will be distributed to the four power stations at Hlawga, Ywama, Thaketa, and Ahlone to fire electric turbines there, as well as to state and privately-owned factories that use natural gas. It will also be supplied to the Pinpek steel plant in Taunggyi, cement plants in the Pyinyaung region of Thazi township, the Taungphila, Yeni and Mindon cement plants in Nay Pyi Taw, as well as to other factories. The offshore Yadana gas platform will pipe 150 million cubic feet of natural gas per day at 1400 pressure psi to the pipeline center in Daw Nyein village in Pyapon district from where it will be piped to Yangon at 800 pressure psi. The new 24-inch diameter pipeline is of international standard with a 30-year life span. A world-famous oil and gas company had proposed to erect the new pipeline at a cost of US\$ 760 million in a three-year period. But, MOGE has constructed it in just 15 months at a cost of only US\$275 and K 4111 million. The 24-inch diameter natural gas pipeline is laid on the floor of sea underwater along a 94-mile route from the Yadana natural gas platform to Daw Nyein village in Pyapon District. TL

Geohydrographic Co of Malaysia and privately-owned SMART Technical Services of Myanmar surveyed the 85-mile-long land route from Daw Nyein to the Ywama gas supply station. [The article provides much more detail about the laying of the pipe-line. Several photos and a diagram are included in the print edition of NLM.]

NLM, 10/06/10. Condensed. <http://www.burmalibrary.org/docs09/NLM2010-06-10.pdf>

At the Yadana natural gas platform in the Gulf of Mottama, Energy Minister Lun Thi launches the operation of the 24-inch diameter offshore natural gas line that will transport natural gas to Yangon. The minister and party view installation of the globe valve that controls the gas flow, gas metering devices and measurement works. Then they travel to the pipeline center camp near Daw Nyein village in Ahmar township in Pyapon district where they are briefed on the building of the pipeline center which forwards the gas to the distribution station at Ywama near Yangon. An onshore pipeline covering 85.43 miles and an offshore pipeline covering 94.52 miles have been laid between the Yadana platform and the distribution station at Ywama. A test-run of the pipeline was completed successfully and since 08/06/10 natural gas has been sent through the new 24-inch diameter pipeline.

Additional references

See above: 'More [gas to be diverted](#) from Yadana for national use' (MT: 14/01/08)
 'Ywama power station dependent on gas distribution system' (NLM, 01/02/07)
 'Pipeline to solve electricity shortages' (MT: 16/09/02)
 'Yadana gas will fire electric power plants in Myanmar' (MP: Sept 1995)

Appendix 7

PLATTS ELECTRIC [POWER PROFILE](#) FOR MYANMAR

Compiler's notes: Internal references indicate that this article was researched in 2006-07 and published in mid-2007. The Myanmar profile was posted on the Net for a few months after it was first published but is now available for purchase only. The factual inaccuracies in the profile have been left uncorrected in the version that appears below.

Myanmar's power system was nationalized in 1951 when the government formed the Electricity Supply Board (ESB) from scattered private utilities, the largest being in Yangon. The state-owned utility Myanma Electric Power Enterprise (MEPE) was created from the ESB in 1972 and now operates as the Ministry of Electric Power (EPM). The government holds an effective monopoly on the electricity business in Myanmar.

In 2006, EPM's capacity was 1,750 MW and power production was 6,064 GWh. This may be compared to 2,226 GWh in 1989 and 4,508 GWh in 2000. As of mid-2007, the country's 10 largest power plants were Hlawga/Ahlone in Yangon (298 MW, combined-cycle), Paunglaung in Mandalay division (280 MW, hydro), Baluchaung in Kayah state (196 MW, hydro), Tikyit in Shan state (120 MW, coal-fired), Tharkayta in Yangon (92 MW, combined-cycle), Ywama in Yangon (90 MW, oil- and gas-fired steam and gas turbine), Shwedaung in Bago division (80 MW, gas turbine), Mone in Magway division (75 MW hydro) and Myanaung in Ayeyarwady division (68 MW, gas turbine). Other simple-cycle gas turbine plants are Kyunchaung (54 MW) and Mann (37 MW), both in Magway division. Additional hydroelectric plants include Kinda in Mandalay Division (56 MW), Thaphanseik in Sagaing division (30 MW), Zawgyi-1 and Zawgyi-2 in Shan state (30 MW), Sedawgi in Mandalay division (25 MW), and Zaungtu in Bago division (20 MW).

Myanmar's peak demand in 2006 was 1,140 MW, almost four times the 332-MW peak in 1989, but not too different from the 1,005 MW value reported for 2000. There is no particular rural electrification strategy in place and per capita consumption remains very low. There are few known autoproducers.

In addition to new construction, EPM has a variety of rehabilitation and modernization programs underway. One important project is at the Baluchuang-2 plant where the first three units were built in the 1950s using

war reparation funds from Japan. In September 2001, Tokyo Electric Power Co and Nippon Koei Co, a Japanese engineering company, were awarded a modernization contract for the Hitachi Pelton turbine/generator (T/G) sets at Baluchuang-2 (6 X 28 MW).

EPM sold 4,353 GWh in 2006 and has 1.3 million customers. At last report, industrial customers accounted for 38% of sales, residential customers for 41%, bulk sales (direct connection) for 18%, and other customers for the balance. Electricity pricing policies are poorly-developed in Myanmar and reflect the lack of modern meters and billing infrastructure. According to the ASEAN Centre for Energy, Myanmar's flat-rate electricity tariff as of 2005 was 7.3 U.S. cents/kWh.

EPM operates three grids interconnected by 230- and 132kV lines with a total system length of 5,131km. The main grid moves power from Baluchaung south to Yangon at 230kV, and north to Thazi and Mandalay in central Myanmar at 132kV. An extension runs west from Thazi to Chauk and the gas-turbine plant at Kyunchaung. A southwestern grid connects Prome [Pyay] to the gas turbine plant at Myanaung and operates at 66kV. A third system supplies the Manna [Manmaw = Bhamo] area at 33- and 11kV. System losses are very high at about 35%.

Germany's Kreditanstalt fur Wiederaufbau (KfW) helped fund a 230kV line from Thazi to Toungoo, which is used to evacuate power from the new hydro plant at Paunglaung. In January 2007, China Power Grid International Economic and Trade Co signed a contract with EPM for equipment supply for a 230kV line on the route Belin-Monywa-Meiktila-Taungdwingyi plus substations at Mongsan, Shweli, and Shwesaryan.

EPM has 76 transmission substations with installed capacity of 2,569 MVA. Myanmar's distribution lines are at 11-, 6.6-, and 3.3kV and measure 30,858km. There are 12,493 distribution substations and transformers with installed capacity of 4,996 MVA.

Myanmar's hydroelectric potential is immense, perhaps as much as 100 GW. In large measure, major power plant development in Myanmar in the near- and medium-term will depend on the development of power exports, and particularly on the outcome of a July 1997 Memorandum of Understanding (MOU) between the Myanmar and Thailand for power sales of about 1,500 MW. Working groups from both countries were formed to finalize and implement the agreement, but intermittent economic problems in the region plus the high cost of large-scale hydroelectric plants have delayed implementation of the export-oriented power projects. Several are now underway, but, in any event, Myanmar's national requirements are continuing to increase so MEP has an active construction program to supply domestic needs. . . .

[Compiler's note: Details about individual power plants and projects covered in the Platts Profile are omitted at this point in the profile but are included with appropriate key articles in the compendium.]

Myanmar has a large number of hydroelectric plants of all sizes and these will be the main focus of renewable power plant development for some time. Since 1990, YMEC has supplied equipment for about a dozen minihydro plants in Myanmar.

The deployment of wind and direct solar energy plants will cost far more than Myanmar can afford at this point, particularly given the abundance of other energy resources. Nonetheless, the Department of Meteorology and Hydrology and the Ministry of Science and Technology have made some preliminary investigations into the wind resource in the hilly parts of Chin and Shan states, in coastal regions, and in the central part of the country where Japan's New Energy and Industrial Technology Development Organization (NEDO) has constructed two meteorological observation stations. EPM, NEDO, and NEWJEC have also installed wind and solar measuring devices at four other locations.

Another potential non-fossil resource is geothermal energy. Myanmar has identified nearly 100 hot springs and during 1987, MOGE, EPM and Japan's Electric Power Development Co (EPDC) completed sampling and measurements at five locations in Mon and Shan States. More studies were done in 1990 and again in 1995, however, no firm plans have been established to attempt to exploit these resources for electricity production.

There has been increasing commercial pressure on Myanmar's timber resources which, with agricultural biomass, are important energy resources in rural areas. The government estimates that 65% of Myanmar's primary energy usage is from biomass, although this is well down from the 80% share estimated a decade ago. Around half of Myanmar remains forest-covered and the Ministry of Forestry has embarked on an ambitious public education and afforestation program, particularly in the dryer areas in the center of the country. To reduce the pressure on wood fuel stocks, the government is also encouraging the deployment of biogas digesters to supply fuel and lighting.

Myanmar's electricity sector has barely entered the "take-off" stage and operation of virtually any part of the transmission and distribution system could be modernized and improved to great benefit. The transmission system is considered to be in reasonably good condition, but there are bottlenecks at key voltage transformation points. Development of Myanmar's big electricity export projects has been delayed, but the generating projects already under construction or in advanced planning will suffice to meet domestic demand growth for some time.

The country has attracted perhaps disproportionate interest from both large commercial enterprises and activist non-governmental organizations for two reasons: an abundance of natural resources and large areas of almost undisturbed wilderness occupied by tribal communities. When long-running ethnic and separatist conflicts are added to the mix, it can be seen that sustainable economic development in Myanmar will be more than usually complex.

Appendix 8

HYDRO-POWERING THE REGIME

Yuki Akimoto, Irrawaddy Magazine, June 2004. www.irrawaddy.org/article.php?art_id=3757

The military junta that rules Burma has a strong predilection for hydro-power plants. SPDC chairman Than Shwe, who hails from Kyaukse, through which the Zawgyi river flows, is widely rumored to believe himself a reincarnation of King Anawrahta (r. 1044-1077). The long-dead Pagan-era monarch was a prolific dam- and canal-builder, particularly along the Zawgyi, where he supervised the building of a series of weirs and canals to atone for killing his foster-brother Sokka-te.

Burma's potential capacity for hydropower is great, and the ruling generals know it. The major rivers run roughly north-south: the Irrawaddy, the Chindwin (chief tributary of the Irrawaddy), the Sittang and the Salween, the longest undammed river in south-east Asia. For generations they have served as a lifeline to the country, used for irrigation, rice cultivation, communication and transport. In recent years the extensive river system has been targeted for another use: large-scale hydro-power.

The interest in hydropower is driven both by the desire to export and domestic demand. With even Rangoon subject to daily blackouts, the need for domestic power is clear. Although plans for dam construction on the Salween River have attracted the most attention among Burma-watchers, similar planning is underway throughout the country's vast river network.

Hydro-power accounts for about one-third of Burma's electricity production. At least four major hydro-power plants started operating in the last decade: Zawgyi No 1 (commissioned in July 1995) and Zawgyi No 2 (commissioned in March 2000) -- both in Shan state; Zaungtu (commissioned in March 2000) in Pegu division; and Thaphanseik in Sagaing division (commissioned in June 2002). Collectively, these plants generate 80 MW of electricity, about one-fifth of Burma's hydro-power production. Large dams service all of these plants: Zawgyi dam is 44.2 meters high; Zaungtu dam is 44.8 meters high and Thaphanseik dam is 32.9 meters high.

Burma's total installed capacity is about 1,200 MW, only 400 MW of which is from hydro-power. Sources such as the EPM and NLM indicate that the SPDC would like to build several dozen additional hydro-power

projects in the future that would add over 25,000 MW of capacity. Many of these projects would involve large dams.

Burma's interest in hydropower is driven both by the desire to export and domestic demand. With even Rangoon subject to daily blackouts, the need for domestic power is clear. Many ongoing or planned hydro-power projects whose electricity is slated for domestic use are located in central areas of Burma -- mostly between Rangoon and Mandalay. For example, there are a number of dams being built -- or in planning -- on the Sittang River and its many tributaries. The sites include Khabaung, Pyu, Kun, Bogata, Yenwe, Thaukyegat and Shwe Gin, with the potential capacity of each site ranging from about 20 MW to 160 MW and the dams about 52 meters to 77 meters high.

Further upstream on another tributary of the Sittang is the Paunglaung Dam, which is near completion at 131 meters high with an estimated capacity of 280 MW. The regime plans to implement two more projects nearby -- Upper Paunglaung and Nancho. Construction is proceeding at Yeywa Dam just southeast of Mandalay, also planned to be over 130 meters high with an installed capacity of 780 MW. Concerns have been raised about the displacement of local residents, as well as the prospective submersion of an ancient Buddhist temple in the area.

But the scale of the dams in central Burma is fairly modest when compared with planned hydro-electricity developments on the country's borders. The sale of electricity to neighboring countries is as important to the regime as securing domestic power supply. The regime will get hard currency, while bordering countries will get cheap electricity free from the headache of dealing with the public debate and protests that would occur if the power projects were built at home.

Burma and Thailand are making plans to jointly develop hydro-power plants on the Salween River, which runs through eastern Shan state in Burma, and along the Thai-Burmese border. The power is to be exported to Thailand. In the early 1990s, about ten potential sites were identified through preliminary studies that were commissioned by energy authorities in Thailand and Burma and conducted by Japan's Electric Power Development Company (EPDC). A feasibility study is underway for the development of two of these sites, Weigyi and Dagwin. Estimates indicate that these two export-oriented projects will, if completed, have generating capacities of 4,540 MW and 792 MW, with dams 168 meters and 49 meters high, respectively.

In 1997, the two governments signed an MoU under which Thailand agreed to encourage the purchase of up to 1,500 MW of electricity from Burma, including hydro-generated power, by 2010. There are also reports that progress is being made with respect to a hydro-power project for export at Tasang in Shan State, which would involve a 168 to 180-meter high dam and potential generation capacity of 3,300-3,600 MW (recently SPDC capacity estimates for this project jumped to 7,110 MW). Japan's EPDC has already conducted a feasibility study at the Tasang site. In December 2002 an MoU purportedly on the project was exchanged between the military regime and MDX, a Thai company. The content of the MoU has not been made public, however, and the exact status of the Tasang project is unclear.

In western Burma, just inside the Indo-Burmese border, runs the Chindwin River, where several potential dam sites have been identified that are likely to service export-oriented hydro-power plants. The sites include Thamanthi, Mawlaik, Homalin, and Shwezaye.

The World Commission on Dams has found that large dams can cause irreversible harm to the environment -- tens of millions of people have been displaced around the world because of dams. It also found that large dams built to deliver hydro-power tend to perform below expectations. Some developed countries have simply stopped building large dams and have started decommissioning existing ones, while looking into alternative options for generating and saving energy. In developing countries, too, plans to build large dams are often met with strong opposition.

But Burma's regime seems determined to repeat the mistakes of its neighbors, which have prioritized investment in large-scale energy supplies regardless of the consequences. The political and social conditions in Burma compound the negative impact common to large dam projects in developing countries. Burma has all the factors needed to bring about the worst-case scenario. The country lacks a sound socio-

economic infrastructure, the rule of law and mechanisms for public participation. Burma's environmental regulations are weak, and those that exist are not enforced effectively. And then there is the military: in Burma, development projects typically involve an increase in the military presence in the targeted area, which leads to greater human rights abuses.

Sites are identified and studied without consultation with surrounding communities; troops are brought in to "secure" the area; people are ordered to move at gunpoint; then villagers are taken as forced unpaid laborers. Burma has a tradition in this regard. The building of Baluchaung No 2 hydro-power plant in Karenni State, which was completed in 1960, led to the forced relocation of local residents. Today the area is surrounded by landmines. Dam projects since have entailed the displacement of local residents.

The International Labour Organization reported that villagers were required to contribute labor to the Zawgyi Dam. Human rights abuses and environmental damage have been linked to projects along the Sittang, and forced labor has been reported in connection with dam construction at Shwe Gin. Forced labor also has been documented at the dam project at Thaukyegat, which is likely to result in the forced relocation of residents in the area of its reservoir. More recently, independent Burmese media reported that four villages were ordered to be relocated and villagers' land confiscated to make way for a dam on Paday Creek, a tributary of the Irrawaddy. Given the difficulties in obtaining detailed, reliable information about such abuses in a secretive, authoritarian state like Burma, these few documented cases may be only the tip of the iceberg.

Serious concerns have been raised about the well-being of the environment and local residents near the projects on the Salween. The prospective dam at Tasang, for example, would mean the flooding of the gorge for 230 km upstream. There are reports that soldiers guarding the Tasang site forced local residents to porter and build military facilities. The Chiang Mai-based Kachin Post reported in June 2004 that if the planned Myitsone, Kachin State hydro-project is built, "5,000 houses from 30 villages will be sunk and 8,000 people will become homeless." Additionally, 18,000 arable acres, forests and natural resources will be submerged. The dam will destroy the Mali-N'mai confluence, which is regarded as the Kachin cultural heartland.

Although the Burmese government currently does not receive any public multilateral development financing for hydro-power development, it has found other sources of funding, especially from Asian countries. In the absence of multilateral financing, bilateral assistance from Japan and China and investment by private companies from Japan, China, and Thailand have supported the regime's efforts to build large dams.

In 2002, the Japanese government promised to rehabilitate Baluchaung No 2 hydro-power plant through its Official Development Assistance. This plant accounts for a large part of Burma's installed hydro-power capacity. Japan has shown a particular commitment to developing hydro-power in Burma, and a number of prospective dam sites have been identified and studied by Japanese government agencies and companies. Apart from the EPDC, mentioned above, other Japanese firms have been involved with studies relating to potential dam sites on the Salween and elsewhere.

In August 2001, the Kansai Electric Power Company, or KEPCO, contracted with Burma to provide technical assistance for developing 12 hydro-power plants, including at least five sites on the Sittang -- Yenwe, Khabaung, Pyu, Bogata and Shwe Gin. In its FY 2003 business plan, KEPCO stated that it was negotiating with Burma about conducting feasibility studies for additional projects. The firm's involvement in the Shwesaryay and Myitsone projects has been reported within the last year.

Moreover, between 1980 and 2000, Nippon Koei Co conducted pre-feasibility or feasibility studies for sites at Yeywa, Tasang, and Yenwe. In 2000-2001, Tokyo Electric Power Services Company, or TEPCO, a subsidiary of Japan's largest private electricity firm, the Tokyo Electric Power Company, conducted a feasibility study of the Shweli hydro-power project in Shan State. If and when Japanese ODA to Burma is fully resumed, Japanese companies will be well positioned to begin helping the regime with large-scale dam construction.

China is also a major player in promoting Rangoon's hydro-power development. China's Export-Import Bank has provided financing for at least three hydro-power projects -- Thaparseik, Mon Creek, and Paunglaung --

and has expressed an interest in the Salween hydro-power project. It also has been reported that loans from China will be used to buy equipment for the Yeywa project. Chinese companies such as CITIC and YMEC, have been involved in the development of many hydro-power projects, including Mone Creek in Magwe Division, Shweli, Zawgyi No 1, Zaungthu, Thaparseik, and Paunglaung. It also has been reported that China National Machinery and Equipment Import and Export Corporation, the same company that has been involved in building China's Three Gorges Dam, has expressed an interest in working on the Weigyi and Dagwin projects.

Thailand has been working on the Weigyi and Dagwin projects on the Thai-Burmese border. The Myanmar Times recently reported that the Burmese government intends to establish two hydro-power plants to supply electricity to the industrial zones near Hpa-an and Myeik that are planned to be developed under Thailand's Economic Cooperation Strategy, or ECS. For dam sites on the Chindwin River along the Indo-Burmese border, the regime is reportedly looking for assistance from Indian companies.

It bears mentioning that the Asian Development Bank, to which Japan is one of the largest financial contributors, includes the controversial Tasang site in its "Master Plan" for regional power interconnectivity, under which electricity generated by hydro-power plants in Burma, China and Laos will be consumed by Thailand and Vietnam. While not providing direct financial assistance to Burma because of the current political situation, the ADB, like the Japanese government, may be waiting for what it believes will be a more propitious time to begin assisting the regime to develop large-scale hydro-power projects.

Rangoon has been able to secure funding for the development of large-scale hydro-power in Burma, so the construction of major dams has been proceeding at an accelerated pace. If the regime's ambitions are even partly achieved, many large dams will be built in coming years—and not just on the Salween, but on the Irrawaddy, Sittang and Chindwin rivers. The lack of meaningful public participation in development decisions and widespread human rights abuses inflicted by Burma's military are likely to increase the ecological and social problems commonly associated with large dams built in developing countries, while revenues from electricity exports will bolster the incumbent regime.

Compiler's note: The print edition of Irrawaddy for June 2004 carries a map that pinpoints the location of most of the hydropower projects mentioned in the article.

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Appendix 10

RURAL POWER SERVICES IN CHIN STATE

Chin state, approximately 13,900 square miles (36,140 sq km) in area, stretches for some 250 miles from north to south along a series of ranges known as the Chin Hills. In the south where the state is about 100 miles wide, the Chin Hills are flanked on the west by the Saman Tlang range, while in the north and central parts, where the state narrows to a width of 50 to 75 miles, the Lethataung and Ronklang ranges lie along its eastern boundary. The whole region is made up of high hills and deep valleys, and there are hardly any plains or plateau areas. The average elevation varies between 1500 and 2700 meters, the highest peak being Natmataung or Mt. Victoria in southern Chin state at 3100 meters above sea level. Chin State is relatively sparsely populated with approximately 530,000 people scattered in 500 villages and 13 towns. The largest towns are Haka and Falam in the central part of the state and Tiddim in the north.

The four main roads in the central part of the state are the 115-mi route that connects Haka and Falam with Kalemmyo, just over the border in Sagaing division, the 70-mile-long road that links Haka with Gangaw in Magwe division, the 172-mile-long Haka-Rezua-Matupi road; and the 102-mile-long Matupi-Mindat road. According to official sources these four roads are now tarred and serviceable in all seasons. In 2005, the Indian Border Roads Organisation completed a survey of the much travelled, but poorly maintained, 95-mi gravel road between the border town of Rih near Mizoram and Tiddim with a view to improving its capacity for motor traffic. Tiddim already has a fairly good road connection with Kalemmyo. Paletwa in the south of Chin state has never had a motor road connecting it with the rest of the state but is reachable by river from

Kyauktaw in northern Arakan. An agreement reached in 2008 calls for a multi-modal transportation corridor to be financed by the Indian government that will run along the Kaladan river from Sittwe to Paletwa, thence by road to the Mizoram border where it will link with a highway that will eventually connect the states of northeastern India by road, river and sea to south-east Asia and the Indian sub-continent. This transportation corridor and improvements in the port of Sittwe connected to it are to be completed by 2011-12.

At the beginning of 2008, there were no large electricity generating stations in Chin state and it was not connected to the national transmission grid. The principal sources of electricity are mini- and micro-hydro plants close to the larger towns and diesel plants supplied by MEPE in the towns and some of the larger villages. According to a survey conducted by the Central Statistical Organization in 1999, 47pc of all households in the state were electrified, including 92pc of the households in the larger towns and 39pc of village households. The accuracy of this survey insofar as Chin state is concerned would appear to be highly doubtful. The main mini-hydro plants include the Laiva station a few miles west of Falam installed in 1994, with a generating capacity of 600 kW (2 X 300 kW), and the Ngasitvar station, 12 miles north of Falam, with a generating capacity of 1000 kW (2 x 500 kW), installed in 1986, and the 500-kW (2x250 kW) Bungtla Falls (BF) station on the Rha Lawng creek 6 miles from Matupi, opened in May 2007. Both the Laiva and Ngasitvar plants originally had Austrian-made Voest-Alpine machines which were later replaced by Chinese-made turbine-generator sets. On 22/09/08, NLM reported that the Laiva [Hlaingbar] power station had been [re-]opened. Other mini-hydro plants are the 400-kW (2 X 200 kW) Zalui station near Tiddim, installed in 1984, also with Voest Alpine machinery, the 200-kW (2 X 100 kW) Namtlaung station, eight miles east of Matupi, installed with locally made cross-flow machines in 1992, the 150-kW station at Vuitu village, six miles from Matupi, opened in 1997, the 200-kW (2 X 100 kW) Chechaung station, 7 miles southwest of Mindat, opened in 1997, and the 200-kW (2 X 100 kW) Tuisaung chaung station near Tonzang with locally made cross-flow turbines, opened in 1997. Paletwa in the south of Chin state reportedly has a small (2 X 25 kW) station that is no longer in operation. In FY 2003-04, there were 23 diesel plants and 10 mini-hydro plants in operation mainly during the evening hours. Total consumption of electrical power in the state amounted to only 8.6 million kWh in 2004-05.

The best possibilities for improving the supply of electricity in Chin state lie in harnessing the hydropower potential of the river systems which originate in the highlands in and around the state. In 2006, the national government initiated construction of a 525-foot-high dam (MP) on the Manipur river on the eastern border of Chin state close to where the Manipur flows into the Myittha in Kalay township of Sagaing division. The four 95-MW turbines to be installed in the powerhouse at the dam will eventually produce almost two million kWh annually. But the long-term national grid plan published by the EPM No 2 (PG) indicates that the electricity to be generated at the Manipur station will not be used in Chin state but directed to the Ayeyawaddy grid through twin 230-kV lines leading to a sub-power station near Myitche. Another dam and power plant presently under construction near Pyintha in Gangaw township on the Myittha river, close to the eastern border of Chin state, is slated to provide electricity through a 66-kV line that will connect with Haka, Falam, Tiddim and Kalemmyo. Any immediate prospects for improving the power supply in the central and northern parts of the state would appear to lie in developing more mini and micro-hydro plants close to the larger towns and villages.

In the southern part of Chin state, other sites for hydropower development lie along the Lemro river and the Mi-chaung in the southeast and southwest corners of Paletwa township. Bangladesh has expressed some interest in tapping into the hydro potential of these sites, but distance and other factors involved have caused tentative plans to be shelved. As work gets underway on the multimodal transportation corridor up the Kaladan, the need to develop hydropower sources in the southern part of the state will be more evident.

In the northeastern corner of the state, Jinbao Mining Industry Ltd, a joint venture formed by two Chinese mining companies, is currently studying the feasibility of mining a large nickel and chromium deposit at Mwetaung, about 12 miles north of Kalemmyo. The reserve is estimated to contain in excess of 10 million tonnes of nickel ore at an average grade of 1.5pc. The high demand for electricity at the mine and associated concentrator and smelter would have to be met by building a thermal power station that could use coal from nearby sources in Sagain Region. Excess power from that station could supply domestic demand in the Kalay area and northern Chin state. The power plant would almost certainly have to be built and operated by the joint-venture nickel mining company or an independent power producer.

Compiler's note

This article was originally prepared for the second edition of the Compendium in 2007 and has been updated on various occasions since then. Users should consult the article 'Minister clarifies grid connection plans for Chin State' ([ELPG013](#)) for current information about the small-scale hydropower stations in the state. Some confusion exists as to whether the Bungtla falls (Bontalar) station ([ELSF038](#)) and the Namtlaung station mentioned above and in March 2011 are simply different names for the same power plant that supplies power to Matupi. A Japanese team that studied the possibilities of improving access to electrical services in rural Myanmar visited some of the small power stations in Chin State in 2001-02 and reported on their findings. See pages 27-31 of *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Appendix A* published jointly JICA, MEPE, Nippon Koei, Institute of Energy Economics Japan in Sept 2003. http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=000000000&filename=11734092_05.pdf&seqno=5

Additional references

See above: 'Minister clarifies [grid connection plans for Chin](#) State' (NLM: 22/03/11)
'[Manufacture of small hydro turbines](#) in Myanmar' (JICA: Sept 2003)
'MoU signed on [Mawlaik and Kalewa](#) power projects' (NLM: 29/05/10)
'[Bontalar](#) hydropower station in Matupi visited' (NLM: 23/11/08)

NLM, 09/02/11. <http://www.burmalibrary.org/docs11/NLM2011-02-08.pdf>

A box in an article entitled 'Colourful Chin state' notes that there are 10 [small-scale] hydropower plants in the state. A hydropower sub-station with a generating capacity of 0.7 MW is under construction at Laingvar in Falam township

Khonumthung News, 04/01/11. Edited and condensed.

<http://www.bnionline.net/news/khonumthung/9976-forced-labour-for-hydro-electric-project.html>

People are being forced to transport materials for a hydro-electric project on the Pata river located between Vangkai [21°33'N, 93°18'E] and Satak village in Paletwa township. Things needed for the project including machinery and cement bags have to be brought from Matupi town, 25 miles away from the project site. A local person said villagers were also being made to dig 20-foot-ditches to place the machinery near the river. The villagers are upset because they say the project will only benefit a local monastery and three military families in Vangkai. The project is being handled by a military unit in Matupi. Electricity is scarce in Chin state. Rihkhawdar town and Zokhawthar in the Indo-Myanmar border areas use electricity from Mizoram state in northeast India.

Khonumthung News, 30/03/10. Edited and condensed.

<http://www.khonumthung.com/kng-news/09-news/less-electricity-for-those-who-cannot-pay-extra-in-tidim/>

In Tedim town in the upper part of Chin state, electricity is being supplied on a regular basis only to those consumers who pay the electricity department extra charges in addition to the regular monthly bill. "We get electricity from 7 pm to 8 pm about two or three days in a week. But a person who can pay K 10,000 per month to the officers can have electricity day and night everyday," said a local in Tedim. Villagers outside the town depend on lanterns and candles, but some have purchased solar energy devices from India get electricity that way.

NLM, 07/02/09. <http://www.burmalibrary.org/docs6/NLM2009-02-07.pdf>

Lt-Gen Khin Zaw of the Ministry of Defence inspects the Laingbar hydropower plant of EPM-2 in Falam township. . . . Later he inspects the Ngasickbar [Ngasitvar] hydropower plant of the Electric Power Supply Enterprise of EPM-2 [also in Falam township].

Appendix 10

KINDA DAM FIFTEEN YEARS ON: AN EVALUATION OF HYDROPOWER IMPACTS

Asian Development Bank, "Case Study 6: Kinda Dam Multi-Purpose Project" in *Strategic Environmental Framework (SEF) for the Greater Mekong Subregion: Integrating Development and Environment in the Transport and Water Resource Sectors: Volume IV: SEF Case Study Reports*, pp 119-39, March 2002.

[document, pp 130-50]

<http://www.rrcap.unep.org/sef-gms/Volume%20IV%20-%20SEF%20Case%20Study%20Reports%20FINAL.pdf>

The Kinda Dam Multi-Purpose Project (Kinda Dam) consists of a dam (for hydropower, irrigation and flood control), a hydroelectricity generating power station, and an irrigation command area. It was commissioned at the end of 1985 after a construction period of approximately five years, and was financed by the World Bank through the International Development Association and the Kreditanstalt für Wiederaufbau, a Germany promotional bank that specializes in development assistance for developing countries. The total cost of the project was US\$270 million, including US\$156 million in foreign exchange. World Bank financing was provided through a loan for US\$90 million. A project completion report (PCR) was issued in June 1992, covering both the power and irrigation components. An operations evaluation impact (OED) study was prepared in 1996.

The project area is located about 65km south of the city of Mandalay in the central dry zone of Myanmar. The dam is on the Panlaung river, a tributary of the Ayeyarwady, about 15 km upstream of a pre-existing weir. According to Myanmar's National Commission for Environmental Affairs (1999) the total "project area" is about 80km from north to south and 30km east to west. This apparently refers to the dam site, including the power house, the area of the reservoir, and the irrigated command area.

The project area is part of the dry central zone of Myanmar, and has a tropical monsoon climate with three distinct seasons. The annual rainfall is approximately 1060 mm in an around the dam site but is only about 810 mm in the irrigated command area. There is practically no rainfall from December through March. Temperature variation at Mandalay ranges from an average in January of 21.1°C to an average in May of 30.6°C. However, minimum temperature can fall below 10°C, and the maximum temperature can rise above 40°C. Humidity varies with temperature and rainfall, and leads to considerable evaporation in the hot dry months from March to May. The catchment area of the Panlaung river at the dam site measures about 2,240 km². Annual stream flow (1950-77) averaged about 1,400 mm³ at the dam site, which fluctuates depending on rainfall in the upper basin area. Minimum stream flow usually occurs in March-April.

Table 7.1 Kinda Dam Multit-purpose Fact Sheet

Project Objectives

Primary Objective: Economic Growth

Secondary Objectives:

Hydro-electric generation

Irrigation

Flood control

Turbine

Type: Francis

Capacity

Speed: 250 rpm

No. of units: 2

Site Location

Mandalay Division, Myinttha township

65 Km South of Mandalay

Generator

Capacity: 2 x 28 MW

Annual energy: 165 Gwh

Hydrology

Catchment area rainfall: 1060 mm

Irrigable area rainfall: 810 mm

Catchment area (dams site): 2240 km²

Catchment area (weir site): 2445 km²

Mean annual inflow: 1.399mm³ (1950-77)

Spillway

Size: 29'-6" x 34' x 4" with shutter

Conduit

Length: 465 m

Maximum discharge: 114 m³/sec

Size: diameter 7.4 m

Dam

Type of dam: Rockfill dam
Dam height: 72 m
Crest elevation: RL 213.36 m
Crest length: 625 m
Crest width: 10 m
Storage volume (MOL): 970 mm³
Active storage volume: 764 mm³
Maximum operating level: RL 207.25 m
Minimum operating level: RL 175.5 m
Diversion tunnels: 1
Length: 465 m
Diameter: 7.8 m

Service Area

Irrigable area: 175000 acres
Crop area: 201,381 acres (1994-95)

Implementation Period

Project start: 1981-82
Project completion: 1989-90

Project Financing

World Bank loan: US \$90 million
Total Project Cost: US \$ 270 million
including in foreign
exchange of US\$156M

Penstock

Length: 2 x 30 m
Diameter: 3.2 m

Project Reports³⁹

Staff Appraisal Report (SAR) 1980
Project Completion Report (PCR) 1992
Operations Evaluation Impact study 1996

Power House

Type: Shaft powerhouse

The first investigation of the dam site was undertaken during 1967-71 by the Irrigation Dept of Myanmar. In 1975, Engineering Consultants Inc.(USA) was commissioned to prepare a feasibility report, which was subsequently appraised by the IDA in May-June 1976. Additional IDA-financed engineering studies were carried out by Lahmeyer International (Federal Republic of Germany). A Staff Appraisal Report (SAR) was submitted to the IDA in May 1980.

Kinda Dam was constructed with the objective of exploiting irrigation releases by producing hydro-electric energy prior to conveying and supplying an irrigated command area. Reservoir operation studies were undertaken assuming a maximum operating level of 207.26 m asl and minimum operating level of 178.61m asl. Reservoir releases were designed primarily to correspond to irrigation demand. The project was designed to generate a maximum capacity of 56 MW (two units of 28 MW each), and an average annual energy production of approximately 165 GWh. The Kinda reservoir was formed by a 71.93-metre-high rockfill dam on the Panlaung River. Water is released from the reservoir through the hydro-electric plant. Storage at the maximum operating level is 969.5 MM³ and the active storage is 763.2 MM³. The existing Kinda weir was rebuilt as a regulating dam with 2.2 MM³ of storage.

The first release of water from the reservoir took place in August 1985, and power reached the national grid on schedule in January 1986. The irrigation component of the project was delayed and completed in 1991, over four years behind schedule. Before the construction of the Kinda Dam the existing Panlaung irrigation system, which included three diversion weirs on the Panlaung river, irrigated about 35,600 ha. The Kinda Dam improved agricultural production on the existing 35,600 ha and was planned to bring an additional 43,300 ha of rainfed area, predominantly bushland, under irrigation (this is less than was initially estimated to be irrigated in the original Staff Appraisal Report carried out in 1980. The combined planned irrigated area was 78,900 ha.

Runoff from the catchment area upstream from the dam site is quite variable and predominantly occurs during the monsoon season. Over the 1950-77 period annual runoff varied from a minimum of about 965 MM³ (1972) to maximum of 2,400 MM³ (1956), with an annual average of about 1,400 MM³. [But] from 1986 through to 1998 the average inflow was [only] about 1,110 MM³, or approximately 76 percent of the 1950-77 average. Due to the below average rainfall in the catchment during this period (1986-98), the average release was about 1,056 MM³, again roughly 76 percent of the planned average irrigation; thus the actual irrigated area is closer to 70,800 ha. During these years hydropower production was given priority in

the winter months, when the demand for irrigation was less than the water released. This contributed to water shortage during periods of higher irrigation demand.

Due to head variations the Kinda Dam energy generation has varied significantly over its life. Since commissioning in 1986 the power station has generated on average 106.1 Gwh annually, which is far below the annual targeted production of 165 GWh. There has been only two years, 1992 and 1993, when annual energy production has exceeded the target of 165 GWh (Table 7.3).

Table 7.3 Annual Inflow, Release, Maximum and Minimum Water Level and Energy Generation, Kinda Dam. p 125 = doc p 136

Year	Annual inflow (Ac ft)	Annual release (Ac ft)	Water level (ft)		Peak (MW)	Annual Generation (Gwh)	Rainfall (inch)
			Min	Max			
1985	700038	231942	-	-	-	-	-
1986	749280	714648	-	-	-	83.1	-
1987	775506	711813	646.1	619.4	-	104.5	-
1988	768765	850139	639.9	612.3	-	117.9	38.78
1989	964934	764111	647.6	592.9	-	99.5	34.57
1990	723885	1048544	646.0	591.5	41.2	135.5	35.00
1991	1004937	647629	649.5	489.0	40.9	82.2	44.21
1992	1359135	1130655	676.8	616.0	56.0	183.9	43.05
1993	897386	1251621	663.4	600.1	52.9	167.6	44.07
1994	748612	765046	614.4	569.8	32.6	74.8	30.51
1995	724218	549902	629.2	562.0	37.4	42.7	37.17
1996	1010177	836322	649.4	601.1	45.5	116.8	42.13
1997	840561	1113946	646.2	587.1	46.5	126.9	29.72
1998	629670	729801	602.4	559.4	31.2	43.1	28.85
Mean	861313	855244				106.1	37.09

Due to study constraints, little can be said in detail about key environmental issues often associated with dams, such as impacts on fisheries and biodiversity, habitat loss, area flooded by the reservoir, downstream hydrological and geomorphological changes, and reductions in water quality; or the impacts associated with dam construction and the construction and operation of associated roads and transmission lines. It seems unlikely that a fish species inventory was carried out in the project impact area during the dam planning and design phases, or that the possible impacts of the project were identified. According to a report issued by National Commission for Environmental Affairs (NCEA) of the Myanmar Government in 1999, the growth, spread and persistence of aquatic weeds in the newly irrigated project area is the most serious environmental problem in the scheme. The report also states that poor drainage in the canal system, combined with a pattern of cropping requiring large amounts of water, has resulted in extensive water logging and salinization. The drainage problems are a result of “inappropriate design and planning of project”.

A water quality monitoring program has been carried out continuously since the formation of the reservoir (NCEA, 1999). The purpose of this programme is most likely to assess the quality of the irrigation water supply and also to monitor water quality with regard to the hydroelectric powerhouse, but is also useful for fish culture management. Oxygen content and other parameters are monitored. Water quality is reported as being good, and no conditions have been observed so far which would inhibit fish development. However, it is not clear if the water quality monitoring programme is confined to reservoir water or if it also includes sampling of dam discharge water. The dam wall is 72 m high and the turbines installed are of the high head Francis type. Drawdown is substantial at 28.65 m. It is therefore possible that deoxygenation of the hypolimnion occurs annual during the dry season. This suggests that water low in oxygen (and possibly containing toxic hydrogensulphide) is discharged downstream for part of the year. A negative impact on downstream fisheries and fish biodiversity could be expected under such conditions.

According to NCEA (1999) deforestation has become an issue in the project area, arising from shifting cultivation in the upper parts of the area and heavy fuelwood consumption in the lower parts. In response UNDP and the Government of Myanmar established in 1997 the project "Pilot Watershed Management for Kinda Dam". The NCEA (1999) reports that these programmes successfully introduced watershed management technologies "appropriate" for Myanmar. Since the idea of watershed management was new to the staff of the Forest Department and to the rural people living in the catchments, it was decided first to start with a pilot project. A 24,300 ha demonstration area was selected for the pilot project in the 222,600 ha watershed area near Ywangan township in Shan State. The Food and Agriculture Organisation of the United Nations (FAO) was designated as the executing agency and Myanmar Forest Dept as the counterpart agency responsible for project implementation. The UNDP contribution was US\$3.3 million and the Government contribution was K20.2 million. A pilot demonstration area was established, including multipurpose nurseries, species trials, and small scale planting. A total of about 90 miles of roadside plantations were established. Woodlots belonging to the Forest Department were established on approximately 320 ha in six village tracts in the project demonstration area. To protect the plantations, a fire protection plan was developed and 50 village guards appointed following a brief training season.

According to NCEA (1999), the project resulted in almost "negligible" resettlement of persons displaced from the reservoir area. However, the construction of the dam entailed the flooding of 4 villages with a total of 96 households (426 person), as well as 29 ha of irrigated paddy and about 113 ha of rainfed cropland. The ratio of displaced persons to the power generation (which according to Goodland, 1997, is a reliable "first" approximation to distinguish between "better" and "worse dams") is approximately 7.6 displaced persons/MW, which, while much lower than the ongoing Three Gorges Dam (71 displaced persons/MW) or the Akosombo/Volta Dam in Ghana (96 displaced persons/MW), is on the same order as the controversial Nam Theun 2 Dam in Lao PDR (8 displaced persons/MW) and the Ertan Dam in China (9 displaced persons/MW). The project is said to have provided for the resettlement of these peoples, including compensation of loss for immovable private and communal property and a subsistence allowance for about 6 months. Each family was provided an approximately 15m x 30m residential plot and a new house. The agricultural land given per family was 0.8 to 2 ha depending on the number of family members.

No information is available indicating if, during the planning and development, a public consultation and stakeholder dialogue process was undertaken. NCEA (1999) notes that in the past a "top-down" planning approach had been widely used in Myanmar development programmes that concerned local peoples, with minimal success, if any, and without active participation of the stakeholders. It is further noted that under the previously mentioned "Pilot Watershed Management for the Kinda Dam" project, a "bottom-up" approach was introduced, including direct people's participation in initial planning, implementation, and maintenance, and this has proven to be a successful mechanism for motivating communities and farmers to improve land-use practices. According to NCEA (1999), initiatives such as the species trials and the small scale planting demonstrated in the pilot watershed areas have heightened awareness on the part of the government and local communities on the need for immediate action to reverse the trends in environmental degradation in the area. Expansion to a full-scale integrated watershed management program is envisaged in this area during subsequent phases of the watershed management technical assistance programme.

Of particular note in evaluating the environmental sustainability of the project is the fact that production of paddy is [only] 40pc of the projection made in the initial staff appraisal report. One of the reasons offered for this in the NCEA report (1999) is that most farmers had pursued different cropping patterns after initially agreeing to plant paddy "in support of government's rice export campaign". A World Bank OED study on agro-economic impacts of investments in gravity-fed irrigation schemes in the paddy lands of south-east Asia (1997), which included the Kinda Dam, found that that the area supplied by the irrigation system is usually considerably less than planned, and in general noted that amongst the six sites studied reasons included over-optimism, engineering errors, lower than normal rainfall, and failures to extend the tertiary canals. More significantly, the report concludes that smallholder irrigated paddy can no longer provide the basis for a growing, or even stable, household economy.

As far as energy generation is concerned, the Kinda Dam output has varied significantly. Since commissioning in 1986 the power station has generated on average 106.1 Gwh annually, which is far below

the annual targeted production of 165 Gwh. In only two years, 1992, 1993, did the annual energy production exceed the target of 165 Gwh.

Overall, the Economic Rate of Return (ERR) is considerably lower than originally estimated, primarily due to the decline in the international price of rice (NCEA, 1999). The original projection for 1990 rice prices, made in 1980, was US\$ 700/ton. The actual midyear 1995 price was US\$ 237/ton. According to the original staff appraisal report in 1981, it was projected at 21.3 pc. At the time the project was completed in 1992, it was calculated at 14.0 pc. An operations evaluation study prepared in 1996 reported the actual figure at the time was 7.4 pc. For the Government of Myanmar (the borrower), an ERR of between four and seven percent is acceptable given the visible sign of improvements over large areas previously rainfed. The Government of Myanmar is satisfied that the project has been successful.

Given the lack of documentation on the project (and in particular the lack of access to official World Bank project Staff Appraisal Reports (SARs), Project Completion Reports (PCRs), and Operations Evaluation Impact Studies (OEDs), the inability of the authors to visit the site; and the inability of the authors to conduct Qualified Observer interviews in-country, it is impossible to draw any comprehensive conclusion about lessons learned. The project [appears to be] economically sustainable. However, some doubts have arisen regarding the full achievement of anticipated benefits, as the inflow into the reservoir has so far not exceeded 76 percent of the expected inflow. Though the last few years have been dry years all over central Myanmar, the possibility of errors in the initial analysis cannot be ruled out. Even with reduced inflows, the project benefits could be maximised with maximum use of rainfall, prudent water management on the farm and keeping the power station closed when there is no irrigation demand. Extension service for irrigated agriculture, especially for promotion of non-paddy crops requiring less irrigation water, has to be actively pursued and strengthened. The fact that the lender (World Bank) has no long term involvement with the Kinda Dam project, or even the borrower country, highlights the need to maintain longer term monitoring programs in order to more accurately assess positive and negative social and environmental impacts, and to learn from these experiences.

Internal references

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 World Bank, 1992. *Project Completion report (PCR)*, World Bank, 1996. *Operations Evaluation Impact Studies (OEDs)*

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-09: Mandalay
 Kinda dam and power station, north of Nyaunggyat [21° 06' N, 96° 19' E], grid sq ref: 12\9, 26\4
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-9.jpg>

The sluice gates and spillway are easily located on Google Earth at 21° 09' 45" N, 96° 19' 16" along with penstocks, power house and the large reservoir behind the dam.

Additional references

Data summary: [Kinda](#)
 NLM, 22/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08n1m/n080222.htm>
 Dredging of the left canal at Kinda Dam in Myittha township to improve the flow of water through the canal. U Kyaw Myint, head of the Kinda power station, reports on the flow of water flow into the dam and its supply of electric power to the national grid. An electric pump station is being installed to supply water from the dam

to irrigate 30,000 acres in the Daingkaunggon area (21° 12' N, 96° 02' E) in Wundwin township. The project which is a part of the plan for greening the Meiktila plain will be completed over a three year period.

Department of Irrigation, Myanmar Ministry of Agriculture and Irrigation, [undated, circa 2004]

<http://www.irrigation.gov.mm/works/majorirrigationworksconstructed.html>

Kinda multipurpose dam in Myittha township, a rock-filled dam, 2,034 feet in length, 236 feet in height, with a storage capacity of 873,580 acre-feet. The irrigation potential works out to a command area of 201,500 acres and a cropping area of 328,390 acres. It also generates hydro-power from two turbines, each having an output of 28 megawatts, together capable of producing 165 million kilowatt-hours annually. It is the largest reservoir in Myanmar according to storage capacity and dam height. The Irrigation Dept renovated the existing 215.7-mile canal system and constructed new canals, totaling 498 miles. Construction of the dam was initiated in 1980-81 and completed in 1990-91.

Myanmar Nyauggyat (Kinda) Dam Multipurpose Project [Evaluation] Report, September 2002

http://www.jbic.go.jp/english/oec/post/2002/pdf/069_full.pdf

A Japanese loan in the amount of 3,081million yen (US\$12.8 million), repayable over 30 years, was made to assist with irrigation and agricultural parts of the project. An evaluation carried out in Sept 2001 also included references to hydropower side of the project.

Table 1 Comparison of Original and Actual Project Cost Unit: Million US Dollars

Items	Projected Cost			Unit: Million US Dollars Actual Cost		
	Foreign Currency	Local Currency	Total	Foreign Currency	Local Currency	Total
Multipurpose Dam	77.0	24.5	101.5	69.69	39.71	109.40
Hydropower Station	45.0	18.0	63.0	48.58	17.30	65.88
Irrigation and Drainage Facilities	24.6	30.4	55.0	19.18	52.34	71.52
Agriculture Support	2.0	2.2	4.2	0.26	1.45	1.71
Agriculture Mechanization	1.5	0.9	2.4	0.69	0.63	1.32
Valley Survey & Detail Engineering	6.4	0.8	7.2	7.00	0.80	7.80
Utilization of Underground Water	1.5	0.2	1.7	1.20	0.20	1.40
Total	158.0	77.0	235.0	146.60	112.43	259.03

The design capacity of the hydropower station (28 MW x 2 Units) was confirmed in performance tests conducted in December 1985. The station commenced supplying energy to the National Power Grid in 1986. Yearly unit generation fluctuates between 31 to 222 GWh (target value = 165 GWh). This fluctuation of generation was caused by demand side requirements and was not due to the matters in the hydropower station. The present function of the hydropower station has been peak shaving, and it is now operated under the standard operation pattern (utilization factor = 37.2%, equivalent to 173 GWh generation).

WPD, 23/03/90. <http://www.ibiblio.org/obl/docs3/BPS90-03.pdf>

Kinda Multi-Purpose Dam Project formally inaugurated, built at a cost of K1,759,400,000, including US\$184,200,000. Through its canal system it will irrigate 201,500 acres of arable land.

Michael Aung Thwin, *Irrigation in the Heartland of Burma: Foundations of the Pre-Colonial Burmese State*, (Centre for Southeast Asian Studies, Northern Illinois University, Occasional Paper No. 15, 1990), pp 14 – 18. [not available on-line]

The Kyaukse irrigation system has long been considered as the most effective and efficient in Burma, relative to its size, with its origins in the Pagan period. Kyaukse's irrigation techniques, particularly weir-

canal technology was, perhaps, developed in the 10th or 11th centuries A.D. When the Irrigation Dept under the British reconstructed the Kyaukse weirs, in no case was it found advantageous to alter the site. The Zawgyi and Panlaung rivers were the foundations of the Kyaukse's irrigation system. The Panlaung had five weirs: the Kinda, Htongyi, the Kinda II (or Pinda), the Nathlwe and the Kyime.

Sekhar Bandyopadhyay, *Burma To-day: Development and Political Control since 1962: June 1987* (Papyrus, 1987), pp 58-60. [not available on line]

The idea of the Kinda project was born in 1967, when the government set up a joint survey and study team composed of Soviet and Burmese experts to devise means for a systematic utilization of the water of the Panlaung river. The team produced a preliminary feasibility report and during 1973-74, a request for financial assistance was made to the World Bank for the implementation of the project. The Bank agreed to finance the project, whereupon in 1975 an American firm made a fresh feasibility study, after which international tenders were invited. A West German firm, Lehmeyer International won the tender bid and in 1978 it submitted the final feasibility report, which was approved by the World Bank and the required financial loan was given. In 1981-82, the Kinda Multipurpose Dam project was initially implemented, the total capital investment for the project being K1,586 million kyat, out of which K1,070 million [was] in foreign exchange. The project had two aspects: the construction of a dam and the building of the hydroelectric power house. Later on, Hyundai Construction of the South Korea was given the contract to construct the dam, while the West German firm is responsible for the hydroelectric power project. The whole project was expected to be completed within 1986.

In order to develop the infrastructure for the project, the Irrigation Dept has undertaken the construction of new irrigation canals and the renovation of existing canals. The renovation work involves the removal of silts, repairing of pipes, sluices and sluiceways in the existing diversion canals. In addition, a main canal, about 78 miles long, 32 feeder canals having a total mileage of 32 miles, and 304 smaller canals with a total length of 280 miles are among the proposed construction plans. To protect against floods, an embankment, 26 miles long, is being built along the Panlaung river, together with another 6-mile-long embankment along the Paukchaung stream. For the transportation of farm products of the area, a 38-mile-long road is also under construction, together with a proposed all-weather road, 110 miles long, along the main canal. As a result of the project, the annual value of the agricultural produce of the area is expected to increase from over 106 million kyat to over 501 million kyat. It is calculated that in about eight years to total cost of the project will be recovered.

WPD, 17/04/87. <http://www.ibiblio.org/obl/docs3/BPS87-04.pdf>

Kinda dam multipurpose project was implemented in 1979-80 and by 1986-87 the main dam and minor dams were completed, as were 50pc of the irrigation works; when completed it will irrigate 201,500 acres of land and 322,400 acres of cropland, and generate 165 million kWh of electricity annually.

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Appendix 11

KEY [WEBSITES](#) FOR ACCESSING INFORMATION ON MYANMAR'S ELECTRICAL INDUSTRY

ASEAN Energy Centre

<http://www.aseanenergy.org/>

The Myanmar electricity section provides barebones information on MEPE, installed capacity, production and sales, completed, ongoing and future generation projects and information about possible grid connections between Myanmar and Thailand. The Myanmar information has not been updated since the beginning of 2001.

BurmaNet News

<http://www.burmanet.org/news/>

This widely used resource provides news articles from a wide spectrum of agencies five times a week. Both 'keyword' and 'calendar' search facilities are available through this page for editions of the BNN from July 2004 up to the present. For 'calendar' searches of editions of the BurmaNet News from 1994 to 2001 use the reg.burma archive. <http://www.ibiblio.org/obl/reg.burma/> For 'keyword' searches of the reg.burma archive use <http://www.ibiblio.org/obl/cgi-bin/reg.burma/namazu.cgi>

Burma News International

<http://www.bnionline.net/>

The 'keyword' search facility on this page gives access to articles from the ten news organizations that form the BNI network. 'Calendar' searches can be made by consulting the archives, also available on this page.

Burma Rivers Network

<http://www.burmariversnetwork.org/>

This site, which was first uploaded in the latter part of 2008, has been developed by a coalition of environmental organizations opposed to large-scale hydropower developments in Burma. Maps, photos and information about major hydropower projects in the country, as well as news about protest activities and publications, are featured. The news and publications sections are regularly updated but little is done to keep other information on the site current.

Central Statistical Organization of the Myanmar Ministry of National Planning and Economic Development

<http://www.csostat.gov.mm/>

<http://www.csostat.gov.mm/slIndicators.asp>

Monthly Indicators 9 and 10 show electric power generated and sold and production by generation types. Current monthly stats are updated quarterly. Past monthly stats are retained for two years, then rolled into financial year totals. This site is frequently difficult to access.

Country Presentation Myanmar: Franco-ASEAN Seminar, 6-7 September, 2007.

<http://burmalibrary.org/docs4/Tin%20-%20Myanmar%20-%20Presentation.pdf>

An up-to-date presentation on the two Ministries of Electric Power and current, planned and completed generation and transmission projects. Useful maps on the locations of the projects are provided.

Country Report Myanmar on Infrastructure Development with a focus on Public Private Partnerships (PPP), 2007. http://www.unescap.org/ttdw/ppp/reports/Myanmar_6july2007.pdf

The sub-section entitled 'Power Sector' (pp 23-28) has a useful summary of developments on the national scene up to 2007. The report has very little to say about 'public-private partnerships' in the electricity sector except for a reference to the need for "a sharp increase" in private participation in developing the infrastructure of the national grid system and a vague assertion that the private sector has co-operated with the MEPE "to a workable extent".

Country Report Myanmar on Power Development Plans and Transmission Projects, Greater Mekong Region ADB Consultation, 21 November, 2008.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

This is a set of slides accompanying the Myanmar presentation at an ADB consultation in Ho Chi Min city in Vietnam. Updated maps showing projected transmission grids are included.

Directorate of Industrial Supervision and Inspection

<http://www.industry1myanmar.com/English/DISI/disi.html>

Among other things, this division of the Ministry of Industry-1 is responsible for the inspection and approval of electrical installations in public buildings, housing estates and industrial enterprises under Myanmar Electricity Act enacted in 1984. It also includes competency certification for electricians and electrical engineers.

International Energy Agency

<http://www.iea.org/Textbase/stats/>

This website provides country-specific statistics and graphs on production, consumption and pricing of oil, natural gas, coal and electricity. The data for Myanmar is typically two to three years out of date. Useful for comparison purposes with other countries in the region.

Irrigation Department of the Ministry of Agriculture and Irrigation

<http://www.irrigation.gov.mm/works/default.html>

This site has valuable information on many of the multipurpose dams constructed in Burma/Myanmar over the the last 50 years. The following sections are of particular interest for the data related to the hydro-electric installations at these dams

<http://www.irrigation.gov.mm/works/between1962and1988.html>

<http://www.irrigation.gov.mm/works/1988.html>

<http://www.irrigation.gov.mm/works/majorirrigationworksconstructed.html>

<http://www.irrigation.gov.mm/works/datarelativetomajorirrigationwork.html>

Water in the multipurpose dams appears to be reserved primarily for agricultural purposes. Operation of the dams at these locations is the responsibility of the Department of Irrigation, while intake and discharge of water used for hydro-electric generation is the responsibility of Hydropower Generation Enterprise. Technical data on river flows and dam capacities on this site can be usefully cross-checked with information available in the key articles and supplements in the compendium.

Ministry of Electric Power No 1

The old website of the EPM-1 <http://www.energy.gov.mm/MEP_1.htm> is no longer accessible. Recently, a blogspot was set up for this ministry <http://moep1.blogspot.com> . It features news items in English and Burmese about the ministry as well as a set of a dozen slides showing the hydropower stations currently in operation. According to the main page of the blogspot, a Ministry website with the URL <http://www.moep1.gov.mm/> is under construction. Perhaps, a similar website for EPM No 2 will emerge in due course.

Myanma Machine Tools and Electrical Industries (MMTEI)

<http://www.myanmargeneva.org/e-com/MOI-2/MOI-2/myanmar.com/Ministry/moi2/mtei.htm>

MMTEI is one of four manufacturing enterprises under the aegis of the Ministry of Industry-2 (formerly Ministry of Heavy Industry). MMTEI manufactures electrical and electronic products in seven factories: at Nyaungchidauk in Padaung township, on Parami road in Hlaing township in Yangon, on Mogok street in Dagon South township, at Sinda in Padaung township, at Indagaw in Bago township, in the Pakokku industrial zone in Myaing township, and at Thagara in Yedashe township. A branch of the Dagon South factory also operates a workshop that produces electric irons and rice cookers in the old MMTEI factory on Inya Lake road in Yangon. Note that neither of these websites provides information on recent developments at the newly opened MMTEI factories in Pakokku and Thagara.

An major article on the factories and training institutions of the Ministry of Industry-2 in NLM on 25/0710 mentioned a research and development centre set up by the Myanmar Industrial Development Committee to carry out research on the products of industries under the ministry but did not provide further information.

<http://www.burmalibrary.org/docs09/NLM2010-07-25.pdf>

Myanmar Information Management Unit (MIMU)

<http://www.themimu.info/>

This website grew out of the international response to Cyclone Nargis in 2008. It hosts a growing collection of detailed maps covering many parts of Myanmar. See especially the section States / Division Maps.

Myanmar On-line Archives of the Myanmar Ministry of National Planning and Economic Development

<http://www.myanmararchives.com/>

In the section, Industry, Mines and Power, there is historical data on electric power installation, production and sale from 1985-86 up to 2006-07.

Myanmar States, Divisions/Townships

http://www.burmalibrary.org/docs6/MIMU001_A3_SD%20&%20Township%20Overview.pdf

This two-page document consists of a map outlining the borders between Burma/Myanmar's 325 townships and information about a proposal for standardizing the English spelling of place names including those of the village tracts and villages in Burma Myanmar. According to the document, all place names in the country have been assigned a P-code that identifies them by number. This must have been quite an undertaking since there are more than 60,000 villages in Burma. Users of the compendium will find the map useful for pinpointing the approximate location of many of the place names mentioned in the news items and other reports contained in this document.

Myanmar Times

<http://mmtimes.com/>

This is an excellent source of information about both privately- and state-owned companies and projects of Burma/Myanmar's electrical industry. 'Key word' searches are best carried out through Google. Recently an archive going back to Issue 369, June 4 – 10, 2007 was added. Note that many of the older articles from the Myanmar Times that were previously available on the Internet through the <http://www.myanmar.gov.mm/> archive have disappeared. Some of these older articles can be traced through on-line list-servs such as the Yahoo's Myanmar Information discussion group: http://dir.groups.yahoo.com/group/myanmar_information/

New Light of Myanmar

Much information available about state-operated industries and projects is available through this source. For 'keyword' searches of the on-line editions 1998 - 2003, use

<http://www.burmalibrary.org/cgi-bin/NLM/namazun.cgi>

For 'key word' searches of the on-line editions from July 2003 to the present, use

<http://www.foreverspace.com.mm/fulltext/default.aspx>

For 'key word' searches of editions of the Working People's Daily (WPD) and the New Light of Myanmar (NLM) 1987 – 1996, as reported in the Burma Press Summary, use Google.

Access to the on-line editions and print editions of the New Light of Myanmar from 1988 to the present is available through <http://mission.itu.ch/MISSIONS/Myanmar/NewsArchives/newsindex.htm>

The On-line Burma Library (OBL) also has a readily accessible archive of the print edition of NLM from Oct 2003 to the present. The same page also provides links to the archives of other state-owned media.

<http://www.ibiblio.org/obl/show.php?cat=1449&lo=d&sl=0>

To access the archive of the Burma Press Summary of the editions of WPD and NLM from 1987 – 1996:

<http://www.ibiblio.org/obl/show.php?cat=1455&lo=d&sl=0>

An archive (2001 – 2005) with feature articles from the print edition of NLM (not normally available in the on-line edition), formerly available at <http://www.myanmar.gov.mm/> has disappeared from the Internet. Some of by-line features can still be traced through on-line list-servs such as the Yahoo's Myanmar Information discussion group: http://dir.groups.yahoo.com/group/myanmar_information/

Online Burma/Myanmar Library

<http://burmalibrary.org/>

The library, which hosts this compendium, provides links to a vast array of publications, articles, websites and other sources of information and opinion about Burma/Myanmar. For starters on the 'electrical industry', consult the following sections of OBL's 'Main Library' division: Economy > Industry > Manufacturing > Electrical; and Economy > Infrastructure > Energy. OBL's 'Reading Room' provides permanent archives and useful links to countless publications in English and other languages that are referred to in this compendium.

Salween Watch

<http://www.salweenwatch.org/>

The Salween Watch bills itself as 'a coalition of organizations and NGOs that deal with Burma-related environmental issues'. 'It was set up with the primary aim of preventing the building of harmful hydro-electric power dams on the Salween (Thanlwin) river.' The site is updated regularly and provides ready access to recent publications by coalition members. A newsletter is available. Fourteen issues of the Salween Watch Update from February 1999 to March 2003 are available through a permanent archive maintained by the On-line Burma Library <http://www.ibiblio.org/obl/> The SW archive can be accessed directly through OBL's 'Main Library' division: Economy > Infrastructure > Energy > Hydroelectric > Dams.

Appendix 12

THAUKYEKCHAT HYDEL POWER PROJECT: NOTES

Kyaw Thu, Myanmar Times, 26/11/07. <http://www.mmtimes.com/no394/b005.htm>

Two private Myanmar companies developing hydropower projects are planning to hire foreign consultant companies, said an energy expert close to one of the companies on 20/11/07. Asia World is slated to build the Thaukyegat hydropower project in Bago division, which is expected to produce some 140 MW of electricity, while Olympic Construction will build the Baluchaung No 3 project in Kayah State. "The two companies have been running feasibility studies and preparing to submit a proposal to the Myanmar Investment Committee," the expert said. However, he refused to say which company – or companies – Asia World is planning to hire, or to state the value of any such deal, although he did say what its role would be. "The foreign consultancy company will help us to draw-up a project design and monitor the overall construction," he said.

Compiler's Note: Reference is made in the items below to two hydropower projects on Thaukyekhat creek. Most of the reports are concerned with Thaukyekhat-2 dam and power station in the lower valley of the Thaukyekhat. This project is well underway and currently being carried out by Asia World Co under contract with EPM-1. A second project referred to as Thaukyekhat-1, which appears to be farther up the river valley, is still on the planning boards of the ministry, but seems destined to stay there for the foreseeable future. .

Plans for a hydropower project on the Thaukyekhat go back to the late 60s and early 70s. An interim report published jointly by Engineering Consultants, Inc of Denver, Colorado, and the Electric Power Corporation of Burma in Sept 1973 gave details. A bibliographical entry can be found in R. Lee Hadden, *The Geology of Burma (Myanmar): An Annotated Bibliography of Burma's Geology, Geography and Earth Science*, 2008, p 100. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA487552&Location=U2&doc=GetTRDoc.pdf>

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: NE 47-05: Toungoo Thaukyaykhat creek dam, near Tonbo [18° 55' N, 96° 37' E], grid square reference: 9\9, 26\1
<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-ne47-5.jpg>

Additional references:

Project data [Thaukyegat-2](#)

NLM, 26/11/10. <http://www.burmalibrary.org/docs09/NLM2010-11-26.pdf>

An agreement was signed by U Myint Zaw, D-G of the Hydropower Implementation Dept and an [unnamed] official of Shweswam-in Co Ltd for the supply of machinery and equipment for the Thaukyegat-2 hydropower project.

Ko Tin Hlaing, NLM, 31/08/10. Edited and condensed.

<http://www.burmalibrary.org/docs09/NLM2010-08-31.pdf>

Thaukyaykhat-2 hydropower project-2 is located on Thaukyaykhat Creek about 14 miles east of Toungoo. It is part of the Sittoung basin development project. Experts of the UNDP and Myanmar engineers carried out a feasibility study in 1964. EPM-1 started work on the project in 2008. Inflow of water to the dam that is under construction is estimated at 3.39 million acre-feet annually. Generators with a capacity of 120 megawatts will be installed and are expected to produce 604 million kWh per year. The power plant will be connected [to the Toungoo sub-station] by a nine-mile-long 230-KV transmission line. The project involves building an approach road 8.6 miles long, 42 bridges and 144 buildings. More than 2000 white-collar and blue-collar workers are engaged. The project is currently 60pc complete and will be finished in 2012. [Photos by Ko Thant Zin in the print edition of NLM show the intake canal and sluice gate and the diversion tunnel. The diversion tunnel does not appear to be in use. Asia World Co and the Golden Energy Co are not mentioned in the article.]

Naw Noreen, DVB, 28/04/10. Edited and condensed.

<http://www.dvb.no/news/karen-army-takes-blame-for-grenade-attack/8808>

The Karen National Liberation Army (KNLA), has claimed responsibility for Tuesday's grenade attack on the Thaukyegat hydropower project in eastern Burma. The attack on the project under construction by Burma's Asia World Co injured four workers. Saw Mae Ae Sein, commander of KNLA Brigade 2, said that an elite unit had been sent to the dam site to carry out the attack. He claimed that construction work at the dam site has led to militarisation of the surrounding area as Burmese army looks to secure swathes of land for the project. "There are concerns for the survival of the local people who are facing threats of shootings, oppression, forced labour, torture and forced relocation," he said. KNLA troops launched rockets and fired heavy weapons at the dam site, while the Burmese army returned fire. The fight last for about an hour, Saw Mae Ae Sein said. "There were no casualties on our side but there were some on the government side, as well as some damage to their buildings." Construction on Thaukyegat hydropower project begun in 2003. Saw Mae Ae Sein said that around 30 villages and nearly 100,000 people will be impacted by the dam.

NLM, 30/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-30.pdf>

PM Thein Sein inspects Thaukyaykhat-2 hydropower project about 14 miles east of Toungoo. He is briefed by EPM-1 Zaw Min and the chairman of Golden Energy Co Ltd with regard to ongoing tasks, strength of heavy machinery, and workforce. The dam at site will be rock-filled with a concrete face. It will be 1253 feet long and 308 feet high. The power plant will have a generating capacity of 120 megawatts and will produce 604 million kilowatt hours a year. (Photos of the dam and project site are included in the print edition of NLM.)

NLM, 22/01/10. <http://www.burmalibrary.org/docs08/NLM2010-01-22.pdf>

A contract for the supply of HSS, EM, machinery and services for Thaukyegat-2 hydropower project was signed between Hydropower Dept of the EPM-1 and China National Machinery & Equipment Import & Export Corporation (CNMEC) of the PRC in Nay Pyi Taw on 20/01/10. Among those present was President Han Gang of CNMEC. [Compiler's note: No explanation of the terms "HSS" and "EM" provided. CNMEIEC has been a major supplier of machinery and equipment to the Yeywa hydropower project.]

NLM, 22/03/09. <http://www.burmalibrary.org/docs6/NLM2009-03-22.pdf>

EPM-1 Zaw Min reports that plans to implement the Thaukyekhat-1 and Bawgata hydropower projects are underway.

NLM, 16/01/09. <http://www.burmalibrary.org/docs6/NLM2009-01-16.pdf>

Maj-Gen Ko Ko of the MoD checks on work at the Thaukyaykhat-2 hydropower project, 14 miles east of Toungoo.

"Myanmar Country Report on Progress of Power Development Plans and Transmission Interconnection Projects", *Fifth Meeting of Planning Working Group of the Regional Power Trade Coordination Committee, Greater Mekong Subregion* (Ventiane, 17/06/08), Appendix 4, p 22.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/PWG5-Appendix4.4.pdf>

An MoU on the Thaukyegat-2 hydropower project (120 MW) was signed between the Ministry of Electric Power-1 and Asia World Company Ltd on 2nd May 2008.

NLM, 21/02/08. <http://mission.itu.ch/MISSIONS/Myanmar/08nlm/n080221.htm>

Construction of a diversion tunnel is underway at the Thaukyekhat-2 hydropower project on Thaukyekhat creek, 12 miles east of Toungoo.

Franco – ASEAN Seminar Myanmar Country Presentation, 06-07/09/07.

http://www.jgsee.kmutt.ac.th/seminar_programme/DAY%20Country%20Report%20Tin%20-%20Myanmar%20-%20Presentation.pdf

Thaukyegat dam and power station with a planned capacity of 140 MW is under implementation by the HPID. It is expected to generate 670 million kWh annually when it comes on line in 2011.

NLM, 24/09/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nlm/n060924.htm>

At a SPIC meeting, EPM No 1 Zaw Min reports that the 140-MW Thaukyaykhat-2 hydel power project will be built on Thaukyaykhat Creek near Htonbo Village, seven miles east of Toungoo in Bago division. The project will distribute electricity through the national grid. It will also protect the Sittoung basin from flooding and supply water to 50,000 acres of farmland in the Toungoo and Htantabin regions.

KHRG, Toungoo District: Update on the Dam on the Day Loh River, 30/05/06.

<http://www.khrg.org/khrg2006/khrg06b5.html>

The site of the dam on the lower Day Loh river (known in Burmese as the Thauk Yay Ka river) is at the western edge of the hills in Tantabin township of Toungoo district, just east of the plain surrounding Toungoo town. According to information gathered from local people by the Free Burma Rangers (FBR), four foreign engineers from "Japan and France" visited the site in 2002. In May 2005, six Japanese engineers visited Day Say Hta village in Tantabin township to oversee preparations for the construction of the dam and the 150-MW hydroelectric power plant. The arrival of the Japanese engineers in May 2005 probably accounts for the large force of military deployed in this relatively small area at the time. According to the website of the Ministry of Electric Power all of the preliminary studies performed for the project thus far have been conducted by tTokyo Electric Power Services Co. Ltd. (TEPSCO) of Japan. In January 2006 a number of the villages from the area around Tun Boh (just below the dam site) were reportedly issued orders to relocate to the Law Gha Inn relocation site, an area not too far from the dam site with scarce water resources, few trees, and poor soil which cannot support adequate crops. If not used to work directly on the dam and power plant itself, the villagers will almost certainly be ordered to work on related infrastructure projects, such as building and maintaining access roads to the dam site, building new army camps along those roads, and keeping them stocked with provisions by portering food and munitions for the soldiers based there. Since the beginning of 2006, the SPDC has already been ordering one villager per household from nearby villages to stand sentry at the dam site. **Compiler's Note:** See the Toungoo (Taw Oo) district map: <http://www.khrg.org/maps/2006maps/Toungoo2006b5.jpg> Note that the district and township boundaries and names on KHRG maps differ from those on most Myanmar maps.

NLM, 12/05/06. <http://mission.itu.ch/MISSIONS/Myanmar/06nml/n060512.htm>

Lt-Gen Khin Maung Than of the Ministry of Defence visits Thaukyekhat hydel power project in Htonebo village, 12 miles from Taungoo, where he is briefed by Director Tint Lwin of HPID's Construction Group 3 on work at the project site. He inspects sites chosen for building the dam and hydel power plant. When the Thaukyekhat hydel power station is completed it will produce 670 million kWh per year.

KHRG, Report on Toungoo district, 19/08/05. <http://www.khrg.org/khrg2005/khrg05f7.html>

The Burmese military junta plans to build a new dam and access road on the Thauk Yay Ka (Day Loh) river just upstream of its emergence from the hills into the plains to flow toward the Sittaung river. This dam will be downstream from Pa Leh Wah and just upstream from Tun Boh village in the Day Say Hta area (see map <http://www.khrg.org/maps/2006maps/Toungoo2006b5.jpg>). Local people have been told the dam is part of 'development', but they say it will be bad for them because every time the military junta announces infrastructure projects they confiscate land belonging to the people, demand money and materials, and force civilians to do labour. Local civilians fear that they will be unable to refuse these demands because the SPDC will enforce them with guns. To assert its control in the area and secure it for dam and road construction, an extremely large column of 2,000 SPDC soldiers was sent into the area between Tun Boh and Pa Leh Wah in May 2005.. After patrolling for several days they returned to their bases, but from the beginning of June onwards columns from LIB 599 began constant patrols between Tun Boh and Pa Leh Wah. Access to the area is now extremely difficult, so KHRG researchers have been unable to get details on the direct effects of construction activities on local villagers thus far. Other battalions are stopping all vehicles travelling along the roads between this area and Toungoo town. In the areas of Thandaung township west of the Klay Loh river, the military is checking all traffic along the roads. Small outposts, each manned by five soldiers, have also been established at regular intervals along the railway line in the Sittaung River area.

NLM, 15/03/05. <http://www.ibiblio.org/obl/docs2/NLM2005-03-15.pdf>

On a visit to Pyu creek dam site, General Than Shwe is briefed on the Thaukyaykhat hydel power project and geological data of the Sittoung river basin. He gives guidance on implementing the Thaukyaykhat project.

Monywa Copper Mine Electric Power Plant Project by BOL Scheme, Engineering Consulting Firms Association -- Japan, [late 2004].

http://www.ecfa.or.jp/japanese/act-pf/H16/minkatsu_Myanmar_Eng.pdf [doc, p14, p16]

According to a long range plan for development of electric power facilities prepared in 2001 by the Planning Dept of the Ministry of Electric Power, three turbines of 50 MW each were to be installed at the Thaukyegat hydropower project which was expected to produce 780 million kWh annually. A preliminary study had been completed by TEPCO of Japan. The project was estimated to cost US\$ 180 million and was scheduled for completion in 2006.

NLM, 01/02/00. <http://mission.itu.ch/MISSIONS/Myanmar/00nlm/n000301.htm>

On a visit to Thandaunggyi, SPDC Secretary No 2 Tin Oo mentions that the Thaukyaykhat hydel power project is now under way.

KHRG, *Peace Villages and Hiding Villages*, 15/10/00. See the section: Forced labour on roads.

<http://www.khrg.org/khrg2000/khrg0005.html>

Adding to the problems created by all the other road projects in Thandaung township, a new dam is to be built on the Day Loh River at Pa Leh Wah village. Three Japanese engineers carried out surveys in the area earlier this year and villagers have been required to work on the project. The dam at Pa Leh Wah will almost certainly result in forced relocation without compensation of the villagers at the reservoir site.

NLM, 12/11/99. <http://mission.itu.ch/MISSIONS/Myanmar/99nlm/n991112.htm>

At an SPIC meeting EPM Tin Htut presents a feasibility study on implementing the 150-MW Thaukyekhat hydel power project in Thandaung township.

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Appendix 13

SOUTH NAWIN HYDEL POWER PROJECT: NOTES

Monywa Copper Mine Electric Power Plant Project by BOL Scheme, Engineering Consulting Firms Association -- Japan, [late 2004].

http://www.ecfa.or.jp/japanese/act-pf/H16/minkatsu_Myanmar_Eng.pdf [doc, p.18]

According to a long range plan for development of hydropower resources developed in 2001 by the Planning Dept of the Ministry of Electric Power, two single megawatt generators were to be installed at the South Nawin dam which was expected to produce 10 million kWh annually. Procurement of the turbine generator sets was said to be underway. Completion was scheduled for 2003.

Additional references

Data summary: [South Nawin](#)

NLM, 01/06/03. <http://www.myanmargeneva.org/03nlm/n030601.htm>

Lt-Gen Khin Maung Than of the MoD visited the South Nawin Dam. At the briefing hall, officials reported on facts about the dam, water storage capacity, irrigation of farmlands including some 54,000 acres of monsoon paddy and 16,000 acres of summer paddy, cultivation of paddy and other crops with the use of water from the dam. At the site of South Nawin hydel power project, Deputy EPM Myo Myint and D-G Win Kyaw of Hydel Power Department reported on the project.

NLM, 15/06/01. <http://mission.itu.ch/MISSIONS/Myanmar/01nlm/n010625.htm>

Secretary-1 Khin Nyunt and party went to South Nawin Dam in Paukkhaung township where A&IMin Nyunt Tin reported on the condition of generating electricity from the dam. Later, they inspected the dam and the site where a penstock has been installed and the site chosen for construction of a hydro-electric power station.

Irrigation Dept website, [n.d.]. www.irrigation.gov.mm/works/majorirrigationworksconstructed.html

The South Nawin dam is in Paukkaung township, Bago Division. It is an earthen type, having a length of 16,674 feet and a height of 141 feet. The storage capacity at full level is 287,000 acre-feet. The potential for irrigation is 62,500 acres of command area and 98,100 acres of cropping area. The main canal covers 32 miles and the lateral canals 177 miles. Construction commenced in 1985-86 and came to completion in 1994-95. The opening took place on 28/04/95..

Irrigation Dept website, [n.d.]. www.irrigation.gov.mm/works/datarelativetomajorirrigationwork.html

South Nawin in Paukkaung township, 5082 m long, 32 m high, storage capacity, 354,015,000 cu m completed in 1995-96.

U.S. Dept of Labor website, Report on Labor Projects in Burma, Appendix III, Infrastructure Projects using Unpaid Labour 1988-1996, Sept 1998.

<http://www.dol.gov/dol/ilab/public/media/reports/ofr/burma/main.htm#AP3>

The U.S. Department of Labor has identified the South Nawin Dam, built by the Burmese regime with planning and engineering paid for by the Government of Japan, as having used some 260,000 forced laborers during the mid 90s.

NLM, 29/04/95. <http://www.ibiblio.org/obl/docs3/BPS95-04.pdf> [doc, p 95]

SLORC Secretary No 2 Lt-Gen Tin Oo spoke at the inauguration of South Nawin dam in Paukkaung township. It will irrigate 62,500 acres of catchment area and 98,100 acres of plantations. In his address Gen Tin Oo said the Overseas Economic Co-operation Fund (OECF) of Japan had conducted a survey for drafting the Project for Allround Development of the Upper Sector of Ayeyawady Delta Region from 1977 to 1979. Based on the report, consultants of the Sanyu Group were hired to draw the design for the dam beginning in April 1983. He also referred to the hundreds of thousands who had "contributed voluntary labor" for the dam. The dam cost K 1,473 million, of which K 438 million (Yen 8,150 million) was in foreign exchange loaned by the OECF of Japan. Ambassador of Japan to Myanmar Takashi Tajima expressed pleasure at the completion of the dam.

WPD, 20/08/88. www.ibiblio.org/obl/docs3/BPS88-08A.pdf [doc, p.21]

Under the South Nawin Dam Project launched in 1985-86, construction work is under way. When finished, it will supply water to 62,500 acres of land and 94,900 acres of crops.

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Appendix 14

POWER TRADING IN THE GREATER MEKONG SUB-REGION (GMS)

David Fruitman, *Review of the Energy Sector Integration in the Greater Mekong Sub-Region: A Focus on the Electricity sub-Sector* (Hanoi Resource Centre, CUTS International, February 2007). Excerpts.

<http://www.cuts-international.org/HRC/pdf/PB-2-07.pdf>

The GMS is generally considered to consist of five nations – Cambodia, Lao People's Democratic Republic (Lao PDR), Myanmar, Thailand and Vietnam – as well as parts of the People's Republic of China (PRC). As a whole, the GMS encompasses an area of over 2.5 million sq km and, as of 2004, the region had a population of approximately 313 million people. Within this region, there is incredible diversity with respect to economic development, political and legal structures. The greatest linkage between these countries from an economic perspective is their mutual access to the Mekong River – one of the most important natural resources of the region. While the GMS is rich in energy sources, it is also a region with growing energy demands, uneven distribution of energy resources and shifting needs with respect to sources of energy.

The GMS is particularly well situated to take advantage of the benefits of increased energy sector co-ordination. Focusing on the electrical sub-sector, from a supply and demand perspective, GMS members generally have significant imbalances between current and forecasted demands and available and economically viable power generation resources. The high level of electricity demand in Thailand and the growth of demand as Vietnam's industrial sector develops, explain why they are the main destinations of electricity transfers in the planned regional power interconnections. At the same time, potential benefits of

integration reflect the degree of surplus energy resources in the other GMS members, particularly in Lao PDR, which already exports most of its generated hydroelectric power and recognises power exports as a valuable source of capital. With their proximity to high demand markets and surplus in resources, Lao PDR and Myanmar are, therefore, in a particularly good position to reap significant additional benefits from increasing power exports to Thailand and Vietnam.

Table 2: Increasing Energy Needs in the GMS: Peak Demand (MW)

	Thailand	Lao PDR	Cambodia	Vietnam	Total (non co-incident)
2000	14,918	167	114	4,890	20,089
2005	21,222	280	280	7,877	29,659
2010	28,912	442	529	12,589	42,472
2015	38,519	618	799	19,169	59,105
2020	51,359	784	1,156	28,739	82,038

Source: H.S. Woldstad, T. Holtedahl, G.L. Doorman.
Large Scale Power Exchange in the Greater Mekong Subregion. 2004.

Table 3: Increasing Energy Needs in the GMS: Energy Requirements (GWh)

	Thailand	Lao PDR	Cambodia	Vietnam	Total (non co-incident)
2000	96,781	865	586	26,722	124,954
2005	134,794	1,528	1,329	44,230	181,881
2010	184,213	2,468	2,502	72,014	261,197
2015	245,948	3,472	3,848	111,333	364,601
2020	328,429	4,437	5,720	169,428	508,014

Source: H.S. Woldstad, T. Holtedahl, G.L. Doorman.
Large Scale Power Exchange in the Greater Mekong Subregion. 2004.

Geographically, the proximity of the GMS countries as well as their ties through the Mekong river makes economic international power interconnections and trade practical. In 1998, the Experts Group on Power Interconnection and Trade (EGP) was created to promote the development of a GMS transmission network and facilitate the expansion of cross-border power trade. In addition, the EPF and EGP adopted a Policy Statement on Regional Power Trade in 1999, which was subsequently adopted at the GMS Ministerial Meeting in January 2000. The Policy Statement was intended to provide a framework for promoting opportunities for extended economic cooperation on regional power trade and facilitating the implementation of priority power projects in the GMS. It called for an intergovernmental agreement to advance regional electricity trade. This represented a significant commitment by GMS ministers to integrating national power systems into a regional grid. An ADB technical assistance project (2000-02) -- the Regional Indicative Master Plan on Power Interconnection in the GMS -- strongly supported the case for economic and environmental benefits arising from regionally harmonising the development of power systems in the GMS. It recommended significant investments in power plants, transformer stations and the development of a high capacity interconnection grid with the goal of linking the GMS electricity pool.

The signing of the Intergovernmental Agreement (IGA) on Regional Power Trade in 2002 accelerated this integration process. The IGA, fully ratified by all GMS members by 2005, represented a strong ministerial commitment by each of the signatories to help implement priority power projects and to address technical, economic, financial and institutional issues in promoting power trade. The IGA also supported a transfer of generation from thermal to hydroelectric. It called for the establishment of the Regional Power Trade Coordination Committee (RPTCC) to actively coordinate the implementation of regional power trade. The RPTCC was established in 2004 with a number of explicit responsibilities to finalise an operating agreement

setting out the rules of regional power trade – the Regional Power Trade Operating Agreement (RPTOA) and make recommendations for the overall policy and day-to-day management of regional power trade.

An MoU on the Guidelines for the Implementation of first stage of the operating agreement was signed in 2005. It set out the rules and guidelines for bilateral power trading as part of the gradual process towards cross-border power interconnections and efficient and reliable power trading among the GMS countries. Two sub-groups of the RPTCC were established in 2006. The Focal Group was meant to coordinate the implementation of the RPTCC activities in each GMS country and the Planned Working Group was created to perform priority activities of the RPTCC, such as determining training requirements, and setting pricing rules and technical standards.

An ADB report (2007) on the benefits of a co-ordinated approach to the energy among GMS countries cites four rationales for a regional approach to the energy sector in the GMS: 1) topographical features of energy supply options do not correspond to national boundaries and there may be overall supply cost reductions with international source options; 2) individual markets may be too small to justify large scale investments needed to achieve scale efficiency; 3) cross-border energy supply provides diversification of sources and thus increases energy security; and 4) environmental implications that transcend national boundaries need to be integrated in energy planning if sustainable development is to be achieved. Nevertheless, a significant amount of energy is still being imported into GMS member countries – particularly hydrocarbon fuels and electricity. An interconnected energy market is expected to reduce the need for fuel imports by supplanting significant amounts of thermal energy with hydroelectric power. This will have both supply and environmental impacts throughout the GMS. Thailand's recent efforts to reduce its reliance on higher costing natural gas generated power and the environmental protests over its proposals to build new coal facilities evidence the importance of these issues. These benefits are not only driven by high energy demand of GMS members like Thailand, but also by the developing economies of presently low energy demand members such as Cambodia where it can be expected that greater percentages of the population will be put on the grid and/or switch a portion of their energy usage from fuel wood.

Enhanced co-ordination, increased investment and exploration, and increased energy trade would create larger markets justifying not only the economies of scale, but also potential economies of scope. These scope economies would not only increase energy security through source diversification, but could also reduce energy production costs (particularly with respect to peak load generation) and increase reliability. Further, increased investments may also lead to improved quality of energy supplied throughout the interconnected regional grid. It may be expected that regional power trading and an interconnected electricity market would lead to increased investments and necessitate closer economic and legal co-operation within the GMS. The co-ordinated approach to the power sector could also increase the efficiency of investments, and might even reduce total investments in generation capacity required across the GMS. A regional power market could also lead to more efficient resource exploitation and generation as new resources are discovered throughout the region. In addition to providing more efficient power generation, this might also increase the speed at which generation of assets become available which could foster improvements to national grid and distribution of power to the rural population.

The recent efforts by Thailand to address its projected energy shortages evidence the rationale for broader GMS energy sector integration. Faced with a shortage of generation assets, Thailand has recently explored initiatives to develop marine gas pipelines with Myanmar, increase coal imports from Myanmar, increase investments in hydroelectric and hydrocarbon generation facilities in Lao PDR and Myanmar and has even entered into discussions with the PRC about future electricity imports. In addition, Thailand has joined other GMS members in exploring the potential to add nuclear generation to its energy supply options. From Thailand's perspective, it thus appears that efficient energy planning involves co-operation in more than just the electricity sub-sector. The decision by the GMS members to change the name of the EPF in 2004 and the ongoing ADB project signify their desire to explore expanding trade and integration efforts beyond the electricity sub-sector. More detail with respect to the benefits of integration and cooperation in the electricity sub-sector and broader energy sector are provided in the May 2007 interim report.

Map references

To locate planned and completed hydropower dams and facilities along the Mekong and its tributaries, see the map on slide 4 of *China Hydropower Investment in the Mekong Region – Impacts and Opportunities for Co-operation*, as presented by Zao Noam and Pianporn Deetes of SEARIN at the China-ASEAN Power Co-operation and Development Forum 2007. <http://burmalibrary.org/docs2/ChinaHydroPowerInMekon.pdf>

For maps showing two scenarios for power trade connections between Thailand, Laos, Cambodia and Vietnam, see *Power Integration in the Lower Mekong*, a power point presentation prepared by Thierry Lefevre, Jean-Marc Alexandre, Jessie L. Todoc of the Centre for Energy Environment Resources Development (CEERD) for national consultations in Bangkok in 2005. This document also presents useful background information on the countries and areas represented in the GMS and initiatives directed towards power interconnections between them. It includes a somewhat dated list of electricity generating projects under planning and development in Laos and Cambodia. The maps are on slide 16.

www.onep.go.th/eia/SEA/NationalWorkshop/PresentationMeeting_SEAworkshop/Power_Integration_in_LMC.ppt

Additional references

See above: 'Chinese engineers planning grid connection with Burma (IRROL: 23/01/10)
'Myanmar, Thailand begin work on [controversial Tasang dam](#)' (AFP: 05/04/07)
'Agreement signed for [Upper Kachin hydropower](#) projects' (NLM: 02/01/07)
'South Korea's [KEPCO](#) to study improving power transmission system' (MT: 31/07/06)
'[Tribe's home](#) to be a valley of the dammed' (London Times: 22/03/06)
'Hydropower Dept and EGAT ink agreement on [Hutgyi](#) project' (NLM: 10/12/05)
'Power purchase [deal between Thailand and Burma](#) on the way' (Nation: 27/05/97)

Agreement signed during visit of General Than Shwe to India, 29/07/10.

<http://www.burmanet.org/news/2010/07/29/mea-government-of-india-joint-statement-during-the-visit-of-chairman-state-peace-and-development-council-of-myanmar/>

The Agreement mentions "the need to provide for inter-grid connectivity between the two countries" and a willingness to "cooperate in this area" of and that of "generation of electricity from renewable sources, and, where necessary, [to] set up joint projects or corporate entities for that purpose".

NLM, 02/04/08. <http://www.myanmargeneva.org/08nln/n080402.htm>

Prime Minister General Thein Sein of the Union of Myanmar attended the Third Summit of Greater Mekong Sub-region held at Convention Hall Zone A of Don Chan Palace Hotel in Vientiane of Lao People's Democratic Republic on 31 March. . . . At the signing ceremony of the MoU and Joint Summit Declaration (JSD), . . . Minister for National Planning and Economic Development U Soe Tha and Ministers of GMS countries signed an MoU on the Road Map for Implementing GMS Cross-Border Power Trading before the leaders of GMS countries.

Frank Zeller, AFP, as reported in the Myanmar Times, 31/03/08. <http://www.mmtimes.com/no412/n006.htm>

Leaders from the six Mekong River countries are meeting in Laos for two days this week to discuss closer integration, mainly through new transport corridors and a regional power grid. The Greater Mekong Subregion (GMS) groups China's southern Yunnan and Guangxi provinces with Thailand, Cambodia, Vietnam, Laos, and Myanmar. Initiated by the Asian Development Bank (ADB), the group was founded in 1992 to boost economic growth and reduce poverty in the countries that share the Mekong, Southeast Asia's largest river. . . . GMS leaders previously met in Phnom Penh in 2002 and China in 2005. The summit is the "highest-level affirmation of the desire and willingness to continue to incorporate as a subregion," said John Cooney, the ADB's infrastructure division director for Southeast Asia. . . . The Manila-based ADB has also promoted the idea of a regional power grid. "One country can share its surplus capacity with another country," said Cooney. "The power demanding countries – Vietnam, Thailand, to a lesser extent Cambodia – require power imports. Laos has power for export, as does Myanmar."

Report of ASIA 2008: 2nd International Symposium on Water Resources and Renewable Development in Asia, 10-11 March, 2008. http://www.hydropower-dams.com/hd_70_0.htm

Nearly 500 participants representing 40 countries assembled in Danang, Vietnam, for ASIA 2008. The event was organized by the International Journal on Hydropower & Dams (Aqua-Media International), and co-hosted by Electricity of Vietnam. . . . The session on hydro potential focused especially on the Greater Mekong Subregion (Cambodia, Lao PDR, Vietnam, Thailand, Myanmar, and the neighbouring provinces in PR China). It was demonstrated that several of these countries have a very rapid growth in demand, and also that all the countries have vast hydropower potential and an impressive number of projects currently under construction and planned. Delegates heard of preparations in these countries for power trading opportunities, assisted by the Asian Development Bank. A team from the ADB late led discussions on project finance, which included the management of risk, and legal aspects.

China Power Investment Corp website information, 21/05/07.

<http://eng.cpicorp.com.cn/news.do?cmd=show&id=24580>

On 21 May 2007, CPI South China Branch signed a co-operation agreement on co-development of hydropower projects in the N'mai Hka River, Mali Hka River and Irrawaddy river basins in Myanmar with South China Grid Corp (CSG). The two companies have become strategic partners in the project. **Compiler's note:** CSG operates in the five southern provinces of the PRC where it assumes responsibility for the construction and management of cross-regional power transmission as well as the purchase and sale of power and the financing of power projects "at home and abroad". According to the company website, there is a total installed capacity of 79,540 MW in the region with transmission lines of 229 kV and higher spanning 41,005 km and substation capacity of 138,400,000 kVA. CSG says it has been particularly active in promoting the process of Greater Mekong Sub-region power co-operation.

Forum of the Heads of ASEAN Power Utilities/Authorities (HAPUA), 10–11 October 2006. <http://www.asean-sustainable-energy.net/documents/libraries/001/HAPUASecretary%20akhir%20Bangkok%206-10-06.pdf>

HAPUA has been tasked by SOME/AMEM to pursue an integrated and coordinated development program for an ASEAN power grid project through conducting a master plan study for regional electricity interconnection (AIMS). Included in the list of eleven interconnection projects based on the long-term power development optimization plan is a 1500-MW HVAC grid between Myanmar and Thailand for possible implementation by 2013. The masterplan study was started in 2000 and completed by 2003.

Appendix 15

COUNTRY REPORT OF [MYANMAR AT THE FRANCO – ASEAN SEMINAR](#)

"Powering ASEAN: Technology and Policy Options", 6-7 September, 2007.

During September 2007, a seminar aimed at exploring technology and policy options in meeting the long-term demands for electricity in ASEAN countries was held in Bangkok, Thailand. Issues dealt with at the seminar included global power demand and supply outlook, nuclear power and strategies, national and regional strategies for long term power supply security, the development and deployment of energy efficiency programs and energy technologies for sustainable development, including decentralized rural electrification. A collection of the reports and papers presented at the seminar is no longer available on-line but the Myanmar country report comprised of a set of 38 slides is archived at <http://burmalibrary.org/docs2/MMpresentation.pdf>

Of interest in the Myanmar report are three slides with organograms of the Ministry of Electric Power as it existed between 1997 and May 2006 and of the re-organized Ministries of Electric Power No 1 and No 2 which have functioned since then. (Slides 6,7,8 & 9). The organograms of the re-organized ministries have been reproduced with interpretive comments in the article above: Ministry of Electric Power [Re-organized](#) (NLM: 16/05/06).

Slide 11 has a list of 26 of the main generating stations in the country in operation in mid-2007. The locations of the 11 hydropower stations are shown on a map on Slide 13. Slides 21 and 22 contain a list of 19 hydropower projects in various stages of implementation in mid-2007. A map showing the location of these is found on Slide 23. Slide 36 has a list of 7 hydropower project in the planning stage in mid-2007.

Of special interest is the information about transmission facilities in operation or under implementation or planning. Slide 28 contains a map showing the transmission system as it existed in mid-2007. Slide 34 shows the system as it is conceived when the current set of domestic hydropower projects under implementation is finished, possibly in 2012 – 14. The map on Slide 35 shows the transmission system when projects in the border areas being undertaken by foreign companies are completed, possibly in the early 20s. These maps, accompanied by an interpretive commentary, are reproduced in Annex 1 below. National High-Voltage [Grid System and Maps](#).

Slide 12 contains a list of 52 sub-stations in operation in mid-2007. Slides 26 and 27 provide a list of 21 transmission projects under implementation in mid-2007. Slide 28 has a list of 12 sub-stations that were under construction between 2005 and 2007. Slides 30, 31 and 31 have a list of 41 transmission lines to be set up “in the near future”, while Slide 33 has a list of 8 sub-station projects for construction “in the near future”. These lists and news items from national and foreign media provide the background for the commentary accompanying Maps 3, 4 and 5 in Annex 1 below.

Existing Sub-stations: 2005 – 2007 (Slide 12)

1. Bhamaw	14. Wazi	27. Sinde	40. Pakhanng
2. Shwegu	15. Nyaungoo	28. Taungoo	41. Ngaphe
3. Kyaukpahto	16. Sale	29. Hinthada	42. Malun
4. Ngapyawdine	17. Aungthapye	30. Bago	43. Nyaungchedauk
5. Letpanhla	18. Chauk	31. Yekyi	44. Kyankhin
6. Monywa	19. Thazi	32. Pathein	45. Myainggalay
7. Nyaungbingyi	20. Kalaw	33. Myaungmya	46. Bayintnaung
8. Aungpinle	21. Magwe	34. Pha-an	47. Mann
9. Mandalay	22. Taungdwingyi	35. Myaungtaga	48. Yinmarpin
10. Pyinoolwin	23. Pyinmana	36. Ingone	49. Kyaukchaw
11. ?	24. Thayet	37. Kyaukpadaung	50. Hlaing Tha Yar
12. Myingyan	25. Kyawswa	38. Pozoland	51. Thayargone
13. Pakokku	26. Pyi	39. Tanyaung	52. Athok

Transmission projects under construction: 2005 – 2007 (Slides 26 & 27)

Sr.	From	To	Voltage (kV)	Circuit	Length (miles)
1	Yeywa	Belin	230	2	30
2	Yeywa	Meikhtila	230	2	80
3	Shwezaryan	Belin	230	2	25
4	Belin	Meikhtila	230	2	65
5	Meikhtila	Thazi	230	2	14
6	Shweli	Mansan	230	2	60
7	Mansan	Shwesaryan	230	2	120
8	Thaketa	Thanlyin	230	2	12
9	Taungoo	Tharyargone	230	2	56
10	Tharyagone	Bago	230	2	54
11	Bago	Thanlyin	230	2	65
12	Bago	Myaungtaga	230	1	50
13	Belin	Monywa	230	2	110
14	Meikhtila	Taungdwingyi	230	1	105
15	Phyu	Toungoo – Bago line	230	2	4.5
16	Thazi	Myingyan	132	1	65
17	Kengtawng	Namzang	132	1	73
18	Kyee-on Kyee-wa	Mann	132	1	94
19	Kun	Toungoo – Bago line	230	1	8
20	Tounggoo	Shwedaung	230	1	100
21	Upper – Paunglaung	Nancho	230	1	26

Substation Projects under construction: 2005 – 2007 (Slide 28)

Sr.	Name	Voltage Ratio (kV)	Capacity (MVA)
1	Shweli	230 / 66 / 11	45
2	Mansan	230 / 66 / 11	60
3	Shwesaryan	230 / 132 / 11	200
4	Shwesaryan	230 / 33 / 11	60
5	Thanlyin	230 / 33 / 11	100
6	Belin	230 / 132 / 11	160
7	Meikhtila	230 / 33 / 11	60
8	Monywa (Extension)	230 / 132 / 11	400
9	Shwemyo	230 / 33 / 11	100
10	Thephyu (Yeni)	230 / 33 / 11	100
11	Myingyan	132 / 66 / 11	90
12	Namzang	132 / 66 / 11	75

Transmission projects to be implemented in the near future (Slides 30, 31 & 32)

Sr.	From	To	Voltage (kV)	Circuit	Length (miles)
1	Nancho	Shwemyo	230	1, TB	28
2	Shweli No 1 and No 2	Shweli No 3	230	2, TB	50
3	Shwekyin	Tharyargone	230	1	40
4	Shweli	Mong Mit	230	2, TB	20
5	Belin	Pakokku	230	1, TB	120
6	Belin	Meikhtila	230	1, TB	65
7	Meikhtila	Nay Pyi Taw	230	1, TB	90
8	Maei	Kyaukphyu	230	1, TB	75
9	Thahtay	Ann	230	1, TB	97
10	Thahtay	Athoke	230	1, TB	145
11	Shwedaung	Oakshitpin	230	1, TB	24
12	Hinthada	Athoke	230	1, TB	60
13	Athoke	Pathein	230	1, TB	40
14	Hutgyi	Mawlamyaing	230	2, TB	123
15	Namzang	Pinpet	132	1	53
16	Upper Kengtawng	Kholam	132	1	40
17	Thahtay	Oakshitpin	230	1	70
18	Ann	Mann	132	1	80
19	Pimput	Kalaw	132	1	40
20	Hutgyi	Thaton-Pa'an grid	230	1	90
21	Hinthada	Myaungtaga	230	1	80
22	Myitkyina	Taping Nos 1 & 2 & Shweli No 1 HP stations	230	1	135
23	Upper Thanlwin	Kyaington	230	2, TB	12
24	Manipur	Pakokku	230	2, TB	180
25	Shwesaryay	Monywa	230	2, TB	30
26	Thaukyegat	Taungoo	230	1, TB	25
27	Bawgata	Tharyargone	230	1, TB	20
28	Tanintharyi	Myeik	230	2, TB	40
29	Myeik	Mawlamyaing	230	2, TB	222
30	Myeik	Kawthaung	230	1, TB	250
31	Myitsone	Myitkyina	230	2, TB	60
32	Myitkyina	Ohndaw	230	2, TB	320
33	Htamanthi	Hopin	230	2, TB	100
34	Htamanthi	Phaungpyin - Kalewa - Monywa	230	1, TB	340

35	Meikhtila	Nya Pyi Taw	230	1, TB	90
36	Tasang	Pyinmana	500	1, QB	200
37	Htamanthi	Monywar	500	1, QB	230
38	Belin	Toungoo – Bago grid	500	1, QB	300
39	Monywa	Mann- Oakshitpin - Hinthada grid	500	1, QB	350
40	Myitsone	Mong Mit – Belin grid	500	1, QB	430
41	Htamanthi	Myitsone	500	1, QB	220

Sub-station projects to be implemented in the near future (Slide 33)

Sr.	Name	Voltage Ratio (kV)	Capacity (MVA)
1	Oakshitpin	500/230	kV 500
2	Pyinmana	500/230	kV 500
3	Monywa	500/230	kV 500
4	Mann	500/230	kV 500
5	Hinthada	500/230	kV 500
6	Belin	500/230	kV 500
7	Taungoo	500/230	kV 500
8	Bago	500/230	kV 500

Additional references

See also the paragraphs dealing with developments in the national grid system and electricity distribution in the *Country Report Myanmar on Infrastructure Development with a focus on Public Private Partnerships (PPP)*, 2007, pp 25-28. http://www.unescap.org/ttdw/ppp/reports/Myanmar_6july2007.pdf

Appendix 16

IMPACT OF CYCLONE NARGIS ON MYANMAR'S ELECTRICITY SECTOR

Review: Post Nargis Joint Assessment, (Tripartite Core Group, July 2008)

Cyclone Nargis which swept over the delta areas of the Irrawaddy and Yangon rivers on 2 and 3 May 2008 caused major damage to the economic infrastructure in the affected areas. This appendix synthesizes the scattered references to the impacts of the cyclone on the electric power infrastructure in the region. It draws mainly on findings reported in the study, *Post-Nargis Joint Assessment* (PNJA), prepared by a team of international experts and published by the Tripartite Core Group in July 2008. Unless otherwise noted, all references and page numbers in the article are to the published version of the report, available at <http://www.asean.org/21765.pdf>. References to the electricity sector will be found on pp 18, 33, 46, 115 – 123. The tables included in the Joint Assessment report are best consulted in the online version. Apart from the information it provides about the impact of the cyclone on delivery of electric power in the affected area, this report is useful for the data it contains about the electrical infrastructure in the region.

In October 2008, an international group of civil society organizations, mainly based in Thailand, published a report critical of the *Post-Nargis Joint Assessment* (PNJA), titled *Post Nargis Analysis – the Other Side of the Story* [<http://h1.ripway.com/APPPB/Post-Nargis%20Analysis.pdf>]. The critique, authored by Yuki Akimoto of the Burma Information Network, claims that “the PNJA report cannot be considered truly comprehensive or objective” (p.4) because it was conducted in collaboration with Burma’s military government and was highly selective in the details it published both of the situation in cyclone-hit areas it describes and the responses to it. Since the *Post Nargis Analysis* makes no reference to aspects of the report dealing with the electricity sector, it is not commented on this appendix, except to note that the sections in the Joint Assessment report that deal report on the damages to the electric power sector caused by the cyclone and the estimates of the costs involved in responding to it do indeed appear to have been prepared by the Ministry of Electric Power No 2 of the Myanmar government.

For other key articles about the impact of Cyclone Nargis see the following:

- 'PM calls for [bio-batteries](#) in every cyclone-hit household' (NLM: 07/04/09)
- 'Restoration of electric power to Irrawaddy [delta given priority](#)' (AFP, 01/07/08)
- 'YESB: Five billion kyat spent on power [line repair in Yangon](#)' (MT: 16/06/08)
- 'Myanmar to build first [storm-resistant model village](#)' (Bernama: 12/06/08)
- '[Industrial zones recovering](#) from cyclone' (MT: 26/05/08)
- 'Myanmar's [biggest city still paralyzed](#) five days after cyclone' (New York Times: 08/05/08)
- 'Irrawaddy [delta region submerged](#) by floodwaters' (AFP: 06/05/08)

Compared to other aspects of the economy affected by Cyclone Nargis, the impact on "the electricity sector was modest", according to the report, *Post-Nargis Joint Assessment*. "Although more than four million people were directly affected by lack of electricity after Cyclone Nargis, the effect of the cyclone on the electricity sector was modest from a national perspective. Total damage and losses in the sector amounted to slightly more than K 15 billion. Most of the distribution and transmission system had been reconstructed by 30 June but, in places, to a standard below generally accepted technical specifications." (PNJA, p. 18) In fact, for reasons not explained in the report, these costs are not even factored into the computation of total recovery needs estimated at K 1,102 billion [US\$ 1.002 billion]

The reason for minimal losses in the electricity sector may be due to the fact that the rural areas most affected by the cyclone in both Ayeyawaddy and Yangon divisions have not been widely electrified. In the impact area of Ayeyawaddy division," the household electrification ratio is only about 7 percent. "The urban areas of Patheingyi and Myaungmya [not heavily affected by the storm] account for 76 percent of total sales in the impact area. Demand is however, suppressed because of 6-8 hours of daily load shedding in the grid." In Labutta township, one of the worst affected areas, "the [municipal] power plant was [only] operated for about one hour daily between 20:00 and 21:00 hours; likewise in other off-grid systems." (PNJA, p 116)

"Of the 1,490 kVA of diesel-fuelled off-grid power plants in the affected area, about 1,075 kVA were damaged, or lost. On Hainggyi Island, [in Ngupadaw township], three generating sets totaling 136 kVA providing power to 139 consumers, were partly damaged by salt water during the storm; they were repaired and are back in operation. The 860 kVA genset at Labutta township providing power to 1,320 consumers was also partly damaged, but is now in operation. In Pyin Sa Lu [in Labutta township], however, the 79 kVA genset providing electricity to 192 consumers was washed out to sea by the tidal surge. The village was destroyed, and the unit has not yet been replaced, as there is no surviving staff and very few or no consumers left in the village. Total damages to the state facilities in Ayeyawaddy division were estimated at Ks 731 million." (PNJA, pp. 46, 117)

Some consumers such as wealthier home owners, hotels, restaurants, shops, small industries in the rural areas of Ayeyawaddy division had "opted to procure their own generating sets (typical size 5-10 kVA)". "No systematic data was available on these sets." "There is no data on damages, and subsequent repairs, to private sector generating units. It is expected, however, that those generating units in villages that were close to the coast, and that were affected by the tidal surge, may have suffered extensive salt damages." In other cases, "villages not connected to the grid have formed co-operatives to procure and operate small generating units. Typically for lighting only, these consist of petrol fuelled generating sets or steam turbines using rice husk and vegetable oils as fuel." (PNJA, p. 117) These were also excluded in the analysis.

"As to transmission and distribution facilities [in the impacted areas of Ayeyawaddy division], most of the damage (82% of 33 kV lines and 30% of 11/6.6 kV lines) occurred in Mawlamyinegyun, Bogale, Kyaiklat, Pyapon and Dedaye townships. In the affected areas, transmission and distribution lines have poles made of reinforced concrete (rectangular and cylindrical) as per Myanmar technical standards, or railway rails. The railway rails cannot be considered as being a permanent solution for any medium voltage line. The initial cost estimates provided by the Government included only materials, and have been adjusted to also include labour, installation and transport costs. It has been assumed that materials account for 70 % of total costs.

The total transmission line damages in Ayeyawaddy Division are estimated at Ks 5,724 million [US\$ 5.2 million].” (PNJA, p. 117)

The report has comparatively little to say about damage to the electrical infrastructure in the areas of Yangon division affected by the cyclone. “There was no major damage to any of the four gas-fired power plants in the Yangon area. No data was available on damages to private sector generating sets, normally used for backup during load shedding periods. However, damages were incurred in distribution and transmission system worth an estimated Ks 6,816 million [US\$ 6,200,000].” (PNJA, p. 119) Table 8 (PNJA, p. 120) shows that 70pc of the estimated replacement costs for transmission and distribution costs, approximately Ks 4773,300 million [US\$ 4,340,000] were in the city of Yangon itself. This is not far off the estimate of Ks 5 billion made by the secretary of the Yangon Electricity Supply Board in an interview with the Myanmar Times ([ELPG: 006](#)), although the cost of replacing concrete power posts and lighting fixtures in the city does not seem to have been factored into the estimates of the Post-Nargis Assessment.

Replacement costs for damage to transmission and distribution lines in Bago division and Mon and Karen states which were impacted to a lesser degree by the cyclone are estimated at Ks 2,160 million [US\$ 1,963,000]. (PNJA, p. 121)

In addition to the cost estimates of the damages caused to the electrical infrastructure by the cyclone, the report also provides estimates of the financial impact due to loss of electric power sales in the areas affected. In fact, because of very low electric power tariffs and the high transmission and distribution system losses, it was found that outside of Yangon, MEPE may actually have reduced its financial losses as a result of the storm. “Average cost of generation of K 20/kWh was provided by EPM No 2, and represents the cost of buying electricity from EPM No 1 from hydropower plants. Generating costs of gas and steam turbines were not available, but are likely to be higher than K 20/kWh. . . . System losses were assumed at 28pc and include technical and administrative losses. The net loss considering generation savings and lower sales is found to be negative.” (PNJA, p. 122)

Appendix 17

COGENERATION POTENTIAL OF MYANMAR’S PRODUCTION OF SUGARCANE

Hla Kyaw et al., *Status and Potential for the Development of Biofuels and Rural Renewable Energy: Myanmar* (ADB: Greater Mekong subregion Economic Cooperation Program, Manila, 2009, pp 27 – 29)
 Edited and extracted from a much longer section on bioethanol production.
<http://www.adb.org/Documents/Reports/Biofuels/biofuels-mya.pdf>

Sugar production in Myanmar increased markedly after FY1998, following its emergence from import substitution and the shift to export-oriented production. New participants joined the industry while the domestic sugar price was highly attractive; but in 2006, with the fall in domestic sugar price from MK800/kg to MK430/kg, producers accumulated stockpiles. The declining sugar price may become an opportunity for diversion of part of the crop to ethanol production.

The area under sugarcane cultivation in FY2007 was estimated at almost 240,000 acres (97,560 ha), and cane production was about 5 million t/year. Based on these figures, the amount of molasses by-products available from both large factories and small and medium-sized sugar plants was 122,500 t. If one-third of the molasses were converted into bioethanol, 1.65 million gal of 95.5% ethanol would be produced. But actual production from large-scale factories would not be more than 50,000 t of molasses because capacity is underused in most sugar factories. Recently, private companies established bioethanol plants by annexing the existing sugar factories in the same compound.

Bagasse is the fibrous material comprising about 30-40% of the core of the sugarcane plant which produces sufficient heat energy to supply all the needs of a typical sugar mill with energy to spare. To this end, a secondary use for the waste heat is electricity generation where the heat is used to produce steam that can

be harnessed to generate electricity. Any excess electricity generated can be sold on to the consumer electricity grid.¹

Bagasse output as by-product of sugarcane processing is about 250 kg per ton of cane (at 50% moisture content). The gross calorific value is 4,600 kilocalories per kg. A rapid assessment of cogeneration potential which has been made for all existing large sugar factories in Myanmar would be as follows:

Cogeneration potential assessment

1. Installed capacity of 17 sugar factories = 27,100 tons crushed per day (TCD)
2. Potential crushed cane per year = 4,336,000 t cane per year
3. Potential steam generation = 732,784 mt
 - 1 kg of burned bagasse = 5 kg production of steam
 - 1,000 kg cane produces 260 kg bagasse fiber)
4. Potential electrical output = 38,567 GWh power
 - (steam 19 kg per hour = 1 kW)

Cogeneration actual assessment based on present cane crushing

5. Actual sugarcane crushed in 2006-07 = 1,071,241 t
6. Actual output steam = 181,040 t
7. Actual electrical output = 9,528 GWh power output
 - (steam 19 kg per hour = 1 kW)
8. Potential excess = 29,039 GWh electrical power¹

The large discrepancy in cogeneration is primarily attributed to the amount of available cane to be crushed. But if the present declining boiler efficiency is considered, there will be a large power gap. The industry needs to improve the energy input–output system. Myanmar's sugar industry is small compared with other countries, thus sugarcane can offer one energy source, and the country needs to rely on multiple feedstocks.

¹**Compiler's note:** This explanatory paragraph was added to the original using information from the Wikipedia entry on bagasse.

²**Compiler's note:** The potential excess output from bagasse generation of 29,000 GWh in 2006-07 would amount to roughly five times the actual output by the national electric power ministries from all sources including hydropower, gas and steam. See Table [CP002](#) below.

Additional references

See below: ['Biogas power plants supply electricity to rural areas'](#) (MT: 16/08/04)
See also the section on biogas energy in ['Electricity potential'](#) of energy sources available in Myanmar'.

Appendix 18

CASE STUDY OF [MOST'S VILLAGE BIOGAS ELECTRIFICATION](#) PROJECT

Hla Kyaw et al., *Status and Potential for the Development of Biofuels and Rural Renewable Energy: Myanmar* (ADB: Greater Mekong subregion Economic Cooperation Program, Manila, 2009, pp 47 - 48)
Edited and condensed. Partly based on a presentation by the Myanmar Engineering Society. Two photos of biogas tanks are included.
<http://www.adb.org/Documents/Reports/Biofuels/biofuels-mya.pdf>

The Ministry of Science and Technology (MOST) began research into biogas projects in 1995 to help fulfill the energy needs of communities where the wood fuel supply is being depleted. A project was started in 2002 at the cost of K 2,000,000 per 50 m³ fixed dome-type unit (approximately \$7,000) in a village near Kyaukse in Mandalay Division under the supervision of Kyaukse Technology University. The MOST provided

financial support (to be paid back in installments) for the initial projects, including cement at the government-subsidized price.

The project used a 30-horsepower generator with an output of 15 kVA, which is sufficient to supply electricity for a 160-household village. The initial unit supported by the MOST is still in operation and supplies electricity for 2 hours in the morning and 4 hours in the evening. If there are around 100 cows in a village, approximately 50 m³ of biogas can be provided by a 50 m³, fixed dome-type biogas plant.

According to the project implementor, the electricity yield of Myanmar biogas units is higher than those she studied in the PRC. A committee of community elders was formed to charge every household based on the number of florescent lights, televisions (black-and-white or color) and VCD and DVD players used. The monthly charge rates are K 1,000 for a color television, K 500 for a black-and-white television, K 500 for a VCD or DVD player, K 500 for a florescent light, and K 1,000 for a satellite dish. The project's monthly income of approximately K 150,000 since implementation enabled it to break even after 3 years.

The byproducts— a waste liquid of cow dung—are returned in order of sequence to villagers who have supplied cow dung. The by-products are used in their fields as organic manure.

The MOST has installed 126 biogas units: 98 in Mandalay Division, 8 in Magway Division, 19 in Sagaing Division, and 1 in Shan State. Due to the increase in the price of construction materials, a biogas unit now costs MK8 million and the MOST, now provides only technical, rather than financial, support. In addition to the concrete tanks, steel tanks imported from India have been introduced by the MOST, and are in private use.

At the time of writing, 867 floating-type family-size biogas digesters have been constructed and are operational in 134 townships in all 14 states and divisions of Myanmar. The highest number is in the central Myanmar region where wood fuel is rarely used.

The present strategy to expand rural energy self-sufficiency based on the availability of animal waste seems reasonable in view of environmental concerns. However, the use of draught cattle in villages is decreasing due to a rise in the use of small-scale farm machinery. Moreover, cattle are increasingly being smuggled into neighboring countries, such as the PRC and Thailand, for food. Therefore, alternative sources of biomass other than animal waste should be considered in the longer term.

Additional references

See above: [‘Biogas power plants supply electricity to rural areas’](#) (MT: 16/08/04)

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Appendix 19

ANYAPYA HYDROPOWER PROJECT IN DAWEI TOWNSHIP

<http://lvzopac.jica.go.jp/external/library?>

[func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=0000000000&filename=11734092_05.pdf&seqno=5](http://lvzopac.jica.go.jp/external/library?func=function.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159771&volno=0000000000&filename=11734092_05.pdf&seqno=5)

The Anyapya hydropower project was first drawn attention to in detail in a report on the use of renewable energy sources as a means for facilitating rural electrification in Myanmar. The study, funded by Japan's International Co-operation Agency (JICA), was carried out by Nippon Koei and the Institute of Energy Economics, Japan, in collaboration with the Myanma Electric Power Enterprise between 2001 and 2003. Findings of the study have been made available online in English and Japanese under the title: The Study on Introduction of Renewable Energies in Rural Areas in Myanmar. A summary of the study is contained in the first volume entitled Final Report: Summary.

Information on the Anyapya project is found on a single page in Appendix A of the Renewable Energies report. Unlike the other small hydropower projects described in the appendix, no photos accompany the description of the Anyapya project, suggesting that the study team may not have had a chance to visit the proposed location in Dawei township, but simply put forward details provided to them.

Dawei, with a population of 110,000, is the administrative centre for Taninthayi division in southern Burma. Like many other cities in off-grid areas of the country, Dawei relies mainly on diesel-fueled generators to supply most of its electricity. The city is described as facing a severe shortage of electricity for domestic, industrial and agricultural demands.

The proposal to make use of the waters of Anyapya creek to generate electricity for the city seems a logical one. The creek rises in the 1500-metre-high Nwalabo range some 30km to the southeast of Dawei and flows into the tidal Dawei river through the city itself.

According to technical information provided in the Japanese study, a rockfill dam, some 48m in height, would be constructed about 14.5 km upstream from Dawei on Anyapya creek. The proposal calls for three Kaplan type generators of 3.1 MW each to be installed in a power house at the dam. Details about the catchment area, reservoir, headrace tunnel, penstock, average mean discharge from the creek, etc, are also included. Water from the dam would also be used to irrigate 1300 hectares (3200 acres) of cropland, as well as to provide drinking water for the city and surrounding villages. The project would also cover construction of a 33kV transmission line and transformers. An estimate of the cost is not given.

Topographic map reference: Burma 1:250,000: Series U542, U.S. Army Map: ND 47-06: Tavoy Anyapya creek dam, near Anyapya village [14° 07' N, 98° 19' E], grid square reference: 15\5, 4\2 <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nd47-6.jpg>

Additional references

Data summary [Anyarpya](#)

NLM, 19/01/11. Condensed. <http://www.burmalibrary.org/docs11/NLM2011-01-19.pdf>

The Hydropower Planning Department of EPM-1 signed a contract with the Natural Energy Wave Co Ltd to construct the Anyapya hydropower station under the B.O.T system at Yeywa Hall of the ministry on 17/01/11. The contract was signed by D-G Kyee Soe of the HPD and MD Win Oo of the Natural Energy Wave Co. The Anyapya project is on Anyapya creek in Dawei township. [Compiler's note: With the announcement in November 2010 that the long-planned Dawei deep-sea port and transportation corridor with Thailand is to proceed, the need for improved power supply in Dawei itself, the nearest urban centre to the proposed seaport, is clearly in evidence. See [ELEP031](#) for details on the project and plans for a 4000-MW coal-fired power plant to supply electricity to the port and related industrial subdivision.

Weekly Eleven, 19/07/10

http://eversion.elevenmediagroup.net/index.php?option=com_content&view=article&id=357%3Amyanmar-private-companies-allowed-for-joint-ventures-in-electricity-mining-sectors&Itemid=111

Permission has been granted to the Delco Company to develop the Anyaphyar hydropower project.

Compiler's Note: Delco Co Ltd has operated a small tin and tungsten mine in the Kanbauk area of Yebyu township under an agreement with Mining Enterprise No 3 of the Mines Ministry since 1996. The agreement was renewed at the beginning of 2010. Its managing director is U Win Oo. [Compiler's note: The information about the Delco company's relation to this project was not confirmed.]

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held a co-ordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw on 05/03/10. . . . At the meeting, EPM-1 Zaw Min reported that . . . the Ministry of Electric Power No 1 will jointly implement five projects with the investment of local national entrepreneurs. They are: the Upper Biluchaung hydropower project in Shan State South to generate 29 megawatts, the Htakha hydropower project in Kachin State to generate 6 megawatts, the Anyaphya hydropower project in Taninthayi division to generate 9 megawatts, the

Yangon coal-fired power plant project in Yangon division to generate 270 megawatts and the Kawthoung coal-fired power plant project in Taninthayi division to generate 6 megawatts.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

The Anyapya hydropower proposal was mentioned in the country report by Myanmar delegates at an ADB conference in Ho Chin Min city in Vietnam in November 2008.

Appendix 20

HTOO TRADING TO BUILD HTAKHA HYDROPOWER PROJECT ON B.O.T. BASIS

NLM, 01/01/10.

Data summary: [Htakha](#)

NLM, 24/03/11. Edited and condensed. <http://www.burmalibrary.org/docs11/NLM2011-03-24.pdf>

At the session of the Pyithu Hluttaw [People's Chamber] of the Parliament on 23/03/11, Representative N' Htu Phon Hsan of Kachin State said that feasibility studies with regard to the generation of hydropower at Htakhachung waterfall in Machanbaw township had been carried out on various occasions. He wanted to know whether a project was to go ahead and when it would commence. EPM-1 Zaw Min explained that all hydropower projects have first to receive the approval of the Special Projects Implementation Committee. [The Minister said] that approval for the Htakhachung hydropower project had already been sought from the Special Projects Implementation Committee. The project was under observation and it would be classified as a small-scale project to be implemented by a company belonging to national entrepreneur company.

KNG. 17/05/10. Edited and condensed. <http://www.kachinnews.com/News/Eight-Kachin-villages-to-relocate-for-hydropower-project-on-their-own.html>

Eight Kachin villages in the Puta-O district are being forced to relocate to make way for a hydropower project at the Ding Htain waterfall (Ding Htang rum in Kachin). The project is located 10 miles southeast of Machyangbaw town on the Mali river near Lungsha Yang village. It is being implemented by the Asia World company, said local villagers. Since April, five villages east of the river in the project site -- Hpawang Daru, Dingma Ga, N'Hka Ga, N'Hti Ga and Htinggai Yang and three villages west of the river --- Hpagan Yang, N'Loi Yang and N'Hkrang Ga were moved by the IB 138 based in Munglangshidi, they said. But, according to the villagers, they were not provided with an alternative place for their homes or any compensation and will have to construct houses on their own. Each village identified for relocation has about 60 households and they have been under pressure to shift from the hydropower project site since early this year.

NLM, 22/04/10. Excerpt. <http://www.burmalibrary.org/docs08/NLM2010-04-22.pdf>

During a visit by General Than Shwe to the Upper Hsedawgyi hydropower project . . . Chairman Te Za of Htoo Trading reported on preparations for a coal-fired power plant that Htoo Trading will undertake in Htantabin township on the outskirts of Yangon and on the Htakha hydropower project which the company is to implement on Htakha Creek, three miles southeast of Htanga Village in Machanbaw township.

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held a co-ordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw on 05/03/10. . . . At the meeting, EPM-1 Zaw Min reported that . . . the Ministry of Electric Power No 1 will jointly implement five projects with the investment of local national entrepreneurs. They are: the Upper Biluchaung hydropower project in Shan State South to generate 29 megawatts, the Htakha hydropower project in Kachin State to generate 6 megawatts, the Anyaphya hydropower project in Taninthayi division to generate 9 megawatts, the Yangon coal-fired power plant project in Yangon division to generate 270 megawatts and the Kawthoung coal-fired power plant project in Taninthayi division to generate 6 megawatts.

Xinhua, 05/01/10. http://news.xinhuanet.com/english/2010-01/05/content_12757356.htm

Myanmar is encouraging private companies to invest in hydropower projects to share the government's efforts in fulfilling the country's growing electric power demand. Recently, the Myanmar authorities granted one more company to implement hydropower projects under a build, operate and transfer (BOT) system, according to EPM-1. Under an MoU reached on 29/12/09 between the ministry and Htoo Trading Co, the private company will implement two hydropower projects of Upper Hsedawgyi and Thaka, for the first time.

Wai Moe, IRROL, 04/01/10. Excerpt. http://www.irrawaddy.org/print_article.php?art_id=17523

According to a short report published 31/12/09 in Myanma Alin, EPM-1 and Htoo Trading Co Ltd signed an agreement on 29/12/09 to build, operate and transfer electricity from the Hsedawgyi and Htaka hydro power projects. . . . Sources in the Rangoon business community said the contract between the government and Htoo Co. was for 75 years.

NLM, 01/01/10. <http://www.burmalibrary.org/docs08/NLM2010-01-01.pdf>

An MoU was signed between the Hydropower Administration Dept of EPM-1 and Htoo Trading Co Ltd to co-operate on the Upper Hsetawgyi and Htakha hydropower projects through the B.O.T system on 29/12/09. . . Chairman Teza of Htoo Trading Co Ltd explained the purpose of signing the MoU.

Topographic map reference: China 1:250,000: Series L500, U.S. Army Map: NG 47-02: Kung-Shan (Ta-La, China, Burma. The location of the Htakha river has yet to be clarified. It could be the Nam Tisang. Note the location Pingma Ga [27° 04' N, 97° 49' E], possibly the village of Dingma Ga referred to in the KNG news item of 17/05/10, grid square reference: 11\5, 38\4 <http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-ng47-2.jpg>

Additional references

For other electric power projects under planning by Htoo Trading Co see: 'Official visit gives impetus to [Upper Sedawgyi dam](#) project' and 'Agreement signed on [coal-fired thermal power plant for Yangon](#)'.

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Appendix 21

SONPHU HYDROPOWER STATION SERVING [WA REGION](#)

NLM, 14/11/04. <http://www.ibiblio.org/obl/docs/NLM2004-11-14.pdf>

On 11/11/04, Minister for Progress of Border Areas Thein Nyunt went to Nan Pan Creek Sonphu hydro-electric power station, the main power station for the Wa region. It generates 8.5 megawatts and supplies power to Pangsang and Mongpauk.

Those Impeding Eradication of Narcotic Drugs, [1999]. [Edited]

<http://www.myanmar-narcotic.net/MTA/ndrug2.html>

On 9th May 1989, the Wa "faction" [United Wa State Army] officially signed a peace agreement with the [Myanmar] government. In those days, Pangsan was a small village inhabited by Wa and Shan nationals. Ten years later, I went on a visit to the now thriving town. [While I was there, I was driven] to the construction site of Nant Pan (Nangpan) hydro-electric power plant on Nant Pan creek about 30km away from the town. Four hundred labourers were working day and night shifts to finish the project in time for its scheduled opening on 17 April. The facility, which will eventually generate 7.5 MW, of electricity is being built at a total cost of K 3,200 million. I was told that three other similar plants are under construction in the Wa region. They include the 2,000-kW Yone Kyet plant and the 800-kW plant at Khway Mar. [A photo of the opening of the Nantpan power station is included with the article.]

NLM, 28/04/99. <http://www.myanmargeneva.org/99nlm/n990428.htm>

On a visit to the Wa region on 25/04/99, Lt-Gen Khin Nyunt of the SPDC and U Pauk Yu Chan, national race leader of Shan State Special Region No 2, went to the Sonphu (Nangpan) hydroelectric power station where a ceremony was held to commission the station into service.

MIC, 17/08/06. <http://www.myanmar-information.net/infosheet/2006/060817.htm>

For the development of Wa region, the Government has spent K 2,865.66 million and provided cash and material assistance worth K 1,256 million. . . . Regarding energy, altogether 5 towns in Wa region are being supplied with electricity. A village and a town in Wa region is being supplied with hydro-electric [power].

Topographical Map reference: See China 1:250,000 Series L500, U.S. Army Map NF 47-07: Lan Ts'ang for the area where the Sonphu dam is located on the Nam Pang river. The village closest to the Sonphu dam would appear to be Man Hsumpu in grid square 13\9, 28\9.

<http://www.lib.utexas.edu/maps/ams/china/txu-oclc-10552568-nf47-7.jpg>

Additional references

Data summary: [Sonphu](#)

For other electricity generating plants resulting from cease-fire agreements with armed groups in border areas of Myanmar see 'Hydro power station commissioned in [Kaungkha](#)'.

For other hydropower projects on the Namhka and Namlwi rivers in the Wa and Mongla regions, see 'South China power companies target rivers in north-eastern Shan State' (Sohu: 08/02/10)

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Appendix 22

NEW POWER OASIS DEVELOPMENT COMPANY TO DEVELOP [UPPER BILUCHAUNG PROJECT](#)

NLM, 19/01/11. <http://www.burmalibrary.org/docs11/NLM2011-01-19.pdf>

The Hydropower Planning Dept under the Ministry of Electric Power No 1 signed a contract with the New Power Oasis Development Co Ltd to implement the Upper Belu Creek hydropower project under the B.O.T system at Yeywa Hall of the ministry on 17/01/11. The contract was signed by D-G Kyee Soe of the HPD and MD Khaing Oo of the New Power Oasis Development Co Ltd. The Upper Belu Creek project is on [Upper] Belu creek in Nyaungshwe township [west of Inle lake].

Topographic map references: Burma 1:250,000: Series U542, U.S. Army Map: NF 47-13: Yamethin

<http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-13.jpg>

Information pinpointing the the location of the Upper Biluchaung project can be found on a map on page 19 of the report *Poison Clouds: Lessons from Burma's largest coal project at Tigyt*. It shows the project in the mountainous country west of Inle lake, a few miles northwest of Indein (20° 27' N, 96° 50' E) near the village of Htiganaing (20° 28' N, 96° 46' E). <http://www.scribd.com/doc/47176385/Poison-Clouds-English>

Additional information

Data summary: [Upper Biluchaung](#)

Pa-Oh Youth Organization, *Poison Clouds: Lessons from Burma's largest coal project at Tigyt*, (Kyoju Action Network, January 2011, 54 pp) <http://www.burmalibrary.org/docs11/PoisonClouds%28en%29.pdf>

Upper Balu Creek, also known as Indein Creek, originates northwest of Pinlaung town in Shan State South. It flows for 40 miles before reaching the west bank of Inle Lake. It is one of the three main creeks that flow into the famous lake. At Indein village, Balu creek diverges into two branches. The south branch of the creek flows west of Paw Daw Oo Pagoda and the north branch of the creek flows near Ywama village into Inle Lake near Ywama village. The villages along the creek use the water not only for agriculture and transport but also for bathing. Farmers traditionally build small dams on the creek with bamboo to irrigate their paddy fields. However the government has started construction of a bigger 29-megawatt dam on the upper Balu Creek together with the New Energy Oasis Development Company. The dam is less than one

mile from the ancient Shwe Indein pagoda and the famous Phaung Taw Oo pagoda in Inle Lake. It is uncertain how this dam will affect water levels in Inle Lake as no public impact assessments have been conducted. [A good map showing the location of the Upper Balu hydropower project in relation to the coal mine and thermal plan at Tigyit as well as Inle lake is found on p 19 of *Poison Clouds*.]

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

The Special Projects Implementation Committee held a co-ordination meeting (1/2010) at the Operations Meeting Room of the office of the Commander-in-Chief (Army) in Nay Pyi Daw on 05/03/10. . . . At the meeting, EPM-1 Zaw Min reported that . . . the Ministry of Electric Power No 1 will jointly implement five projects with the investment of local national entrepreneurs. They are: the Upper Biluchaung hydropower project in Shan State South to generate 29 megawatts, the Htakha hydropower project in Kachin State to generate 6 megawatts, the Anyaphya hydropower project in Taninthayi division to generate 9 megawatts, the Yangon coal-fired power plant project in Yangon division to generate 270 megawatts and the Kawthoung coal-fired power plant project in Taninthayi division to generate 6 megawatts.

Tin Zar Zaw, Popular News, 09/12/09 <http://popularmyanmarnews.com/epaper/?p=386>

The State has begun cooperation with private companies to implement hydropower projects since November 2009. The Electricity Planning Dept ((HPID) of EPM-1 has signed an MoU with the Minn Anawrahta Co Ltd for the Upper Biluchaung project. The companies will carry out the projects under the Build, Operate and Transfer (BOT) [Compiler's note: The information that the Minn Anawrahta Co would develop the Upper Biluchaung project was not confirmed and it appears that the New Power Oasis Development Co will proceed with the project.

Appendix 23

MYANMAR REPORT ON [POWER PLANS AND TRANSMISSION PROJECTS](#)

Greater Mekong Region ADB Consultation, 21 November 2008.

<http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

This is a series of 27 slides which accompanied the Myanmar presentation at an ADB conference on potential interconnectivity projects in the electricity sector of countries in the Greater Mekong Subregion. The conference was held in Ho Chi Minh City in Vietnam in November 2008. The Myanmar report covered four basic areas. Significant points are touched on below.

(1) Institutional / Policy Framework for the Electricity Sector in Myanmar

Section 1) includes an organogram showing the different stages of the government's administration of the electricity sector from the Electricity Supply Board in 1951 to the split into two government ministries in 2006. Organizational charts for the two ministries are also presented. Noted in the analysis of the regulatory framework of the electricity sector is the fact that policy in Myanmar is gradually shifting towards privatization and that local investors are allowed to participate in the sector as independent power producers for medium-sized hydropower projects.

(2) Status of Electricity Demand and Supply

Maps and charts showing the development and current status of installed capacity and peak generation in the electricity sector.

(3) Progress in Power Development Program

This section includes a list and map with details of 29 hydro electric power projects currently under construction and 14 HE projects to be developed in the future. A note indicating that as of November 2008 no new gas or steam turbines were under construction or planned for the future. However, MoUs for several new thermal projects have been signed with the private sector and with foreign firms since then.

Three charts are included: the first showing that there were 117 existing 230-kV, 132-kV and 66-kV transmission lines totalling 3907 miles, the second showing there were 23 transmission lines under construction totalling 751 miles; also charts indicating 100 existing substations with a total output capacity of 4060 MVA and 15 substations under construction with a potential output of an additional 1063 MVA.

Three country-wide grid maps are included: the first showing transmission lines, hydropower stations and substations under construction at the time the report was presented, the second showing transmission lines and substations to be built by an unspecified future date, and a third presenting the national grid system including power stations, substations and transmission line grid as conceived at a future date, also not specified. These maps along with a brief commentary are included

(4) Developments in Power Cooperation with GMS Neighbors

This section includes a national map showing the location of future hydropower stations close to the borders of Myanmar that will eventually provide neighbouring states with electricity. It also includes information about the Shweli-1 hydropower project, which was in process of coming online at the time of seminar and was the first of a considerable numbers of hydropower projects designed to supply power demand in neighbouring countries such as China, Thailand and India.

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Appendix 24

ACCESS TO ELECTRICITY IN MYANMAR

Hla Kyaw et al., *Status and Potential for the Development of Biofuels and Rural Renewable Energy: Myanmar* (ADB: Greater Mekong subregion Economic Cooperation Program, Manila, 2009, pp 10 - 11). Edited and condensed. <http://www.adb.org/Documents/Reports/Biofuels/biofuels-mya.pdf>

The Central Statistical Organization (CSO) conducted a household income and expenditure survey in 1997 to determine the levels and patterns of household expenditure in urban and rural areas, and the standard of living of the households. The 1997 CSO survey found that 37% of households had access to electricity for lighting, and 72% of urban households and 18% of rural households had access to electricity. About 10% of urban households and 32% of rural households used batteries for lighting. Electricity was found to be the main source of light for urban households. Battery charging and generators were also used to provide electricity for households. More than 70% of the rural population still had difficulty accessing electricity.

A 2008 study by UNESCAP found that the electrification rate was only around 11%, and only 5.7 million people had access to electricity, while 45.1 million people were without access.

The Household Income and Expenditure Survey conducted by CSO in 1989, 1997, and 2001 provided data on the standard of living of households. It also showed how households in Myanmar use different kinds of energy sources for cooking. Fuelwood is the major energy source for 73.3% of households in the country, and it was the major source of energy for 42% of urban households and 93% of rural households. 17% of the households surveyed — 42% urban households and 4% rural households — used charcoal as a source of energy for cooking. Less than 1% of the country's households used gas.

To improve living standards, Myanmar should make greater use of energy in the form of electricity, gas, petroleum, or fuel oil. Data on production and distribution of petroleum oil and natural gas should be examined to help assess the country's energy security. Myanmar is in a favorable position to produce a substantial amount of natural gas from both inland and offshore reserves totaling 454,799 million cubic feet. Annual export of natural gas is increasing. Gas exports jumped from 65,359 million cubic feet in FY2001 to 335,525 million cubic feet in FY2005. There might be a trade-off between the purchase of diesel and the export of natural gas.

Between 2000 and 2004, electricity production in Myanmar grew at an average annual rate of 5.9%. Per capita consumption of electricity was 45 kilowatt hours in 2004. Total installed capacity increased from 1,173.3 megawatts (MW) in FY2000 to 1,718.56 MW by the end of FY2008.

**Table 12: Actual and Projected Energy Consumption
by Source of Energy
(ktoe)**

Year	Coal		Crude Oil		Natural Gas		Electricity		Others		Total	
	Base Case	High Case	Base Case	High Case	Base Case	High Case	Base Case	High Case	Base Case	High Case	Base Case	High Case
1980	126	126	1,167	1,167	84	84	90	90	—	—	—	1,467
1990	37	37	594	594	225	225	149	149	8,389	8,389	9,393	9,393
2000	72	72	1,518	1,518	324	324	281	281	9,010	9,010	11,205	11,205
2010	64	66	2,764	2,757	537	570	745	875	10,069	10,090	14,179	14,307
2020	109	117	4,057	4,312	787	942	1,202	1,966	11,122	11,198	17,257	18,535
2030	169	190	5,783	6,528	1,074	1,756	1,790	4,454	12,286	12,420	21,102	25,348

— = no data, ktoe = thousand tons of oil equivalent.

Source: Ministry of Energy.

Additional references

See above: 'Power dam [projects to benefit foreigners](#): Enviro groups' (IRROL: 31/01/11)

Thomas Kean, Myanmar Times, 04/01/10. (Issue 504)

<http://mmtimes.com/2010/news/504/50403.html>

Energy exports, mining and construction will fuel annual Gross Domestic Product (GDP) growth of 8.6 percent to 2030, an Asian Development Bank (ADB) report says. Electrification, or the percentage of households connected to the electricity grid, is projected to rise to 80pc over the same period, while primary energy demand will increase by 2.6pc annually, slightly above projections for the region and almost double the global average. Edito Barcelona, a consultant with the ADB who worked on the report, Energy Outlook for Asia and the Pacific, said the GDP growth projection was based on government policies and other information reported by Myanmar government officials during ASEAN meetings and workshops. "In modelling, we assumed that this GDP growth could come from energy exports such as oil, natural gas and hydroelectricity which would also spur growth in other sectors of the economy," Mr Barcelona said. "To reach 80pc [electrification] in 2030, Myanmar needs to invest in increasing its electricity generating facilities, extension of its transmission and distribution lines as well as substation capacities to currently un-electrified areas in the country," he said. "Myanmar has huge potential for hydroelectric generation and is even capable of exporting electricity beyond 2030," he said.

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Appendix 25

MONG KHOK COAL RESERVES STIR INTEREST IN STEAM DRIVEN POWER PLANT

<http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

During a power point presentation in November 2008 at an ADB-sponsored seminar on electric power connectivity plans in the Mekong sub-region, Myanmar delegates showed a map that pin-pointed the location of a future steam-driven generating plant to be built at Mong Khok [Khot] in eastern Shan State. The

station was projected to have a generating capacity of 270 megawatts and to be connected through 230 -kVa transmission lines to a substation at Tachilek across the border from Mae Sai in north-eastern Thailand.

As noted in the news items below, the Saraburi Coal Co, a subsidiary of the Italthai Group in Bangkok, has been in discussions since 2008 with military representatives of the Myanmar government leading to a possible concession to develop a lignite coal mine in the Mong Khok valley. The question of whether Saraburi will ship its coal to Thailand or work with a partner to set up a power plant at Mong Khok or, perhaps, to do both is still up in the air. Saraburi already operates another coal mine near Mawtaung in southern Burma under a co-operation agreement with the military-owned Myanmar Economic Corporation (MEC).

Topographic map reference: Burma 1:250,000: Series S250, U.S. Army Map: NF 47-15: Amphoe Mae Chan. The town of Mong Khok (20° 44' 18" N, 99° 27' 50" E) is shown as Wan Koktau on this map, grid square reference: 5\5, 22\9. <http://www.lib.utexas.edu/maps/ams/burma/txu-oclc-6924198-nf47-15.jpg>

For a map showing the proposed 'coal route' from Mong Khok to northern Thailand see:

http://www.shanland.org/index.php?option=com_content&view=article&id=2650:protest-against-cross-border-road-project-&catid=90:environment&Itemid=287

Additional references

Shan Women's Action Network and Shan Human Rights Foundation, *Burma Army tracks across Shan State* (August 2010, 4pp) Excerpt, edited.

http://www.shanhumanrights.org/images/stories/Action_Update/Files/burma-army-tracks-across-shan-state-english.pdf

The Burmese military regime is constructing a 361-km long railway between Mong Nai and Kengtung which will provide a rail link between southern and eastern Shan State for the first time. According to the regime's media, 18 new railway stations and 461 bridges will be built along the route. They claim that the railway will promote the development of Shan State, facilitate passenger travel and contribute to the swift flow of commodities in the region. However, the speed and ruthlessness with which the railway is being carved through this isolated border area reveal a much more sinister agenda. The real purpose of the railway is strategic. In the event of an offensive against the UWSA, or the resistance forces of the Shan State Army-South, the railway will enable rapid deployment of heavy weapons and other military supplies to this remote mountainous area. Scores of bulldozers and trucks are at work at each end of the railway, where thousands of acres of farmlands have already been confiscated. . . . The new railway will facilitate transport of coal from Mong Kok, where the regime and Thai investors are planning to excavate millions of tons of lignite and build a coal-fired power plant for export of both coal and electricity to Thailand. Thousands of local villagers are being forcibly relocated to make way for the mining project, which will have severe toxic impacts on the local environment and the Kok River, which flows through northern Thailand.

Bangkok Post, 20/07/2010. Condensed.

<http://www.bangkokpost.com/news/local/186917/2000-protest-lignite-mine-in-lampang>

Organisations and villagers in Chiang Rai's Mae Fa Luang and Mae Chan districts want authorities to ban the transport of lignite from a coal mine in Burma, Mae Fa Luang University rector Wanchai Sirichana said. They voiced their concerns at a meeting held by the university after learning up to 5,000 tonnes of lignite owned by Saraburi Coal Co, which holds a coal mine concession in Burma, will be transported daily through the two districts and tambon Pa Sang in Mae Chan will be used as a transit point before the coal is sent to fuel cement-making plants in Saraburi. Mr Wanchai quoted the participants at the meeting as asking: "How about people's health? And how do local motorists feel when they have to share the same roads with lignite-loaded trucks making 200 trips a day." Mr Wanchai said villagers are worried about the emission of dust from lignite and the threat of water pollution if the coal is allowed to be kept in tambon Pa Sang.

Shan Herald, 07/01/10. Edited and condensed.

http://www.shanland.org/index.php?option=com_content&view=article&id=2877:thai-firm-to-construct-a-coal-power-plant&catid=90:environment&Itemid=287

A recent report from the Thai-Burma border says an 11-member Thai business delegation recently visited Mong Kok sub-township, Monghsat township, opposite Thailand's Chiangrai province. The delegation, led by an official of Myanmar Economic Corporation (MEC), visited the site on 24-25/12/09. The Thai business people were believed to be from Saraburi Coal Mining, a subsidiary of Ital-Thai, that has won a contract to mine the coal deposits in Mong Kok. According to the contract, Saraburi is also required to build a road from the coalmines to Thailand across the border near bases manned by the Shan State Army (SSA) 'South' and the United Wa State Army (UWSA). This has caused alarm among the local populace. It is also opposed by environmentalists and local people on the Thai side. As a result, the road project has yet to be implemented after a year.

Khuensai Jaiyen, The Nation (Bangkok), 02/05/08

<http://www.mekongmigration.org/?p=85>

The Ital-Thai company is reported to have been in talks with Burmese authorities since last year to begin digging for coal in the fertile valley of Mong Kok, about 20 kilometres north of Mongkarn. Already 120 Shan families have been forcibly evicted without compensation to make way for the mines, and a further 480 families face eviction. The mining area lies along the Kok River, and villagers are already complaining that the water has become polluted and unusable. As mining expands, the impact is likely to be felt as far downstream as Thailand, where the Kok River is a foremost tourist attraction.

Appendix 26

MICROCHIP TECHNOLOGY USED TO IMPROVE WOOD-FIRE COMBUSTION

September 2010

This article summarizes information available on the following websites.

<http://www.biolitestove.com/BioLite.html>

<http://woofeed.com/Jonathan-Cedar-and-Alex-Drummonds-innovation-the-BioLite-stove/environment/Guardian>

<http://www.takepart.com/news/2009/10/26/exclusive-interview-with-biolite-founder>

Useful diagrams and pictures can be found on the biolite stove website.

Open wood fires used by two to three billion people around the world for cooking are inefficient, wasting potential energy and creating toxic smoke due to incomplete combustion. Carefully designed stoves that use fans to blow air into the fire can dramatically improve combustion.

However, such stoves require small amounts of electricity to power their fans and most people who cook on wood are without grid or battery access. Biolite stoves solve this problem by converting a fraction of the fire's thermal energy into electricity to power the combustion improvement system of the stove. Thermoelectric technology uses a semi conductor chip to produce electricity where one side is hot and the other is cool. In this way, the stove's own waste heat runs the fan, which generates a very clean, hot combustion.

In rural and semi-urban areas of developing countries, the wood stoves used in cooking -- commonly known as three-stone fires -- are inside the home, filling it with smoke. The World Health Organization estimates that 1.5 million people die every year from smoke inhalation related diseases. A distinct advantage of the Biolite stove is that secondary air injection system it employs reduces the amount of toxic smoke produced by as much 90-95%.

Biolite has the technique but the question is how to gain acceptance of this advanced stove system. There are serious cost considerations, and it's been very difficult to get consumers to purchase the previous generation of improved woodstoves, which affected a 50-70% reduction in smoke. All of these are fairly good at reducing the amount of fuel used, but even those stoves at \$10 are a hard sell. Producing ultra clean stoves, such as Biolite will probably mean a doubling of that cost, so part of the present work on the

project is finding a way to structure the sale of the products so that they get into consumers hands. Making the stoves affordable could involve a combination of government and carbon financing.

In the meantime, prototype field testing has been conducted in Myanmar by International Development Enterprises (IDE) and, separately in the central highlands of Guatemala. Feedback received in Guatemala indicated that the Biolite approach would probably best be adapted to a two-pot variant of the design. The trial process in Myanmar also showed that the stoves were too small for the average family of five and that poor families would need to see more value before being ready to make a change. As a result the size of the stoves has been increased and the extra electricity produced is being made available to power small electronic devices such cell phones and LED lights. This robust BioLite mark II model is now in its first full field trial in India.

Further developments are expected at an international conference in Thailand in November 2010 where a mix of government agencies, foundations and manufacturers are gathering to discuss the path forward for these next generation stove technologies.

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Appendix 27

NAME-PLATE GENERATING CAPACITY OF GRID-LINKED POWER PLANTS IN MYANMAR

NLM, 16/12/10. Excerpt. <http://www.burmalibrary.org/docs09/NLM2010-12-16.pdf>

[At the official commissioning of the Yeywa hydropower dam and plant, PM Thein Sein said that as the] “generating of electricity has been speeded up after 1988, a total of 15 hydropower plants including Yeywa hydropower plant, one coal-fired power plant and 15 gas power plants, totaling 31 across the nation are now generating 3045 megawatts. In addition, he said that out of 13 ongoing hydropower projects, Shwegyin Hydropower Project that can generate 75 megawatts and Kunchaung Hydropower Project that can generate 60 megawatts will be launched soon.”

Compiler’s note: The fifteen grid-linked hydropower plants operated by the Ministry of Electric Power No 1 up to the end of 2010 together with the year of commissioning include: 1) Yeywa, 780MW, 2010; 2) Kengtawng, 54MW, 2009; 3) Khabaung, 30MW, 2008; 4) Pathi, 2MW, 2008; 5) Yenwe, 25MW, 2007; 6) Paunglaung, 280MW, 2005; 7) Mone, 75MW, 2004; 8) Thaphanseik, 30MW, 2002; 9) Zaungtu, 20MW, 2000; 10) Zawgyi-1, 18MW, 1998; 11) Zawgyi-2, 12MW, 1995; 12) Balu-1, 28MW, 1992; 13) Sedawgyi, 25MW, 1989; 14) Kinda, 56MW, 1985; 15) Balu-2, 168MW, 1974 and 1960; for a total hydropower generating capacity of 1603MW. The coal-fired steam plant at Tigyit, also operated by Ministry of Electric Power No 1, has a generating capacity of 120MW.

A list of the gas-fired and steam generating plants operated by the Ministry of Electric Power No 2 published in the New Light of Myanmar on 15 May 2009 together with the name plate capacity of each and date of commissioning is as follows: 1) Kyunchaung, 54.30MW, 1974; 2) Mann, 36.90MW, 1980; 3) Shwedaung, 55.35MW, 1984; 4) Myanaung 34.70MW, 1975; 5) Thaton, 50.95MW, 1985; 6) Mawlamyine, 12.00MW, 1980; 7) Hlawga, 99.90MW, 1995; 8) Hlawga (steam) 54.30MW, 1999; 9) Ywama, 60.90MW, 1980; 10) Ywama (steam), 9.40MW 2004; 11) Ahlon 99.90MW, 1995; 12) Ahlon (steam), 54.30MW, 1999; 13) Thakayta, 57.00MW, 1990; 14) Thakayta, (steam), 35.00MW, 1997; 15) Kanma, 8.72MW, 1998; for a total generating capacity of 723.62MW. <http://www.burmalibrary.org/docs07/NLM2009-05-15.pdf>

The Shweli-1 hydropower plant, which is operated by the Yunnan United Power Development Co Ltd, has a generating capacity of 600MW and was commissioned in 2009. It is connected to grids in both Myanmar and Yunnan. According to media reports, 15pc of the power generated at Shweli-1 is designated for Myanmar.

The Tapein-1 hydropower plant, which is operated by Datang (Yunnan), has a generating capacity of 240 MW began operations in September 2010 and was officially commissioned in January 2011. It is connected

to the grid in southern Kachin state in Myanmar, as well as to the grid in Yunnan. According to the operator 90pc of the power produced is designated for export to the PRC.

The Buga Co operates the 10.5-MW Mali Hka hydropower station in Kachin state which supplies power to Myitkyina and Waingmaw. The Wa Administration in Panghsang township in Northern Shan state operates the 8.5-MW Sonphu power plant that supplies power to the areas around Panghsang and Mong Pauk. Neither of these power plants is linked to the national grid or included in the official statistics produced by the government.

In January 2011, the first of four 18.75-MW turbine-generators at the Shwegyin hydropower plant in Bago region was brought online. The other three generators are scheduled to come on-line later in 2011.

Additional references

For an updated list on the generating and production capacities at the grid-linked hydro and thermal stations see Tables [CP011](#) and [CP012](#) below

Appendix 28

[MIDDLE PAUNGLAUNG HYDROPOWER PROJECT LAUNCHED](#)

NLM, 25/01/11. Edited. <http://www.burmalibrary.org/docs11/NLM2011-01-25.pdf>

On 24/01/11, the Middle Paunglaung hydropower project was launched at the project site about 20 miles northeast of Pyinmana. The project site is about two miles upstream of the bridge over the Paunglaung river on the inter-district road between Yamethin and Taung-gyi. It will be undertaken by Construction Group-1 of the Hydropower Implementation Dept. A concrete dam 272 feet high will be built across the Paunglaung river. Generators with a capacity of 100 MW are expected to produce about 500 million kWh per year. After the launch ceremony Deputy Minister Myo Myint and HPID D-G Myint Zaw inspected the sites chosen for the power intake tunnel, the dam and the hydropower plant.

Additional references

Data summary [Middle Paunglaung](#)

Appendix 29

[ELECTRIC IRRIGATION PUMP PROJECTS IN CENTRAL MYANMAR](#)

Courier Information Service, March 2011.

Irrigation projects in Myanmar are benefiting from the improved supply of electricity in the dry zone area of the central part of the country. The agriculture sector continues to play a leading role in the economy of Myanmar, contributing approximately 43% to the country's GDP and giving employment to 65 – 70% of the population. However, in recent years, irrigation has become an important factor in improving the yields and outputs of basic crops such as rice, bean and pulses, maize and cotton. Figures issued by the Ministry of Agriculture and Irrigation indicate that two and a quarter million hectares or 17.2pc of the cropped land in the country benefited from irrigation of one kind or another in FY 2007-08.

Traditionally much of the water used in crop irrigation came from village tanks or ponds, streams and small rural dams. Beginning in the middle eighties, however, international aid financing led to the development of huge multi-purpose dams and irrigation projects. The largest of these, the [Thaphanseik](#) dam on the Mu river in Kyunhla township, alone is reported to have a command area of 530,000 acres (214,500h) and a hydropower capacity of 30 MW. Seven other large multipurpose projects reportedly with a combined

irrigation capacity of 700,000 acres (283,000h) and capable of generating 528 MW are now operational and at least four others are scheduled to come on-line in the near term.

A second major development over the last dozen years has been the push to harness the waters of the country's major rivers for irrigation purposes. As of March 2011, it was reported that 327 pump stations capable of irrigating over 500,000 acres (200,000h) of cropland had been set up along the banks of the Irrawaddy, the Chindwin, the Sittaung and their tributaries, particularly in the Kyaukse plain region. The great advantage of the pump projects has been the location of most of them in the so-called 'dry zone'¹ of the central part of the country where the rainfall varies between 500mm – 1000mm (20 – 40 inches) per year, but others are being developed in the area around Yangon, as well as in the Irrawaddy delta which provides a large share of the national rice crop.

The river water pump projects, as well as a counterpart program to set up pump stations at artesian wells in the dry zone, come under the aegis of the Water Resources Utilization Dept of the Ministry of Agriculture and Irrigation which is also responsible for preparing the network of canals, drains and irrigation structures for each of these projects. According to the WRUD, a total of 189,000 hectares of cropped land received irrigation water through stations maintained by the department in 2007-08². Of this total, roughly 75% (141,000h) were being irrigated by electrically operated pump stations, while the remaining projects used diesel fueled engines. The largest of these pump projects, 22 in number, which irrigate over half of the cropped land covered by pump projects, are all dependent on connections to the electrical grid.

The significance of this development in a country in which electrical service outside of the larger towns and cities has been virtually non-existent until very recently cannot be overestimated. For many of the pump irrigation projects it has meant that long and expensive transmission and distribution lines as well as substations have had to be set up to provide the necessary connections to the nearest point on the national grid.

The Yebudalin project which pumps water from the Chindwin about 40km northwest of Monywa in central Myanmar is a case in point. According to the WRUD, the project, which began in 2001 and was completed in 2006, has benefited over 16,000h of dry cropland in Budalin township. To reach the targeted area the water had to be pumped up through four stages, first to a height of 63 feet and then up another 40 feet. A 300,000-gallon storage tank was built and transformers had to be installed near the sub-pump stations. Canals over 173,000 feet long (53km) were dug and structures for the distribution of the water set up.³ Gunkul Engineering which contracted to supply the 132-KV transmission lines (73 km) and the electrical equipment for a 132/66/11kV, 45-MVA substation reported that its bill alone amounted to \$US 2.3 million.⁴

The Ngathayauk project takes water from the Irrawaddy at a point about 40 km southwest of Myingyan and uses it to irrigate crops of paddy, cotton and edible oil on 3500 hectares. Its main canal is 56,400 feet (17km) long and there are tributary canals 225,000 feet (31.5km) long. Besides the main pump station, there are 17 relay stations. To electrify the Ngathayauk project 36.7 km of 66-KV transmission lines connecting the pump station on the Irrawaddy with the main station in Myingyan.⁵

One of the most elaborate pump projects in Myanmar will see water from the Nampat river of the Myitnge watershed in Lawksauk (Yaksauk) township pumped over a height of land in western Shan state into the Zawgyi river system from where it will flow down to the Myogyi dam still under construction in Yengan (Ywangan) township. From there it will be diverted through a series of canals to eventually irrigate over 12000 hectares of crop land in Wundwin and Thazi townships on the Meiktila plain in Mandalay Region. The electricity to drive the pumps needed for this massive project will be tapped from the Zawgyi and Myogyi power stations.⁶

Experiments with the use of paddy husk-fired generators as the source of electrical power are being conducted on two river pump projects in Lower Myanmar. In the village of Thayawe in Kyaiklat township the WRUD has harnessed a generator that uses six baskets of husks and can lift 90,000 gals of water from four to six feet. The same generator is being used for lighting the homes and operating a rice mill in the village.⁷ At the Balar pump project-2 ([ELSF040](#)) near Highway 3 in Mingaladon township water is being lifted up 15 feet from the Ngamoeyeik dam canal by three sets of 30-HP, 22-kW pumps that can be operated either by a

diesel or a paddy husk-fired generator. The project is said to benefit 700 acres of farmland stretching along canals that are nine km in length. According to the WRUD, the dual fuel system helps reduce diesel consumption by two-thirds and saves K 17,730 per acre in paddy field costs. The paddy is purchased from local farmers at K200 per basket. Photos of the pump and generator and the irrigation system in operation are included with the article in NLM.⁸

Energy costs are a large factor in determining whether irrigated crops – summer paddy in particular -- will prove profitable to farmers. Speaking at a regional workshop on rice-based irrigation systems in Ho Chi Minh city in 2005 Maung Maung Naing of the Myanmar Irrigation Dept pointed out that water tariffs for fields irrigated by diesel engine pumps was twice as much the charge for electric pumps.⁹ Not surprisingly, commercial farmers with large acreages fed by pump projects are not backward in pressing the case for the necessary infrastructure to be set up to have their fields irrigated by electrical pumps.¹⁰ Cost-benefit analysis studies, if they have been made, are so far not available for public scrutiny, but one must wonder how long it will take for the water tariff rates of electrical pump projects to be able to cover the heavy infrastructure and maintenance expenses involved in these projects. Only a system in which the costs of transmission lines, substations and all the other electrical infrastructure needed were shared by residential, commercial and other industrial users would appear to offer a viable solution.

¹For a map of the area covered by the dry zone see Slide 13 at the following URL

<http://www.climateadapt.asia/upload/events/files/4c849c0062adeMyanmar.pdf>

²Fiscal 2007-08 is the last year for which detailed statistical information is available at the beginning of 2011. Unlike its counterpart, the Irrigation Dept, which has responsibility for the government's rural dam construction program, the WRUD does not publish a list of the pump projects it has completed or is currently working on. However, information gleaned from state media reports provides details of at least 123 projects (about 40pc) of the total of 327 said to be fully or partially operational. 22 of the known projects (roughly 7% of the 327) were reported to have irrigation command areas of 4000 hectares or more. The acreage covered by these 22 large projects amounts to well over half of the total of the 189,000 hectares irrigated by pump projects.

³For details of the Yebudalin pump project, see the following editions of the New Light of Myanmar:

<http://www.myanmargeneva.org/01nlm/n010802.htm#%283%29>

<http://www.myanmargeneva.org/02nlm/n020420.htm#%28%201%20%29>

<http://www.myanmargeneva.org/06nlm/n060304.htm>

⁴See GK Power Systems: <http://www.gkmyanmar.com/references.php?show=1&details=24>

⁵For details of the Ngathayauk pump project, see p7 of NLM for 15/05/10:

<http://www.burmalibrary.org/docs08/NLM2010-05-15.pdf>

See also p27 of the Myanmar Country Report in following ESCAP report: *Country Report Myanmar on Infrastructure Development with a focus on Public Private Partnerships (PPP)*, 2007. http://www.unescap.org/ttdw/ppp/reports/Myanmar_6july2007.pdf

⁶For details of the Kengkham-Myogyi-Meiktila diversion project, see the following editions of NLM:

<http://www.ibiblio.org/obl/docs2/NLM2005-08-19.pdf>

<http://www.ibiblio.org/obl/docs2/NLM2006-08-27.pdf>

<http://www.burmalibrary.org/docs07/NLM2009-04-27.pdf>

⁷For details of the WRUD's paddy husk-fired electric pump project at Thayawe, see the following editions of NLM:

<http://www.myanmargeneva.org/03nlm/n030905.htm>

<http://www.myanmargeneva.org/02nlm/n021231.htm>

⁸For details of the Barlar pump project-2, see the edition of 08/01/09 of NLM:

<http://www.burmalibrary.org/docs6/NLM2009-01-08.pdf>

⁹Maung Maung Naing, "Paddy field irrigation systems in Myanmar" in *Proceedings of the regional workshop on the future of large rice-based irrigations systems in Southeast Asia*, pp 120-30 (Ho Chi Minh City, Vietnam: 26-28 Oct 2005). <ftp://ftp.fao.org/docrep/fao/010/ai408e/ai408e01.pdf>

¹⁰The interests of commercial farming companies with large estates in Ywangan township appear to have been behind questions raised on this subject in the first parliamentary session in Nay Pyi Taw in March 2011. See [ELPS026](#) above.

Appendix 30

THE [ELECTRICITY LAW OF 1984](#)

To access a translation of the text of the Electricity Law (1984): Act No. 7 of the People's Parliament (PyiThu Hluttaw), consult <http://www.burmalibrary.org/docs11/Electricity-Law-1984.pdf>

The Electricity Law (1984), enacted by the People's Parliament of the Socialist Republic of Burma, was an attempt to update and simplify the provisions of the original Electricity Act of the Union of Burma which dated back to the period shortly after Independence was declared in 1948. There was nothing very original about the Electricity Act of the late 1940s. For the most part, it was simply a carbon copy of the provisions of the Electricity Act of India (1910) which (with minor modifications) had become the law of the land in Burma when it was separated from India in 1937 by its colonial masters.

Like its predecessor, the Electricity Law (1984) has very little to say about how the national task of searching for sources of electric power and of building up a system of generating plants and substations and of developing a network of transmission and distribution lines is to be organized and regulated. Both the 1949 Act and the 1984 Law are more concerned with supervision of a system that is already in place, i.e., inspectors and inspections, electrical standards, safety precautions, penalties for infractions under the law and the possible appointment of a 'board of advisers' to assist the cabinet minister of a unnamed department in carrying out his/her responsibilities. Chapter 9 of the 1984 "Law" does introduce the idea of an "electrical inspection department" which would be responsible for electrical standards, research, the inspection of electrical goods produced in or imported into the country, the resolution of disputes relating to electrical affairs.

One significant difference between the 1949 Act and 1984 Law is the approach taken to the 'suppliers' of the electrical services named in the legislation. The 1949 Act, like its colonial predecessors, seems to assume that most of these suppliers would be companies that it designates as "licensees", although it also refers to "local authorities" as possible service providers. The 1984 Law, which was drafted as part of the legislative agenda of the Socialist People's Programme Party, designates five possible actors to serve as electrical suppliers. They are named in Section 4 under Chapter 2 of the 1984 Law: 1) the government electrical corporation, 2) state-owned factories and workshops under the different ministries, 3) registered co-ops, 4) registered private enterprises and 5) other organizations. Needless to say, actors 3), 4) and 5) are bound by a much tighter system of regulation than the first two. One interesting holdover from this law is the fact that some government departments such as the Ministries of Mines, Energy, and Defence still have their own separate facilities that produce, distribute and consume electrical power. Certainly, actor no 4 -- registered private enterprises -- with their omnipresent diesel generators have become one of the largest producers and consumers themselves of electricity in default of sufficient supply from the government's electricity corporation.

The best way of understanding the Electricity Law of 1984 is to see it in its context as a period piece of legislation of the Burma Socialist Programme Party era which was instituted at the beginning of 1974 and collapsed in August 1988. This was a time when it was expected that a process of national planning under the the direction of BSPP would guide the country from an agricultural economy to an agro-based industrial economy through a series of five consecutive four-year programs. The Electricity Law 1984 was designed to ensure that the different sectors driving the economy would have a uniform system of regulation in the

development and use of electrical power. In reality, it seems to have been largely ignored, coming as it did close to the end of the first period of military rule in Burma. The second period of military rule under the SLORC-SPDC administration was to bring in a very different set of priorities in the regulation of the electrical industry in Burma/Myanmar which will certainly prove to have been far more wide-reaching in their impact.

Additional references

Other legislation concerned with the provision of electricity in the same section of the Online Burma Library as the 'Electricity Law 1984' includes the 'Electricity Act 1910' (as modified for use in Burma in 1937 and 1948) and 'The Law Amending the Electricity Act 1990'. See <http://www.ibiblio.org/obl/show.php?cat=1766&lo=d&sl=0>

See also: 'Ministry of Electric Power [re-organized](#)' (NLM: 16/05/06)
 'Yangon City Electric Power [Supply Board Law enacted](#)' (NLM: 23/11/05)
 'Review of electric power [developments up to 2000](#)' (BT: July 2002)

See also other titles in the index under 'Government Regulation, Organization, Priorities' ([GR](#))

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[AC](#) ACRONYMS OF AGENCIES, COMPANIES, ORGANIZATIONS USED IN THE COMPENDIUM

ADB	Asian Development Bank
AFP	Agence France-Presse
A&IM	Myanmar Agriculture and Irrigation Ministry (or Minister)
AP	Associated Press
ASEAN	Association of South-east Asian Nations
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Co-operation
BKKP	Bangkok Post
BRN	Burma Rivers Network
BT	Business Tank
CITIC	China International Trust and Investment Company
CNAMC	China National Agricultural Machinery (I&E) Corporation
CNEEC	China National Electric Equipment Corporation
CPT	Myanmar Communications, Posts and Telegraphs Ministry (or Minister)
CPI	China Power Investment Corporation
DHD	Department of Hydropower Planning of EPM-1
DHSHD	Dept of Human Settlement and Housing Development of the Ministry of Public Works
DKBA	Democratic Karen Buddhist Army
dpa	Deutsche Presse-Agentur
DPDC	Division Peace and Development Council
EGAT	Electricity Generating Authority of Thailand
EPD	Electric Power Department (of EPM No 2)
EPM	Electric Power Ministry (or Minister) (from Nov 1997 to May 2006)
EPM-1	Electric Power Ministry (or Minister) Number 1 (after May 2006)
EPM-2	Electric Power Ministry (or Minister) Number 2 (after May 2006)

EM	Myanmar Energy Ministry (or Minister)
EPSE	Electric Power Supply (aka Distribution) Enterprise of EPM No 2
FER	Foundation for Ecological Recovery
FY	Financial year (from April 1 to March 31)
GMS	Greater Mekong Sub-region
GUM	Government of the Union of Myanmar
HPD	Hydro-electric Power Dept (construction dept of MEPE until 2002 and EPM until 2006) Since May 2006 HPD is the administrative and planning dept of EPM No 1
HPGE	Hydropower Generation (aka Production) Enterprise of EPM No 1
HPID	Hydropower Implementation Dept of EPM No 1
IB	Infantry Battalion (of the Myanmar Army)
ICG	International Crisis Group
ID	Irrigation Department (of the Agriculture and Irrigation Ministry)
IDE	Institute of Developing Economies (Japan)
IMF	International Monetary Fund
IMNA	Independent Mon News Agency
Ind-1	Ministry of Industry No 1
Ind-2	Ministry of Industry No 2
IRROL	Irrawaddy On-line News Service
ISEAS	Institute of South-east Asian Studies
JICA	Japan International Co-operation Agency
KEPCO	Korea Electric Power Corporation
KDRG	Karenni Development Research Group
KIC	Karen Information Centre
KNG	Kachin News Group
KNLA	Karen National Liberation Army
KNU	Karen National Union
LIB	Light Infantry Battalion (of the Myanmar Army)
LID	Light Infantry Division (of the Myanmar Army)
MEPE	Myanmar Electric Power Enterprise
MIC	Myanmar Information Committee News Sheet
MMTEI	Myanmar Machine Tool and Electrical Industries
MoD	Myanmar Ministry of Defence
MOGE	Myanmar Oil and Gas Enterprise
MPT	Myanmar Post and Telecommunications Ministry
MTDIU	Mergui-Tavoy District Information Unit (a department of the KNU)
MP	Myanmar Perspectives
MT	Myanmar Times and Business Review
NCGUB	National Coalition Government of the Union of Burma (in exile)
NGO	non-governmental organization
NLD	National League for Democracy
NLM	New Light of Myanmar
NYT	New York Times
PRC	People's Republic of China
PTI	Press Trust India
REAM	Renewable Energy Association Myanmar
SAPAWA	Shan Sapawa Environmental Organization
SEARIN	South East Asia Rivers Network
SHAN	Shan Herald Agency for News
SPDC	State Peace and Development Council (of Myanmar)
SPIC	Special Projects Implementation Committee (of the SPDC)
TEPSCO	Tokyo Electric Power Services Co Ltd
TNA	Thai News Agency
UMFCCI	Union of Myanmar Federation of Chambers of Commerce and Industry
UNDP	United Nations Development Program
UREC	Union Resources and Engineering Co Ltd (formerly YMEC)

USDA	Union Solidarity and Development Association (a government-led political organization)
WRUD	Water Resources Utilization Department (of the Ag & Irrig Ministry)
XN	Xinhua News Agency
WB	World Bank
WPD	Working People's Daily (the official English language newspaper until mid-1993)
WRUD	Water Resources Utilization Department of the Agriculture and Irrigation Ministry
YESB	Yangon (City) Electricity Supply Board
YMEC	Yunnan Machinery and Equipment (Import & Export) Co Ltd (see UREC above)
YUPD	Yunnan United [Joint] Power Development Co

AB OTHER ABBREVIATIONS, SHORT FORMS AND ACRONYMS USED IN THE COMPENDIUM

Ass'n	association
BCS	battery charging station
Ch	chairman, chairwoman, chairperson
Col	colonel
Co Ltd	limited company
cte	committee
CVC	conventionally vibrated concrete (dam construction)
Dep Dir	deputy director
Dept	department
D-G	director-general
Dir	director
DM	deputy minister
ED	executive director
FY	financial year (in Myanmar from April to the end of March in the following calendar year)
Gen	general (no differentiation is made in the rankings of the generals)
GM	general manager
HP	hydropower
hydel	hydro-electric (abbreviation that enjoys wide usage in South Asian publications)
IDPs	internally displaced persons
I&E	import and export (company)
IPP	independent power producer
IZ	industrial zone
J-V	joint venture (company)
K	kyat (Myanmar currency)
MD	managing director
MoA	memorandum of agreement
MoU	memorandum of understanding
M-P	multi-purpose (used to refer to dams built for both irrigation and generation of electricity)
n.a.	information not available
n.d.	date not available
PD	project director
pc	per cent
plc	publicly listed company
PM	prime minister
PV	photo-voltaic
Pres	president
RCC	roller compacted concrete (dam)
RoR	run of the river [hydropower project]
S-G	secretary general
SMI	small and medium industries
T/G	turbine/generator (set)
V-P	vice president

ME DEFINITIONS AND EQUIVALENT MEASUREMENTS USED IN THE COMPENDIUM

This section contains some of the more commonly used terms of measurement used in the compendium. They are intended only as a rough guide. There are many variations in energy industry equivalents.

Electrical industry definitions and equivalents

1 MW, mw	megawatt	= 1,000 kilowatts (kW)
1 kWh	kilowatt hour	= 1,000 watt hours = 3,600,000 joules or 3.6 megajoules
1 MWh	megawatt hour	= 1,000 kilowatt hours
1 GWh	1 gigawatt hour	= 1,000,000 kilowatt hours
1 TWh	1 terawatt hour	= 1,000 gigawatt hours
1 GJ	gigajoule	1 million joules = 950 cu ft of natural gas @ 1000 BTU per cu ft; = .28 MWh of electricity
1 kV	kilovolt	= 1,000 volts
1 MVA	megavolt-ampere	= 1,000 kilovolt-amperes
A	ampere	a measure of the force created by steady electric currents flowing through two wires at a defined distance.
J	joule	an amount of energy; one joule is the equivalent of one watt of power radiated or dissipated for one second;
V	volt	a measure of the potential difference between two points of a constant current of one ampere when the power dissipated between the points is one watt.
V-A	volt-ampere	a unit of electrical power in an alternating current circuit equal to the power dissipated when 1 volt produces a current of 1 ampere; the product of one volt and one ampere is equivalent to one watt; amperage measures the amount of the flow of electrical current, whereas voltage measures the pressure or force of that flow.
W	watt	one watt is the power dissipated by a current of one ampere flowing across a resistance of one ohm.
Ω	ohm	a measure of the electrical resistance offered by a current-carrying element; a device that dissipates one watt of power with one ampere of current flowing through it has a resistance of one ohm.

Generating capacity

In the compendium, any generating facility in Myanmar with a capacity of 100 MW or more is considered 'major'. 'Large' is used for generators or plants above 10 MW. 'Medium' is used for generators or plants from 1 – 10 MW. Any generators or generating plants under one megawatt are defined as 'small'. 'Mini-generators' are classed as those from 10 kw to 50 kw. 'Micro-generators' from 1 kw to 10 kw. 'Pico-generators' below one kilowatt. For the most part, however, the terms used by the authors or translators of the articles included in the compendium have been left as they were in the originals.

Energy industry definitions and equivalents

1 bbl	barrel of oil	42 US gals = 35 imperial gals = 0.15899 cu m = 159 litres
1 bbl crude	barrel of crude oil	5,800,000 BTU = 0.16637 MT (on average)
1 BTU	British thermal unit	amount of energy required to raise the temperature of 1 lb of water through 1° Fahrenheit = approximately 1055 joules
1 GJ	1 gigajoule	= 0.28 MWh or the amount of electricity generated by 950 cu ft of natural gas @ 1000 BTU per cu ft
1 TOE	tonne of oil equivalent	a unit of energy containing 1,000 million (billion) BTUs; it is the amount of energy released by burning one tonne of crude oil; it differs with different kinds of crude but is approximately 42 GJ
1 TOE		1,125 cu m of natural gas in caloric content

1 cu m of natural gas		35.3 cu ft of natural gas @ 14.73 psia
1 BOE (boe)	barrel of oil equivalent	a unit of energy containing 0.146 TOE; 6.841 BOE = 1 TOE.
1 t (ton)	short ton	2,000 lb or 90.72% of a tonne
1 T (tonne)	metric ton	1,000 kilograms or 2,204.6 lbs; roughly a long ton
1 T (tonne)		48,700 cu ft of natural gas
mcf	thousand cu ft	unit used to measure the caloric content of natural gas; depending on its content, 5.5 mcf of natural gas is equal to approximately 1 BOE.
mmcf/d	million cu ft per day	unit used to measure the amount of gas produced by a well or a field or a company on a daily basis
T/d	tonnes per day	
T/y	tonnes per year	

Peak shaving: the process of supplying power to an electrical utility system from an auxiliary source during periods of maximum demand to reduce the load or demand on the primary source of supply.

PSC: Production sharing contract. Countries with oil or natural gas resources contract with one or more oil and gas companies to explore, appraise and develop these resources. The companies that invest in the project are paid in kind with a percentage of the volume produced, while the host country retains ownership of the resources and facilities. A percentage of the oil or gas produced is used to cover the investor's expenses, including depreciation of the facilities ("cost oil" or "cost gas"). The remainder is shared by the project partners and the host country ("profit oil" or "profit gas"). www.burma.total.com/en/ow/glossaire.htm

Units used in measuring land and water

1 A	acre	= 0.4047 ha = 4,047 sq m = 2.5 rai (Thailand)
1 ha	hectare	= 10,000 sq m = 2.47 acres = 6.25 rai (Thailand)
1 AF	acre foot	= volume of water sufficient to cover 1 acre of land to a depth of 1 ft
1 AF	acre foot	= 43,560 cu ft = 1,233.48 cu m
1 AF	acre foot	= 325,851 US gals = 271,328 imp gals
1 cu ft		= 7.48 US gallons = 6.23 imp gals
1 km	kilometre	= 0.6214 miles = 1000 m

South Asian monetary terms used in currency trading

1 crore	= 10,000,000 (often written as 1,00,00000) = 100 lakh
100 crore	= 1 billion (1,000,000,000)
1 lakh	= 100,000 = 0.01 crore
10 lakh	= 1 million (1,000,000)

KTR KYAT TRADING RANGE WITH THE US DOLLAR AT MARKET RATES: 1981 – 2008

The quotes are meant to provide a rough guide to the average trading range for the year cited and do not reflect the extremes to which market speculation has occasionally driven the rate. Various sources have been used.

1981	1 US\$ = K 18 - 20	
1987	1 US\$ = K 24 - 27	
1988	1 US\$ = K 32 - 36	Up to the time of the SLORC coup in Sept 1988
1991	1 US\$ = K 55 - 70	
1992 - 93	1 US\$ = K 80 - 140	
1994 - 95	1 US\$ = K 110 - 120	
1996	1 US\$ = K 120 - 160	
1997	1 US\$ = K 160 – 335	Reflects East Asian financial crisis
1998	1 US\$ = K 335 - 350	
1999	1 US\$ = K 350 - 320	

2000	1 US\$ = K 320 - 435	
2001	1 US\$ = K 435 - 740	
2002	1 US\$ = K 740 - 1070	
2003	1 US\$ = K 1070 - 890	
2004	1 US\$ = K 890 - 880	
2005	1 US\$ = K 880 - 1075	
2006	1 US\$ = K 1075 - 1280	
2007	1 US\$ = K 1280 - 1250	Reflects fall in value of US\$
2008	1 US\$ = K 1250 - 1190	
2009	1 US\$ = K 1190 - 980	Sudden change in direction in January
2010	1 US\$ = K 1000 - 860	Reflects gradual weakening of US\$

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TBL TABLES

CP001: POWER GENERATED AND SOLD BY ELECTRIC POWER ENTERPRISES: 1971 - PRESENT

Year	Installed Capacity MW	Generated Millions kWh	Units sold: millions of kilowatt hours					System Loss
			General	Industrial	Bulk	Other	Total	
71-72		619						
75-76		760						
78-79		976					690	29%
79-80		1081					763	29%
80-81		1228					854	30%
81-82		1345					950	29%
82-83		1562	316	552	145	37	1050	33%
83-84		1652	341	585	158	38	1122	32%
84-85		2321						
85-86	684	2119	409	882	128	40	1460	31%
90-91	804	2643	629	788	214	45	1675	37%
91-92		2676	672	727	229	70	1698	37%
92-93		3007	771	769	238	104	1882	37%
93-94		3385	883	829	263	113	2088	38%
94-95	837	3632	983	863	302	70	2218	39%
95-96	982	3762	972	876	340	74	2262	40%
96-97	1030	4550	1089	876	393	76	2434	47%
97-98	1248	4834	1207	914	473	83	2676	45%
98-99	1055	4139	1132	956	537	91	2716	34%
99-00	1058	4639	1157	1106	561	86	2910	37%
00-01	1172	5118	1361	1295	527	85	3268	36%
01-02	1165	4689	1245	1148	564	85	3041	35%
02-03	1190	5068	1431	1417	552	84	3484	31%
03-04	1312	5426	1612	1577	578	83	3850	29%
04-05	1562	5608	1662	1549	613	85	3909	30%
05-06	1690	6064	1812	1756	695	89	4353	28%
06-07	1684	6164	1614	1854	827	61	4355	29%
07-08	1717	6398	1647	1872	864	55	4438	31%
08-09	1717	6621	1798	1882	932	52	4664	30%
09-10	1717	5850	1982	1834	1064	57	4937	16%

Note 1: Compiled from various sources. MEPE (EPC) data, when available, has been used for years up to and including 2001-02 and CSO data have been used beginning with 2002-03.

Note 2: 'General' is used to refer to sales for domestic or household use. 'Bulk' sales refers to the use of electric power in hospitals, offices, schools, etc. Another category for which figures are not generally available is referred to as 'departmental' use. During the four years between 94-98 and 97-98, 'departmental' use almost tripled from 40 million kWh to 112 million kWh.

Note 3: At a meeting of the State Electric Power Development Work Committee on 29 July 2006, EPM-2 Khin Maung Myint reported that there were 10 hydropower plants with a total generating capacity of 712 MW plugged into the national grid. Two other plants: Yenwe (25 MW) and Khabaung (30 MW), have come on line for a total hydropower capacity of 767 MW at the beginning of FY 08-09. According to the minister the nine gas-fired generating plants on the national grid system had a generating capacity of 550 MW in mid-2006. Since then the Mawlamyaing plant has been converted to gas bringing the total capacity of gas-fired generators to 562 MW. Since 2006, steam-powered plants have been reduced by one and at the beginning of FY 08-09 the remaining five plants had a generating capacity of 273 MW. Diesel generating equipment with a capacity of 25 MW is maintained on standby in the Yangon area. Isolated diesel generating equipment with a combined capacity of approximately 40 MW is operated by MEPE in off-grid areas. MEPE is also responsible for the operation of dozens of isolated mini hydropower power plants with a total generating capacity of 35 - 40 MW in areas not served by the national grid. For an updated list on the generating and production capacities at on-grid hydro and thermal stations see Tables [CP011](#) and [CP012](#) below. See also Appendix 27: Name-plate [generating capacity of grid-linked](#) power plants in Myanmar.

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CP002: GENERATION BY TYPE OF SOURCE 1971 – PRESENT

Financial Year	Millions of kWh				
	Thermal	Diesel	Hydroelectric	Gas	Total
1971-1972	71.00	73.00	475.00	-	619.00
1975-1976	36.00	66.00	532.00	127.00	760.00
1979-1980	37.00	56.00	725.00	263.00	1081.00
1983-1984	72.00	60.00	993.00	549.00	1674.00
1985-1986	55.01	64.50	1003.48	996.38	2119.37
1990-1991	28.11	73.89	1248.45	1292.60	2643.05
1994-1995	79.01	41.84	1658.95	1852.04	3631.84
1995-1996	62.49	43.21	1595.46	2061.17	3762.33
1996-1997	59.32	40.11	1621.72	2409.16	4130.31
1997-1998	212.53	47.79	1747.45	2542.69	4550.46
1998-1999	224.84	43.63	948.47	2922.50	4106.98
1999-2000	667.88	55.03	1038.41	2877.79	4639.11
2000-2001	661.59	36.20	1891.83	2527.92	5117.64
2001-2002	549.74	30.64	2008.25	2100.35	4688.96
2002-2003	895.00	42.00	1932.00	2995.00	5864.00
2003-2004	634.31	31.45	2074.81	2685.31	5425.88
2004-2005	404.72	33.23	2407.75	2762.54	5608.24
2005-2006	631.91	33.37	3000.80	2398.08	6064.16
2006-2007	786.42	28.08	3324.63	2025.02	6164.05
2007-2008	854.70	33.59	3618.51	1891.22	6398.02
2008-2009	609.83	39.67	4070.16	1900.90	6620.56
2009-2010	495.06	28.68	4180.51	1145.83	5850.08

Note 1: The production stats on the CSO website are provisional up to a period of two or three years after the end of the fiscal year and are occasionally revised. It should also be noted that the production totals are for power plants operated by the two electric power ministries only and do not include electricity generated by independently owned generating plants or by other state ministries. Thermal is used to denote steam driven generation fueled either by coal or by heat produced at natural gas co-generation facilities.

Note 2: There has been no official explanation for the sharp drop-off in the total number of kWh generated by gas-fired and steam generators in 2009-10, but the announcement by EPM-2 Khin Maung Myint that many of generators in the Yangon stations needed to be overhauled could be part of the answer. Frequent interruptions in the supply of natural gas from the off-shore Yadana field and falling production on inland fields is also seen as a contributing factor. The new, larger and shorter gas pipeline from the Yadana field should help to alleviate the problem. See [ELTS019](#) and accompanying references.

Additional references

For useful charts showing the amount of electricity generated from different sources in Myanmar from 1971 onwards, check out the Trading Economics website:

<http://www.tradingeconomics.com/myanmar/electricity-production-kwh-wb-data.html>

CP010: DOMESTIC HYDROPOWER PROJECTS UNDER IMPLEMENTATION OR PLANNING

Note that the list below includes projects of the Electric Power Ministry No 1 (EPM-1), the Irrigation Dept of the Agriculture and Irrigation Ministry (A&IM), as well as private companies (aka independent power producers (IPP)).

Project	Location Dam Construction In-charge or B.O.T holder	MWcap Work Annual Startup GWh date target	Current Status	Latest report date	Original finish target date	Current finish target date
Pyy creek (py)	Oktwin, Bago E A&IM	40 120	2001	Hydropower facilities 52pc complete	03/09 2006	2011
Kun creek (kn)	Pyy, Bago E EPM-1	60 190	2002	Whole project 92pc complete Installation of generators	01/11 12/10 04/09	2011
South Nawin (sn)	Paukkhaung, Bago W EPM-1	2 10	1985	Waiting for generators	2003 1996	?
Kyye-ohn Kyye-wa Mon creek (kk)	Pwintbyu, Magwe W A&IM	74 370	2003	Main embank- ment, power- house, spillway	01/11 11/10 08/10	2012
Shwegyin river (sg)	Shwegyin, Bago E EPM-1	75 262	2003	First generator operational.	03/11 01/11	2011
Myittha (pt)	Gangaw, Magwe W A&IM	40 170	2004	Site clearing, tunnelling, main embankment	08/09 2008	n.a.

Myogyi (mg) Zawgyi river	Ywangan, Shan S A&IM	30 135	2005	Tunnels completed Dam spillway	09/10 10/09	---	2012
Kengkham (kg) Namet creek	Lawksawk, Shan S A&IM	6 20	2005	Earthwork	04/09	---	n.a.
Buywa (by) Mon creek	Sedoktaya, Magwe W A&IM	42 195	2005	Site clearing diaphragm wall canal	04/09	---	n.a.
Upper Paunglaung Paunglaung river (up)	Pyinmana, Mandalay EPM-1	140 454	2006	Tunnelling, main embank- ment	01/11 11/10	---	2012
Ann creek (an)	Ann, Arakan EPM-1	10 86	2006	Main dam	04/07 07/08	---	n.a.
Nancho creek (nc)	Pyinmana, Mandalay EPM-1	40 152	2006	Power house Main dam 58pc complete	11/10 08/10	---	2011
Manipur river (mp)	Kalay, Sagaing A&IM	380 1905	2006	Tunnelling	12/08	---	n.a
Thaukyegat-2 (tk)	Toungoo, Bago Golden Energy (Asia World)	120 604	2007	Main dam Tunnelling Under attack	11/10 08/10	---	2012
Thahtay creek (tt)	Thandwe, Arakan EPM-1	111 386	2007	Tunnelling Main embank Diaphragm wall	06/10 03/10	---	2011
Upper Buywa (ub) Mon creek	Sedoktaya, Magwe W A&IM	150 534	2007	Soil tests preliminary construction tasks	04/09 01/09	---	---
Upper Kengtawng (uk) Namtein creek	Mong Nai, Shan S EPM-1	52.5 n.a.	2008	Equipment contract signed	04/10 03/09	---	2012
Upper Biluchaung (ul)	Yawngghwe, Shan South New Power Oasis Development Co	29 n.a.	n.a.	Enviro impact MoU for BOT	01/11 03/10	---	n.a.
Biluchaung-3 (b3)	Loikaw, Kayah Future Energy Co (High Tech Concrete)	52 334	2008	Tunneling Diversion weir	09/10 03/10	---	2012
Upper Yeywa (uy) Myitnge river	Kyaukme, Shan N EPM-1	280 n.a.	2009	Site clearing Main embank- ment	05/10 04/10	---	n.a.
Upper Sedawgyi (us) Nampet river	Madaya, Mandalay Htoo Trading, A&IMin	64 315	---	Main dam MoU for BOT	04/10 01/10	---	n.a.
Bawgata creek (bg)	Kyaukkyi, Bago E	168	---	Permission of	07/10	---	n.a.

	EPM-1	500		SPIC sought	05/09		
Thagyet creek (tg)	Taninthayi, TanDiv Yuzana	20 95	---	MoU for BOT signed	04/10	---	n.a.
Dagyaing creek (dg)	Hlaingbwe, Karen n.a.	25 87	---	Work about to be launched	07/10	---	n.a.
Bilin river (bl)	Bilin, Mon n.a.	280 1512	---	Asia World to undertake project	11/10 07/10	---	n.a.
Anyarpya creek (ap)	Dawei, Taninthayi Natural Energy Wave	9.3	---	B.O.T.signed	01/11	---	n.a.
Htakha creek (tk) Ding Htaing falls	Machanbaw, Kachin Htoo Trading	6	---	Site clearing RoR?	05/10	---	n.a.
Middle Paunglaung (mp)	Pyinmana, NPT EPM-1	100 500	2011	Site clearing			
Pyettaw creek	Bilin, Mon n.a.	10		Mentioned	02/10		

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CP011: MAJOR DOMESTIC HYDROPOWER STATIONS: OPERATIONAL DATA

Station	Location	Startup Date	MW Cap	Equipment Suppliers	Annual Dam GWh target ⁴	Dam height width feet	Storage acre-ft thousand	Type
Yeywa (yy)	Pyinoolwin tsp Mandalay	02-12/10	780	CITIC Synohydro CNEEC CHMC	3550	433 2264	2114	HP
Kengtawng (kf)	Mongnei, Shan S	03/09	54	CNEEC ZOHG	378	975	RoR	HP
Shweli-1 (sl-1)	Namkhan, Shan N	05/09	600	YMEC Synohydro	4022	154? 531		HP
Khabaung (kb)	Ottwin, Bago E	03/08	30	CHMC CNEEC	120	200 920	879	M-P
Pathi³ (pt)	Toungoo, Bago E	01/08	2		8	90 2500	30.5	M-P
Yenwe (yw)	Kyaukdaga, Bago E	02/07	25	CNEEC CITIC	123	251 1050	932	M-P
Malikha⁵ (mk)	Waingmaw, Kachin	2007	10.5	Chinese	45	?		HP

Paunglaung (pg)	Pyinmana, Mandalay	03/05	280	YMEC	911	430 3084	559	M-P
Mone (mn)	Sedoktaya, Magwe W	01/05	75	CITIC YMEC	330	200 4320	674	M-P
Thaphanseik (tp)	Kyunhla, Sagaing	06/02	30	CITIC	117	108 22578	2880	M-P
Zaungtu (zt)	Bago, Bago E	03/00	20	YMEC	76	147 5896	330	M-P
Zawgyi No 2 (zg)	Lawksawk, Shan S	03/00	12	YMEC SFECO	30	145 2550	n.a.	M-P
Zawgyi No 1 (zg)	Lawksawk, Shan S	10/98	18	YMEC SFECO	30	RoR	RoR	HP
Sonphu⁵ (sp) Nantpan Creek	Pangsang, Shan N	1999	8.5	Chinese	?	?	?	HP
Balu No 1 (lp)	Loikaw, Kayah	08/92	28	Japanese	200	36 1736	n.a.	HP
Sedawgyi (sd)	Madaya, Mandalay	06/89	25	n.a.	134	133 4120	120 ¹	M-P
Kinda (kd)	Myittha, Mandalay	01/86	56	n.a.	165	236 2034	874	M-P
Balu No 2 (2nd) (lp)	Loikaw, Kayah	1974	84	Japanese	600	108 n.a.	n.a.	HP
Balu No 2 (1st) (lp)	Loikaw, Kayah	1960	84	Japanese	600	RoR ²	RoR	HP

NLM, 15/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-15.pdf>

A feature article in NLM, dated 15/05/09, put the total installed generating capacity of hydropower stations in the country at 1321 MW. An additional 100-MW turbine-generator set being installed at the Shweli-1 power station at the time was expected to raise this total to 1421 MW.

¹As reported in NLM: 24/05/01. According to the records of the Irrigation Dept of the MoA, the maximum capacity of the reservoir as originally constructed in the 70s was 360,000 acre-feet.

²The first phase of the Baluchaung-2 power station was built according to 'run of the river' specifications. After the Moebye dam came into operation, the first phase turbine-generators like those of the second phase, used water sourced from the dam.

³The Pathi station is a not a major power producer by any stretch of the imagination. But it is included in this summary because it is connected to the national power grid at Toungoo and is occasionally included in statistics quoted by government ministers when citing the total capacity of the Myanmar power plants.

⁴As of the completion of Yeywa power station in December 2010, the combined reported production capacity of all the operating hydropower generating stations connected to the national grid system would be 11964

GWh annually. According to data provided to the Central Statistical Organization by MEPE, 4180.51 GWh were produced by the hydropower stations for distribution to the national grid in the the 2009-10 fiscal year. A report in Decmber 2010 indicated that the Shweli-1 power station had provided approximately 3000 GWh to the Yunnan grid during the period Jan-Nov, 2010.

⁵Neither the Malikha or the Sonphu stations are connected to the national grid system. Both are operated independently of the state-owned electricity company MEPE, although MEPE transmissions lines carry the electricity generated by the Malikha station to Waingmaw and Myitkyina.

The website of the Global Energy Observatory has data information on many of the operating power stations in Myanmar. <http://globalenergyobservatory.com/> The easiest way to check for information is to do a google search using the words Global Energy Observatory and the name of the power station, e.g. Yeywa.

CP012: THERMAL POWER STATIONS: OPERATIONAL DATA

Station and Location	Startup	MW	Type	Fuel	Equipment Supplier	Station Capacity MW
Ywama (Insein) Yangon (ym)	1958	30	Steam	Coal	British & Hungarian	30 ¹
	1975	36.9	Gas	Gas	British	66.9
	2004	24	Gas	Gas	Japanese?	60.9
	2004	9.4	Steam	Combined-cycle	Japanese?	70.3
Ahlon Yangon (al)	PreWW2	30	Steam	Coal	British	30 ²
	1995	99.9	Gas	Gas	Euro Gas	99.9
	1999	54.3	Steam	Combined-cycle	Japanese	154.2
Thaketa Yangon (tt)	1990	57	Gas	Gas	Japanese	57
	1997	35	Steam	Combined-cycle	Japanese	92
Hlawga (Mingaladon) Yangon (hg)	1996	99.9	Gas	Gas	Euro Gas	99.9
	1999	54.3	Steam	Combined-cycle	Japanese	154.2
Kyunchaung (Pakokku) Magwe W (ky)	1974	54.3	Gas	Gas	British?	54.3
Mann (Minbu) Magwe W (mn)	1980	36.9	Gas	Gas	British?	36.9
Shwedaung (Pyay) Bago W (sd)	1984	55.35	Gas	Gas	British?	55.35
Myanaung , Ayeyawaddy (my)	1975	34.7	Gas	Gas	Euro Gas	34.7
	1984	33	Gas	Gas	Hitachi	67.7
2 generators to Thaton	2001	- 33				34.7
Thaton , Mon (tn)	1987	18	Gas	Gas	Czechoslovak	18
2 generators from Myanaung	2001	33	Gas	Gas		51
Mawlamyaing , Mon (ml)	1980	12	Steam	Coal ²	Chinese?	12
Kanma (Pakokku) Magwe (kn)	1998	8.72	Gas	Gas	?	8.72
Chauk , Magwe E (ck)	?	14?	Gas?	Gas?	?	14?

Tigyit (Pinlaung) Shan S	2005	60	Steam	Coal	Chinese	60
(tg)	2006	60	Steam	Coal	Chinese	120

NLM, 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

On 05/03/10, EPM-2 Khin Maung Myint informed a meeting of the Special Projects Implementation Committee in Nay Pyi Taw about plans to repair thermal power plants in various parts of the country. The list included major repairs to No 3 turbine of the Ywama power plant, to No 1 turbine of the Ahlon power plant, to the Hlawga, Ahlon and Thakayta recycle steam turbines, to the Hlawga power plant, to the Thakayta power plant, to No 3 turbine at the Kyunchaung power plant, to the Shwedaung power plant, to the Myanaung power plant, to the steam turbine at the Mawlamyine power plant and to the Thaton power plant.

NLM, 15/05/09. <http://www.burmalibrary.org/docs07/NLM2009-05-15.pdf>

A feature article in NLM, dated 15/05/09, put the total current generating capacity of thermal power stations in the country (including Tigyit) at 843.62 MW.

¹The old steam turbine at Ywama appears to have been phased out in 2003.

²The old steam turbine at Ahlon appears to have been phased out by the mid-90s.

³The station at Mawlamyaing was converted to gas-fuelled in 2007.

The website of the Global Energy Observatory has data information on many of the operating power stations in Myanmar. <http://globalenergyobservatory.com/> The easiest way to check for information is to do a google search using the words Global Energy Observatory and the name power station, e.g. Myanaung.

CP013: THERMAL POWER PROJECTS UNDER PLANNING OR IMPLEMENTATION

Station and Location	Proposed MW Capacity	Type	Fuel	Current Status	Latest Report Date	Companies
Yangon Industrial , Htantabin, YangReg (yi)	270	Steam	Coal	Planning	03/10	Huaneng Lancang Htoo Trading
Nantahin , Kalewa tsp, (nt) Sagaing Region	600?	Steam	Coal	Planning	07/10 05/10	China Guodian (TunThwin Mining)
Kawthoung, Taninthayi	6	Steam	Coal	Planning	03/10	n.a.
Mong Khok, Monghsat tsp Shan East	270	Steam	Coal	Seeking development partner	11/08	n.a.
Dawei seaport , Yebyu tsp Taninthayi (ds)	4000	Steam	Coal	Planning	11/10	Italian-Thai

CP014: FOREIGN INVESTMENT DRIVEN HYDROPOWER PROJECTS (EP)

The companies listed are those that have signed MoUs or MoAs with the Dept of Hydropower Implementation (aka Dept of Hydropower Administration or Planning) of the Ministry of Electric Power No 1. Also included are operating power stations whose main output is being exported from Myanmar. The names of companies involved in contract work for the projects can be found in the key articles hyperlinked with the summaries. Information is updated as new reports are received. Key articles to each project can be accessed by using the bracketed link beside the name of the project.

Project, river Location	MWcap Annual GWh target	Current Status	Latest report date	Work start up date	Target finish date	Companies Foreign (Myanmar)
Mawlaik (ml), Chindwin Mong Yu, Mawlaik tsp	520 n.a.	MoU signed Feasibility study?	07/10 05/10	---	---	China Guodian (Tun Thwin Mining)
Hatkyi (Hutgyi) (ht1) (ht2) Thakohta, Hlaingbwe tsp	1360 n.a.	New MoA signed Field surveys	05/10	---	---	Sinohydro, EGAT (IGE)
Six Cascades, Nam Lwi (sc) Shan State East	452 n.a.	Projects named Planning	07/10 03/10	---	---	Yunnan PowerGrid SDIC Huajing
Nam Hka (nk) Shan State East	200 n.a.	Planning	02/10 03/10	---	---	Yunnan PowerGrid SDIC Huajing
Naunghpa , Thanlwin (np) Tangyan tsp, Shan North	1000 n.a.	MoU signed	07/10 12/09	---	---	Hydro China
Mantawng , Nam Ma (mt) Mong Mao tsp, Shan North	200 n.a.	MoU signed	07/10 12/09	---	---	Hydro China
Sai Tin (Saingdin) (st) Buthidaung, Arakan	76.5 220	MoA signed Site clearing	01/11 07/10	---	2015	Datang Shwetaung Hydro
Laymyo I & II (Lemro) river (lm) Mrauk-U tsp, Arakan state	800 2500?	MoA signed Negotiations with Bangladesh	01/11 09/10	---	2018	Datang Shwetaung Hydro
Tasang , Thanlwin (ts) Mongton tsp, Shan East	7110 35400	Detailed design work Site preparation	11/10 03/10	---	2022	Three Gorges Sinohydro China South Grid EGAT, IGE
Taninthayi river (tn) Ler Pa Doh, Taninthayi tsp	600 3476	MoU signed Field surveys	08/10 06/09	---	2017	Italian-Thai
Kunlong , Upper Thanlyin (kl) Ton Gyap, Kunlong tsp	1400	MoA signed Feasibility study	03/10 02/10	---	---	Hanenergy Goldwater
Tapar , Thanlyin river (tp) Taho-hkao, Kutkai tsp	1160	Under study	05/07	---	---	Hanenergy Goldwater
Ngaw Chang Hka cascade (nc) Tsawlaw, Chipwi tsp	1055	Projects named MoA signed	07/10	---	---	Yunnan Power Investment (IGE)
Chipwenge , Chipwi creek (cn) Lankyaw, Chipwi tsp	99	Opened, work continuing on power station, expected completion June 2011	12/10 10/10	05/07	2011	China Power Investment Asia World
Chipwi , N'maihka (cw) Mantong, Chipwi tsp	2800	Site clearing, dam foundation, tunneling B.O.T. signed	10/09 09/09 06/09	07/10 08/09	---	China Power Investment Asia World

Wusauk , N'maihka (ws) Wutsok, Tsawlaw tsp	1800	Under study	03/10	---	---	China Power Investment
Yinan , N'maihka (yn) Tsawlaw tsp?	1200	Under study	03/10	---	---	China Power Investment
Phizaw , N'maihka (pz) Khawbude tsp	2000	Under study	03/10	---	---	China Power Investment
Khaunglanhpu , N'maihka (kl) Khawbude tsp	2700	Under study	03/10	---	---	China Power Investment
Laizar , Malihka (lz) Sumprabum tsp	1900	Under study	03/10	---	---	China Power Investment
Myitson , Ayeyawady (ms) Confluence area, Myitkyina tsp	6000 29400	Relocation of villagers Site clearing ops Work on bridge	03/11 01/11	12/09	2019	China Power Investment Asia World
Shweli-1 , Shweli (Mao) (sl-1) Namkhan, Shan N	600 4022	Started operations May 2009	12/10 09/10	2005	2009	Huaneng Lancang Asia World
Shweli-2 , Shweli (Mao) (sl-2) Manton tsp, Shan North	520 3310?	MoA signed Planning	11/10 11/09	---	---	Huaneng Lancang Asia World
Shweli-3 , Shweli (Mao) (sl-3) Momeik (Mong Mit) Shan North	1050 3995	Roads, site preps Consulting contract	11/10 04/10	---	---	n.a.
Tapein-1 (Daying) (tp-1) Kalonhka, Moemauk tsp	240 1065	Officially opened Started operations in Sept 2010	01/11 09/10	05/07		Datang (Yunnan)
Tapein-2 (Daying) (tp-2) Kalehkyet, Moemauk tsp	168 633	To be developed in the future	09/10 03/10	---	---	Datang (Yunnan)
Htamanthi , Chindwin (tm) Kason, Homalin tsp	1200 6685	Surveys continuing Under negotiation	07/10 05/10	---	---	NHPC - India
Shwesayay , Chindwin (ss) Budalin tsp, Sagaing Div	660 2908	Under negotiation	07/10 05/10	---	---	NHPC - India
Ywathit , Thanlwin (yt) Bawlake tsp, Kayah	600	Campaign launch MoA signed, survey	03/11 01/11	---	---	Datang (Yunnan) Shwetaung Hydro
Nampun , Nam Pawn (np) Dimawso tsp?	130	Campaign launch MoA signed, survey	03/11 01/11	---	---	Datang (Yunnan) Shwetaung Hydro
Namtabat , Namtamhpak? (nt) Loikaw tsp?	110	Campaign launch MoA signed	03/11 01/11	---	---	Datang (Yunnan) Shwetaung Hydro
Weigyi , Thanlwin (wg) Weigyi, Papun tsp	4540 29217	Suspended	10/03 06/03	---	---	EGAT
Dagwin , Thanlwin (dw) Dagwin, Papun tsp	792 5422	Suspended	10/03 06/03	---	---	EGAT

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CP020: EXISTING TRANSMISSION SYSTEM: MID-2007 (prepared by the compiler)

See Map 3 below

Grid	Voltage	Stations and Substations
1	230 kV	Lawpita - Toungoo - Thayagon - Kamanat (Bago) - Hlawga
1a	230 kV	Toungoo - Pyinmana – Thazi
1b	230 kV	Kamanat - Thaton
2	230 kV	Paunglaung - Pyinmana – Taungdwingyi – Shwedaung – Myaungdaga – Hlawga
2a	230 kV	Myaungdaga - Hlaingthaya < Athok < Bayintnaung
3	132 kV	Lawpita – Kalaw – Thazi – Ingon – Aungpinle
4	132 kV	Kyaukpahto – Ngapyawdine - Letpanhla – Aunpinle – Tagundaing (Mandalay)
4a	132 kV	Tagundaing (Mandalay) – Kyaukchaw – Pyin-U-Lwin
5	132 kV	Monywa – Nyaungbingyi – Kyunchaung – Chauk – Magwe – Taungdwingyi
5a	132 kV	Mone (Sedoktaya) – Chauk
6	66 kV	Taungdwingyi - Aunglan - Pyay - Myanaung - Hinthada – Yegyi – Pathein - Myaungmya
7	66 kV	Thaton – Myaingalay – Pa'an – Mawlamyaing
8	66 kV	Zawgyi No 2 – Zawgyi No 1 – Aungthabye – Kalaw
9	66 kV	Bhamo – Shwegu – Kyaukpahto
10	66 kV	Kyunchaung – Theingon – Pakokku
11	66 kV	Myingyan – Nyaung-U – Chauk
12	66 kV	Pozzolan – Kyaukpadaung – Chauk
13	66 kV	Magwe – Mann < Ngaphe < Malun

Other shorter 66-kV lines connect the hydropower stations at Thapanseik and Mogok to the 132-kV northern grid, and the hydropower stations on the Zaungtu and Yenwe rivers to the Sittaung valley grid. From the 66-kV transmission line linking Taungdwingyi and Pyay, branches reach out to Sinbaungwe and industrial areas at Tayet, Shwepandaw, Kyawswewkyo and Kyawswa. Between Pyay and Myanaung other short 66-kV extensions reach out to the industrial areas at or near Sinde, Okshitppin, Nyaungchedauk, Tonbo (Mathone), Seiktha (Kanyaing) and Kyangin. The thermal power stations and sub-stations in the Yangon area are also interconnected in various ways by 66-kV lines

For information on the development of the grid system between 2007 and 2010, see the notes on [Grid Map 5](#) below.

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ANX ANNEXES

Annex 1: NATIONAL HIGH-VOLTAGE [GRID SYSTEM AND MAPS](#)

[Grid Map 1](#): National grid system as it existed in 1989

[Grid Map 2](#): National grid system as it existed in 2001-02

[Grid Map 3](#): National grid system as it existed in 2002-03

[Grid Map 4](#): National grid system as it existed in mid-2007

[Grid Map 5](#): Grid projects underway 2007 - 2009

[Grid Map 6](#): Future grid projects in mid-2008

[Grid Map 7](#): Long-term plan for transmission system in mid-2008

N.B. The maps below have been selected from various sources. They are shown in chronological order here to give a sense of historical perspective to the development of the national grid system in Myanmar. As indicated in the notes accompanying each map, they are best viewed in the web documents from which they are taken where it is possible to enlarge the projection.

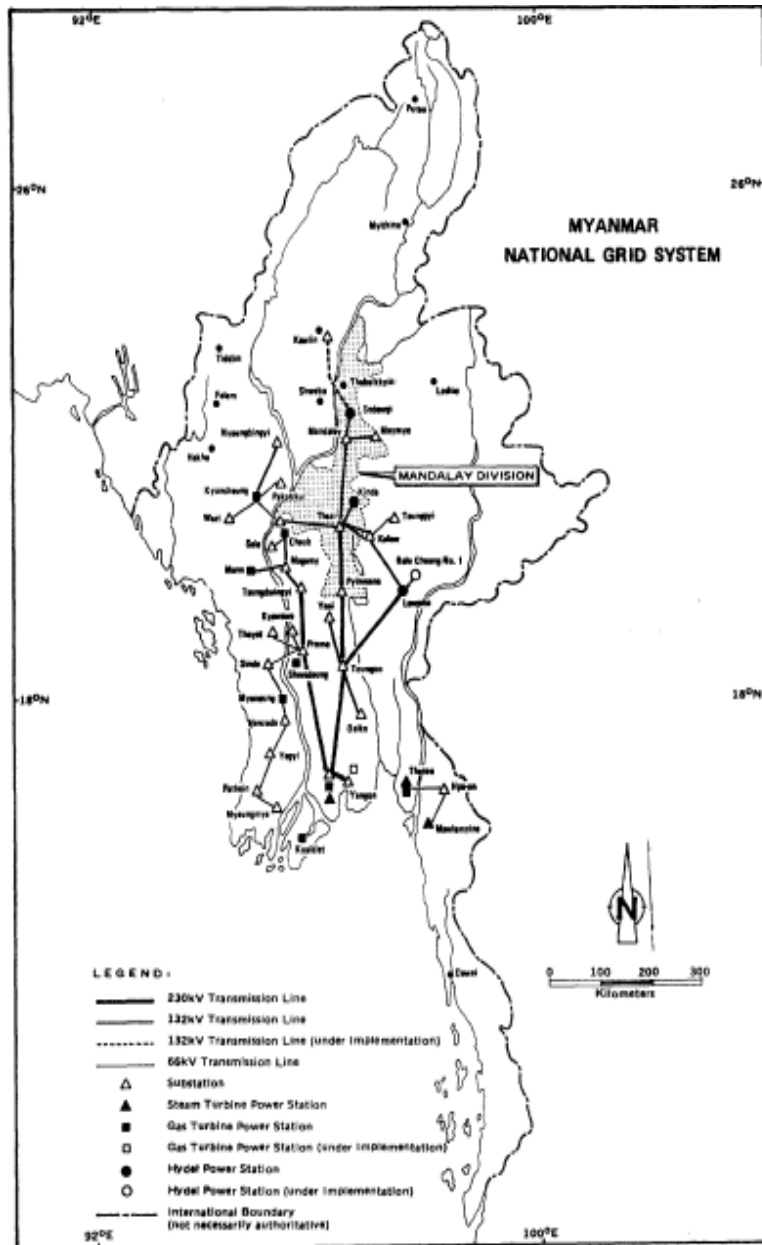
Map 1 (below) shows the national power grid system as it existed in 1989 shortly after the completion of the hydropower station at the Sedawgyi dam. It can also be found on page 6 of the *Project Completion Report of the Sedawgyi Hydropower Project* published by the Asian Development Bank.

<http://www.adb.org/Documents/PCRs/MYA/36112-MYA-PCR.pdf>

According to a study published by the World Bank in 1985¹, Burma/Myanmar then had 1190 miles (1915 km) of high voltage lines. The backbone of the system was the 310-mile-long (500 km) 230-kV line that connected the hydropower station at Lawpita with Toungoo and Rangoon. From Lawpita a 300-mile-long (480 km), 132-kV line stretched north through Kalaw and Thazi to the Mandalay area, while a 66-kV line reached west from Thazi to Chauk. Another smaller grid had been built around the Kyunchaung station, which was put into operation in 1974, and connected to the Chauk station by a 66-kV line.

Other grids with sub-stations were added to the system in the the early 80s through foreign-financed loans. "A 370-km, 66-kV transmission line project connecting Sindé (Pye) with Myaungmya (in the Irrawaddy delta) was completed in 1982 with a US\$12 million ADB loan. The laying of a 132-kV transmission line from Kyunchaung to Monywa, and the renovation of distribution lines in Rangoon, Mandalay and other divisional load centres were undertaken during the Third Four-Year Plan [78/79 to 81/82] with Yugoslav loans."² By the mid 80s, preparations were also underway for further extensions to the national system. "The [145-mile-long (233 km)] Thazi-Taungoo, 230-kV transmission line project connecting the northern and southern parts of the . . . national grid [was] undertaken with a DM890 million loan from [West Germany] in anticipation [that] the Kinda hydro-electric scheme . . . would be plugged into this node at Thazi in the near future. The World Bank (IDA) provided a soft loan of about US\$80 million towards the installation of over 699 km of single-circuit transmission lines (together with sub-stations and switching units) linking the thermal facilities at Mann, Prome and Myanaung with the existing and forthcoming hydroelectric plants at Lawpita, Sedawgyi and Kinda, as well as the planned additions at Paunglaung and Baluchaung. This project, which would be the single largest transmission network undertaken by the EPC, [would] involve a 210-km stretch of 132-kV lines between Chauk and Taungdwingyi (via Magwe and Mann) together with a 398-km, 230-kV high tension line from Taungdwingyi to Thaketa in the Rangoon suburbs (via Pye and Hlawga)"².

As Map 1 shows, these additions, had for the most part been completed by the late 80s. They had in effect, created a national transmission system by connecting and extending the regional grids which already existed in the early 80s. Map 1 also shows that the Sedawgyi power station had been linked to the main grid at Mandalay, by a 132-kV line and was in process of being connected to the gold mine in the Kyaukpahtoe area of Kawlin township. Also to be noted is the isolated 66-kV grid linking the natural gas power station near Thaton with the coal-fired generating plant in Mawlamyine through the sub-station at Pa'an which served the cement plant at Myainggale.



¹Burma: Issues and Options in the Energy Sector, World Bank Report No. 5416-BA (June 1985), p 6.3
www.wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1999/09/17/000009265_3970723102606/Ren dered/INDEX/multi_page.txt

²Tin Maung Maung Than, "Burma's Energy Use: Perils and Promises" in Southeast Asian Affairs 1986 (Institute of Southeast Asian Studies, 1986), pp. 83-85.

Map 2 (below) shows the national power grid network as it existed in 2001-02. This map was originally posted on the website of the Electric Power Ministry but this is no longer available. A clearer version can be

found at: http://www.geni.org/globalenergy/library/national_energy_grid/myanmar-burma/myanmarnationalelectricitygrid.shtml

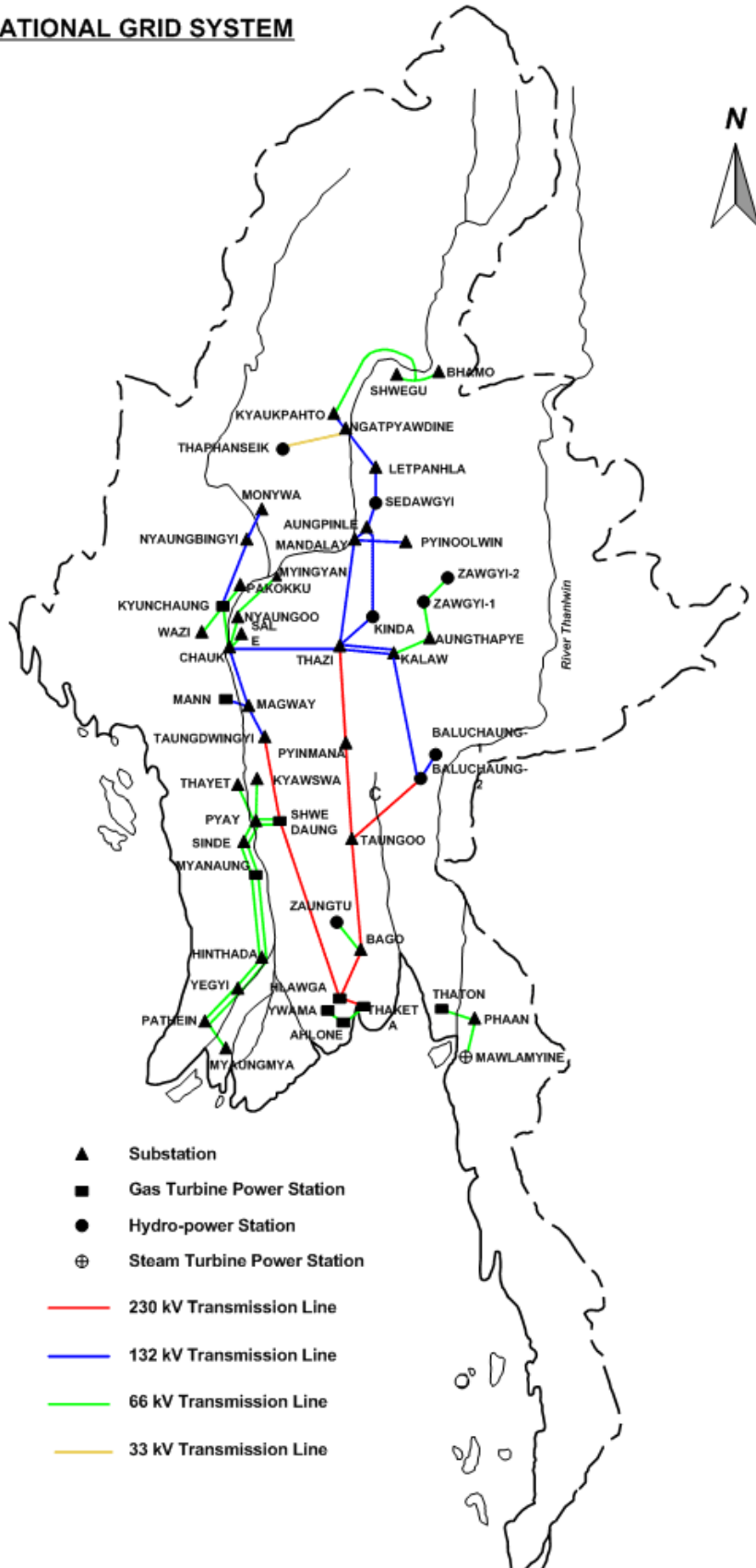
Map 2 shows the national transmission system as it existed in 2000-01. According to information provided by the Ministry of Electric Power to a website maintained by the Yangon City Development Committee (YCDC), high voltage transmission lines 542.63 miles long were added to the grid between 1988 and 2000 bringing the total at that time to 4969.63 miles. They were as follows with indicated voltage, distance and year of completion: (1) Thazi – Pyinmana - Toungoo, 230 KV, 83.2 miles (1988); (2) Sedawgyi - Kyaukpahto, 132 KV, 131.18 miles (1990); (3) Baluchaung-1-Lawpita, 132 KV, 9.32 miles (1992); (4) Zawgyi-1 – Aungthabye, 66 KV, 47.7 miles (1994); (5) Zawgyi-1 – Zawgyi-2, 66 KV, 11.8 miles (1996); (6) Kyaukpahto – Shwegu – Bhamo, 66 KV, 152.87 miles (1997); (7) Letpanhla – Mogok, 66 KV, 51.86 miles (1997); (8) Kinda – Aungpinle (Mandalay), 132 KV, 54.7 miles (1998) http://www.yangoncity.com.mm/ministry/ministry_of_electric_power.asp. With the exception of (1), (2) and (8) most of these additions to the grid were carried out during the construction of hydropower projects.

Also, to be noted were the connections to the grid by a 66-KV line from the Zaungtu hydropower project, completed in March 2000, and by a 33-KV line from the Thaphanseik hydropower project completed in 2001.

The generating stations at Thaton and Mawlamyine were linked together through a sub-station at the large cement plant at Myainggale during the nineties, although this circuit was not yet joined to the national grid.

The nineties were notable for the construction of a series of gas-fired and steam power plants in Yangon in response to the discovery of the Nyaungdon natural gas field. They were linked together through a network of 66-KV transmission lines.

NATIONAL GRID SYSTEM



[Map 3](#) (below) is reproduced from *The Study on Introduction of Renewable Energies in Rural Areas in Myanmar: Final Report: Volume 1: Summary*, Figure 5, p 9. [doc page 16.] This map, prepared by a joint team of Nippon Koei Co Ltd and the Institute of Energy Economics of Japan, highlights the proposed sites of several small-scale rural electrification projects that grew out of a study carried out between 2001 and 2003. It is useful for understanding how the national transmission network was taking shape during that time. The According to MEPE, the total generating capacity of the power plants supplying the system was 1,172 MW and peak capacity of the national grid was 716 MW while peak demand was 1,005 MW. The resulting shortage of 289 MW was managed by load shedding and suspending connections to new applicants. Other information supplied by MEPE indicated that 7,915 miles of 11/33/66-kV distribution lines were maintained by the state electric power company in mid- 2002.

Of particular interest for the development of high-voltage transmission grids at the time were proposals for a) a 230-kV line from the planned Shweli-1 power plant through Mogok to Mandalay; b) a 455km-long, 230-kV line reaching north from a planned gas-fired generating plant in Kanbauk to join the national grid at Kamanat (Bago) and c) 230-kV lines leading from a planned gas-fired power plant in the Ayeyawady delta area to Yangon and Patheingyi. None of these proposed transmission projects was undertaken. The line from the Shweli-1 power station was eventually re-routed through Namhsam, and Shwepyithar. The proposed 1,500-MW generating plant at Kanbauk and the corresponding transmission line north to the heavily populated area around Yangon was never built; instead, a 24-inch gas pipeline was laid from Kanbauk to Myainggale, and eventually to Yangon, to feed the four major thermal stations and industrial zones in the former capital. Similarly, plans for the 200-MW generating plant in the Ayeyawaddy delta that was to have been supplied with natural gas from off-shore fields failed to come to fruition. It was not until 2010 that a 24-inch, 288-km-long pipeline directly from the Yadana field to the natural-gas processing station at Ywama in the northern outskirts of Yangon was finally completed. This pipeline now serves as the main conduit for the gas that is used in the power plants in Yangon.

After the 280-MW Paunglaung plant was commissioned in March 2005, it was connected to the upgraded sub-power station at Taunggyi, thereby completing a second 230-kV circuit to Yangon. The gas-fired generating station at Thabon was also linked to the national grid at Kamanat through a 230-kV line. Another important development, not shown on Map 3, was the construction of an 80km-long, 132-kV line linking the 75-MW hydropower station near Sedoktaya with a substation at Tanyaung and across the Irrawaddy to the main regional subpower station at Chauk. This line was completed in 2004 before the opening of the Sedoktaya project.



Source

<http://lvzopac.jica.go.jp/external/library?>

http://www.opacsch.mmdsp&view=view.opacsch.mmindex&shoshisbt=1&shoshino=0000159772&volno=0000000000&filename=11734100_01.pdf&seqno=1

Map 4 (below) is taken from a slide-presentation made by the Myanmar delegation at a seminar in Bangkok in Sept 2007 [*Powering ASEAN: Technology and Policy Options*]. It reproduces slide 34 from that collection. Although it is titled 'Future National Grid System', it appears to show the grid as it *actually* existed in 2007 with solid lines and the transmission lines and substations under planning or construction with dotted lines. Slide 35 in this same collection (not reproduced below) envisages the national grid system and sub-power station network as it would be in the future when a number of major hydro projects intended mainly for export of electric power to Thailand, China and India would be completed. It does not show the proposed external transmission lines connected with these projects but purple lines are used to show how they would be linked with the system inside Myanmar through 500-kV grids. Since 2007, when slide 35 was prepared, plans for the national grid system have changed considerably and slide 35 is now useful mainly for historical purposes in tracing how future plans for the grid were developing at the time. To view slides 34 and 35 with enlarged project, use the following URL. <http://www.ibiblio.org/obl/docs2/MMpresentation.pdf>

As indicated in the legend, the 230-kV transmission grids are shown in red and the 132- kV grids in blue. Green is used for the 66-kV transmission grids and orange for the 33-kV grids. Blue boxes are used for major hydro-electric stations and red boxes for the major gas-powered generating stations, while triangles indicate the locations of major sub-stations. Coal-fired stations are shown with a circled cross.

Map 4 shows that significant changes took place in the grid system between 2001 when Map 2 (above) was issued and 2007. The coal-fired generating station at Tigyit, completed in 2005, was linked to the 132-kV line between Lawpita and Kalaw which, in turn, was upgraded to a double circuit line. The Paunglaung hydro station, completed in 2005, was linked to the nearby main sub-station at Pyinmana, which in turn was connected to the main sub-station at Taungdwingyi by a 230-kV line. Taungdwingyi and Pyay were connected by a single-circuit 66-kV line. The previously isolated Thaton-Mawlamyaing circuit was connected to the national grid at Kamanat near Bago with a single-circuit 230- kV transmission line. A 230-kV line was constructed to link the main 230-kV Taungdwingyi – Hlawga transmission line through Myaungdaga to the industrial city of Hlaingthaya from where it was extended west across the Ayeyawaddy to Athok in the delta.

Major transmission projects underway in 2007 are also shown with dotted lines on Map 4. They include the 180-mile-long, double-circuit, 230-kV line stretching south from the still unfinished Shweli-1 hydro generating station to sub-stations under construction at Shwesayan and Belin in the Mandalay area. A 130-mile-long, 132-kV line, also under construction, is showing leading west from the unfinished hydropower plant at Kengtawng Falls to Namzang, Loilem and Pinpet to join the central grid at the main sub-station at Kalaw. A 65-mile long, 132-kV line (completed in 2006) leads north-west from Thazi and Meiktila to the Myingyan area on the Ayeyawaddy.

Eleven of twelve 230-kV sub-stations in operation in 2007 are shown on Map 4. They were at Thazi, Taungdwingyi, Pyinmana, Toungoo, Thayagon, Kamanat (Bago), Myaungtaga, Thaton, Bayinthaung Hlaingthaya, Athok and, possibly, at Hlawga (not shown). Similarly, fifteen of the existing 132-kV substations are shown on Map 4 at Kyaukpahto, Ngapyawdaing, Letpanhla, Monywa, Nyaungbyingyi, Pyin-U-Lwin, Chauk, Kalaw, Yinmabin, Magwe, Ingon, Kyaukchaw, Aungbinle, and Tagundaing (Mandalay) and, possibly, at Yeywa (not shown). Forty-two 66-kV and two 33-kV substations are also shown on Map 4. Only 51 substations were listed in the slides shown at Franco-ASEAN seminar.

The information presented at the Franco-ASEAN seminar differs somewhat from that provided by EPM No 2 Khin Maung Myint to a meeting of the State Electric Power Development Project Work Committee in July 2006. According to the minister, "the EPM No 2 has twelve 230-kV power stations, sixteen 132-kV power stations and forty-seven 66-kV power stations for a total of 75. The national grid lines under the ministry include thirteen 230-kV sections with a total length of 834.16 miles; nineteen 132-KV sections with a total length of 1056.73 miles, and fifty-two 66-KV sections with a total length of 1224.92 miles."² Information available to the compilers of Platt's Myanmar Country Energy Profile in mid-2007 indicated that 76 substations with a total installed capacity of 2,569 MVA were in operation.¹

For a synopsis of the grids composing the national transmission system as it existed in mid-2007 see [Table CP020](#) above³.

Information available to the office of the Tripartite Core Group for the report, *Post-Nargis Joint Assessment*, indicates that as of April 2007 the national transmission system exceeded 1,352 km (845 miles) at 230 kV voltage level, 1,692 km (1,056 miles) at 132 kV, and 2,173 km (1,358 miles) at 66 kV.²

¹ See Platts Electric [Power Profile](#) for Myanmar above.

² *Post-Nargis Joint Assessment*, (Tripartite Core Group, July, 2008, p 115 [doc 139]).
<http://www.asean.org/21765.pdf>

³ See also above: '[Inventory](#) of generating plants, transmission grids, projects (NLM: 30/07/06).



[Map 5](#) (below) is taken from a slide-presentation made by the Myanmar delegation at an ADB regional consultation in Ho Chi Minh City in November 2008. It reproduces slide 20 from that collection. This map focuses attention on several of the transmission-substation projects underway in central Burma during the period 2007 – 2009. Map 5 is best viewed with the enlarged projection available at the following URL: <http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

The first and most important of the projects shown on Map 5 involved the building of sub-stations and erection of transmission lines and towers to be used in connecting the large hydro power project then under construction at Yeywa with key transformer stations and switch bays in the central part of the country including those at Belin, Shwesayan, Meiktila, Taungdwingyi, Ohndaw and Nyaungbyingyi. An important reference for this project can be found in NLM: 03/09/05 which refers to the signing of a contract with China National Heavy Machinery Corporation (CHMC) for the supply 230 KVA cables and necessary equipment for the construction of sub-power stations worth US\$ 45.849 million connected to main station at Yeywa. Electricity from the Yeywa station to be supplied to the Meiktila sub-power station through a 75-mile-long, double circuit transmission line from Yeywa to Meiktila and from Yeywa to Bellin (near Kyaukse) sub-power station through a 28-mile-long, double circuit line. Also included is a 60-mile long, 230-KVA double circuit power line connecting Bellin sub-power station with Meiktila and a 22-mile-long 230-KV double circuit line to be built between Yeywa and Shwesayan sub-power station connected to the Shweli-1 hydropower project. <http://www.ibiblio.org/obl/docs2/NLM2005-09-03.pdf> Other references to this important project can be found in the following editions of NLM: 11/04/07; 14/05/07; 05/03/08; 06/10/08; 24/12/08; 04/05/09; 25/08/09; 22/04/09; 09/09/09. In comparison with the media fanfare accompanying the opening of a hydropower station in Myanmar, completion of transmission grids such as those connecting the Yeywa-Belin-Meiktila stations, the Yeywa-Thazi-Meiktila stations, and the Meiktila-Taungdwingyi stations go virtually unnoticed. But a report in [Issue 554](#) of the Myanmar Times (20/12/10) appears to indicate that these grids and power stations are functioning and that electricity from Yeywa and Shweli-1 have been completed and are supplying power to the national grid.

A second major project during this period involved adding another 230-KV circuit to the main transmission line between Toungoo and Kamanat (near Bago) and new 230-KV lines between Kamanat and Myaungdaga and between Kamanat and Thanlyin. The only reference in state media to the work on the Toungoo – Kamanat transmission line is found in NLM: 10/01/08. <http://www.ibiblio.org/obl/docs4/NLM2008-01-10.pdf> Much more information is available on the extensions from Kamanat to Thanlyin and Thaketa ([ELPG009](#)) and from Kamanat to the industrial subdivision in Myaungdaga ([ELIU016](#))

A third major project during this period (not shown on Map 5) involved the development of the electrical infrastructure in Nay Pyi Taw, the new administrative capital in central Myanmar. There are numerous references to this project in the state media. See, for example, NLM, 05/11/07: EPM-2 Khin Maung Myint accompanied by MD U Tin Aung of the EPSE inspected the 230/33/11-KV main power station in Nay Pyi Taw (Pyinmana) on 31/10/07. Officials there reported to the minister on the supply of power from the station. The Nay Pyi Taw (Pyinmana) station is one of four important stations in Nay Pyi Taw and has been installed with a 100-MVA transformer and a 60-MVA transformer to supply power to the Nay Pyi Taw region. Arrangements are being made to link it with the 230-KV power lines from the Shweli-1 and Yeywa hydropower projects. The minister gave instructions on the communication system at the power station. Then the official party viewed transformers in the switch yard and the input and output of the power lines. <http://www.ibiblio.org/obl/docs4/NLM2007-11-05.pdf> Other references to the electrical installations in the new capital are as follows: NLM: 08/09/06; NLM: 21/04/07; NLM: 09/07/07; NLM: 05/04/09.

As shown on Map 5, new substations were being built from 2007 to 2009 at several of the hydropower projects under construction in central Burma at this time. A new substation at Pinpet was put into service for the large iron mine and smelter under development there. Another substation was built at Okshitpin to provide additional power to the state-owned industrial plants scattered about the area west of Pyay.

A list of transmission power station projects underway as of March 2010 was provided by EPM-2 Khin Maung Myint to the SPDC's Special Projects Implementation Committee on 05/03/10 and published in the New Light of Myanmar on 07/03/10. <http://www.burmalibrary.org/docs08/NLM2010-03-07.pdf>

'EPM-2 Khin Maung Myint submitted reports on the renovation of nine national grids, 10 main power station projects and the planned major repair of power plants. Among the lines connected to the national grid the Ministry of Electric Power No 2 is undertaking are the installation of the 18-mile-long Panlon -Namhsam 66-KV power grid, the 3-mile-long power line from the Kyaukpahto-Shwegu-Bhamo 66-KV power grid to the Naba sub-power station, the 9.5-mile-long 66-KV power line from the Kyunchaung-Pakokku 66- KV power line (near Myitchay) to Kanma, the 34-mile-long Lashio-Hsenwi 66-KV power grid, the 15-mile- long Hlinethaya-Ahlon 230-KV twin-bundle, single-circuit power grid, the 0.9-mile-long Hline river crossing (Ahlon) 230-KV twin-bundle, single-circuit power grid, the 60-mile long Thaton-Mawlamyine [? KV] twin-bundle, single-circuit power grid, the 40-mile-long Naba-Mohnyin 66-KV power line and the 55-mile-long Mohnyin-Mogaung 66-KV power line. Of them, the Panlon-Namhsam power line project has been completed, three [others] are under implementation and plans are under way to implement the other five.

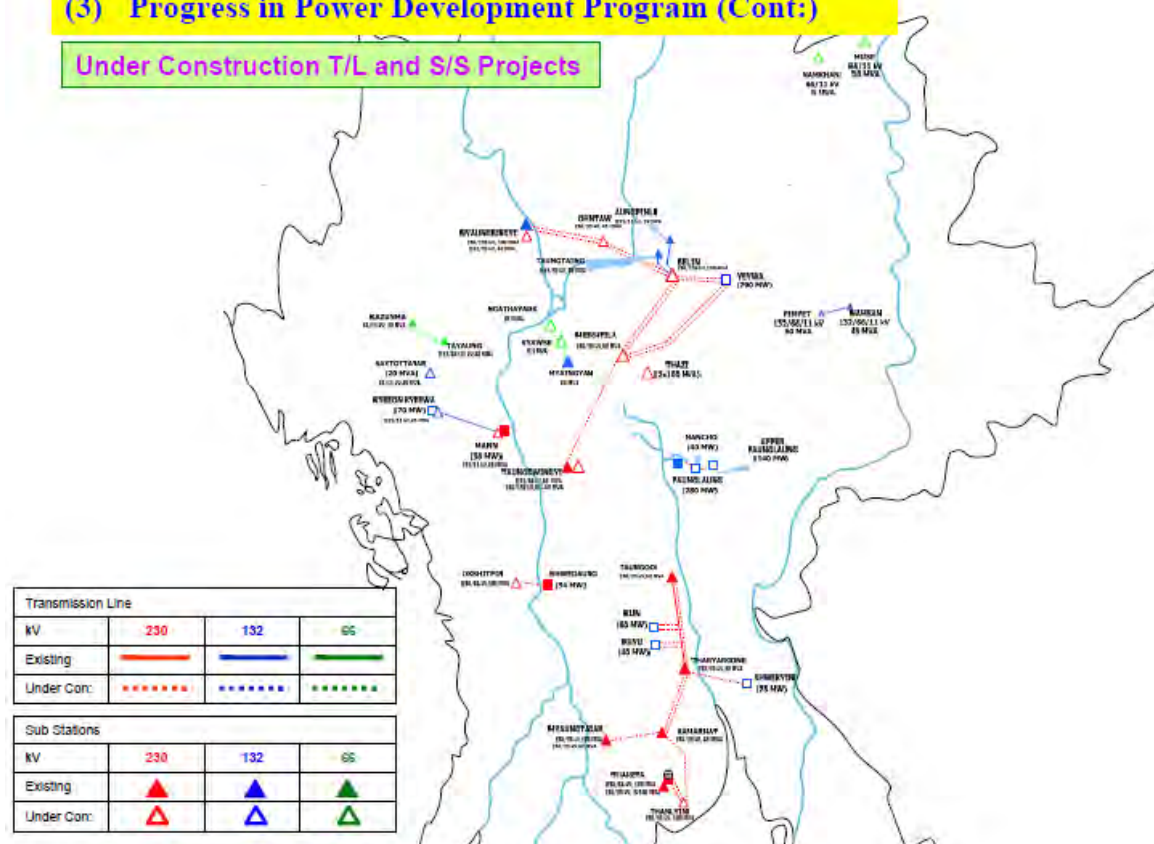
Among the projects to build or upgrade main power stations are: the Namhsam 66/11-KV, 5-MVA power station; the Naba 66/33/11-KV, 10-MVA power station; the Kanma 66/11-KV, 5-MVA power station; the Hsenwi 66/33-KV, 10-MVA power station; the extension of the substation bay at the Hlinethaya power station, the Ahlon 230/33-KV, 2x100-MVA main power station; the extension of the 230-KV switch bay at the Thaton power plant, the Mawlamyine 230/66/11-KV, 2x50-MVA power station; the Mohnyin 66/11-KV, 5-MVA power station and the Mogaung 66/11-KV, 5-MVA power station. The Namhsam power station project has been completed, and the power stations in Naba, Kanma and Hsenwi are currently under construction.'

While some of the transmission and power station projects detailed by the Minister show up on the 'future project' display on Map 6 below, several of the most important do not. This would appear to indicate that the project list in EPM-2 is a constantly shifting one, subject to new priorities, demands upon the system, delays in the completion of generating projects, budget considerations and many other factors.

News items in NLM in mid-February 2011 about the signing of contracts for the purchase of electrical equipment for the 230-KV grids at Sittoung, Thaphanseik and Ngapyawdaing power stations and for the main power stations at Naypyitaw-2, Hlawga, Kamanat, Taungdwingyi, Hlinethaya and Myaungdaga indicate that the upgrading of the power station network continues. Companies involved in the contract signing were listed as Barons Machinery & Engineering Pte Ltd, Sino Hydro Corp Ltd, Gunkul Engineering Public Co Ltd, United National Oil & Gas Pte Ltd, Chint Electric Co Ltd, Supplier Global Pte Ltd, Smart Technical Service Ltd, and Central China Power Grid International Economic & Trade Co Ltd. Further details at <http://www.burmalibrary.org/docs11/NLM2011-02-17.pdf> and <http://www.burmalibrary.org/docs11/NLM2011-02-19.pdf>

(3) Progress in Power Development Program (Cont:)

Under Construction T/L and S/S Projects



Map 6 (below) is taken from a slide-presentation made by the Myanmar delegation at an ADB regional consultation in Ho Chi Minh City in November 2008. It reproduces slide 21 from that collection. Like the previous slide 20 of the series shown at the consultation, Map 6 presents a number of transmission projects, in this case future projects that will link hydropower and thermal projects under construction or planning at the time of presentation. Map 6 is best viewed with the enlarged projection available at the following URL: <http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

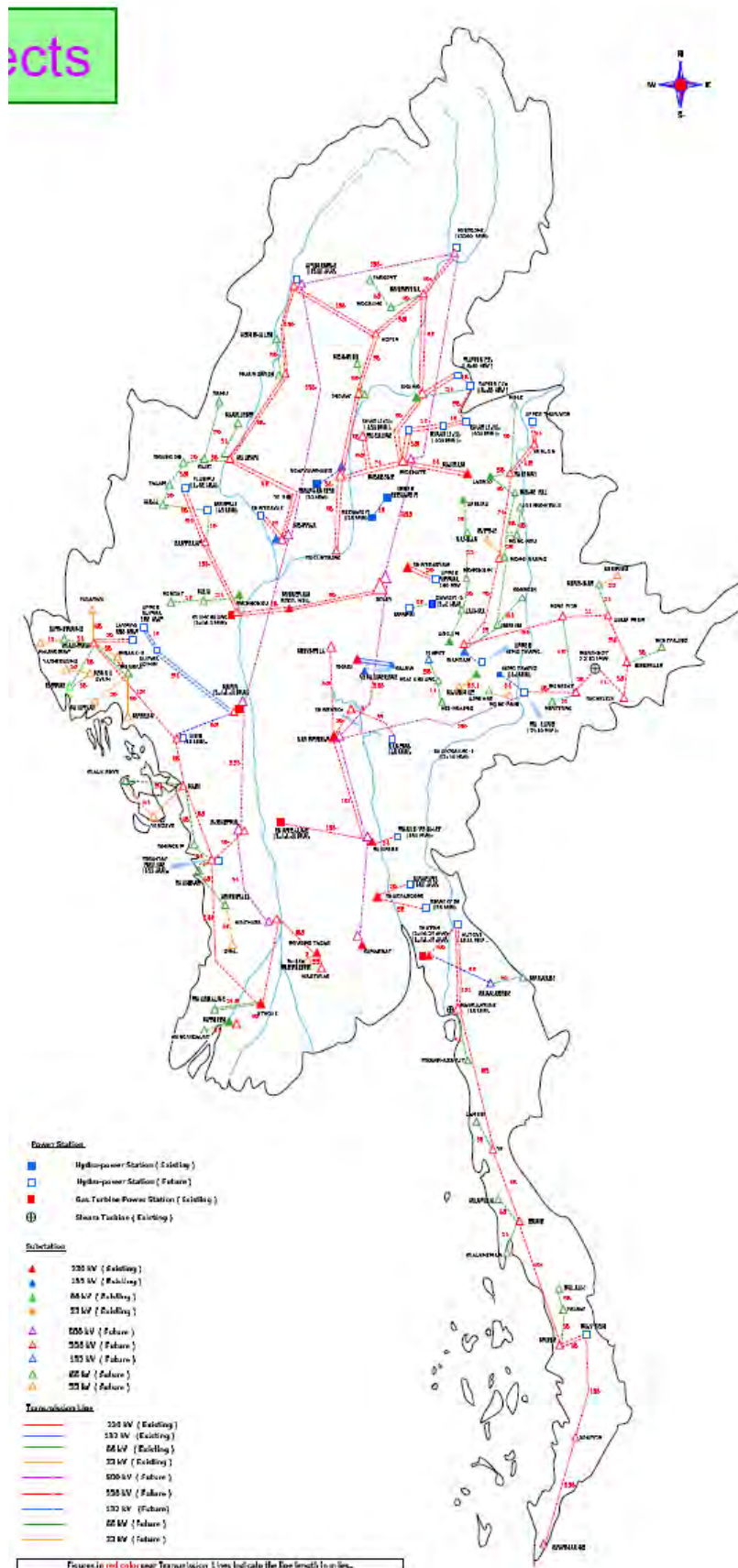
The most noticeable feature of this 'future' project map is the addition of a 500-KV power transmission grid (shown with a purple dotted line) connecting some of the megasized hydropower generating projects in border areas with main power stations in the central and south-central parts of the country. The hydropower projects included in this 500-KV grid are those at Myitsone, Htamanthi and Tsang dams and the main stations shown are at Moemeik (Mong Mit), Belin, Naypyitaw, Toungoo, Kamanat, Monywa, Mann, Okshitpin and Hinthada. There is no indication how the eastern and western arms of this grid are to be connected in the south-central part of the country. Since construction is only beginning at the first (Myitsone) of the three hydropower projects included, the planning for this 500-KV grid would appear to be in the very stages.

A second noteworthy feature in the grids shown on this long-term project map is the addition of several new double-circuit 230-KV lines connecting many of the hydropower projects presently being planned or under construction by foreign developers in the northern, eastern and western parts of the country. Interesting for their omission are the cross-border grids which would connect these hydropower projects with the electricity systems in Yunnan, Thailand, Bangladesh and north-eastern India. The first of these international links (not shown on Map 6) came on-line in 2009 and 2010 with the completion of the Shweli-1 and Tapein-1 projects in northeastern Myanmar.

At least a dozen other hydropower, coal-fired and gas-fired projects for which MoUs were signed in 2009 and 2010 are not shown on this map and the transmission links which would connect them with the national grid are not shown either.

One project that will almost surely get high-lined in the near future is the construction of the 240-KV, double-circuit transmission line shown on Map 5 between the Belin main station and the steel-plant sub-station at Myingyan in Mandalay Region. This plant which is currently outfitted with a 60-ton electric arc furnace is slated to ramp-up annual production to 400,000 tonnes of steel over the next few years. As one of the crown jewels in the industrial empire of the Myanmar Economic Corp (majority owned by the generals who run the country) it would appear that the Myingyan steel plant and its electricity needs will almost certainly be given precedence in the development of the grid system in central Myanmar.

Sub-station and transmission line contracts signed in the early months of 2011 indicate that work on upgrading the national grids and the construction of new MEPE sub-stations is related to the expanding industrial base in Myanmar. The new sub-station at upper Minhla on the Irrawaddy (an extension of the Malun station?) is meant to serve the electrical needs of the recently opened Defence Directorate's munitions and missile factories in the area. The upgrading of the power stations at Thaphanseik and Ngapyawdaing will provide the power needed for the nickel mine and smelter near Tagaung on the upper Irrawaddy. The mine, owned by China Non-ferrous, is scheduled for start-up late in 2011 and is designed to produce 85,000 tonnes of nickel alloy and 22,000 tonnes of nickel annually. It has been estimated that it will need 100 MW of power to operate at full capacity – far beyond the needs of the Thaphanseik plant to supply. The contract for the purchase of electrical equipment for the 230-KV power grid (in/out) for the 230/66/11KV (100 MVA) Thainzayat power station will serve the large paper mill and caustic soda plant at Sittaung.



[Map 7](#) (below) is taken from a slide-presentation made by the Myanmar delegation at an ADB regional consultation in Ho Chi Minh City in November 2008. It reproduces slide 22 from that collection. This map purports to show what the electricity grid system will look like at some time in the future, perhaps in 20 or 25 years, when all the transmission line and power station projects shown in the previous two slides have been completed. Map 7 is best viewed with the enlarged projection available at the following URL: <http://www.adb.org/Documents/Events/Mekong/Proceedings/FG7-RPTCC7-Annex3.4-Myanmar-Presentation.pdf>

Map 7 suggests that about ten of the main power stations in the the future grid system will emerge as hubs in directing the power flow along the circuits that are being developed. Probably the most important of these is the station at Belin, a few miles north of the industrial city of Kyaukse in Mandalay Region. Other hub centres in the south of the country would be at Ywama, Athoke and Kamanat. In central Myanmar Toungoo, Pyinmana-Naypyitaw, Thazi, Mann, Kyunchaung and Monywa appear to be regional hubs. The only regional hub clearly indicated in the north appears to be the main station at Mong Mit (Momeik, shown as Moemate on the map).

Noteworthy is the fact that major new infrastructure projects such as the development of international ports and rail and road terminals near Dawei in southeastern Myanmar and at Kyaukpyu on the Arakan coast are not shown. Undoubtedly the plans for these projects will lead to a major changes in the grid networks in both these sections of Myanmar. Similarly, in the northern part of Kachin state where China Power Investments has signed agreements to develop six massive dams and power stations with a generating capacity of 125 GW, nothing is shown.

Details about some of the sites marked 'Project A', 'Project B', etc, on Map 7 is provided in the 'Work Experiences' section of the website of Gunkul Electric. <http://www.gkmyanmar.com/references.php?view=1>



CI CHRONOLOGICAL INDEX

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[CP002: GENERATION BY TYPE](#) OF SOURCE: 1971 - PRESENT

[CP010: DOMESTIC HYDROPOWER PROJECTS](#) UNDER IMPLEMENTATION OR PLANNING

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