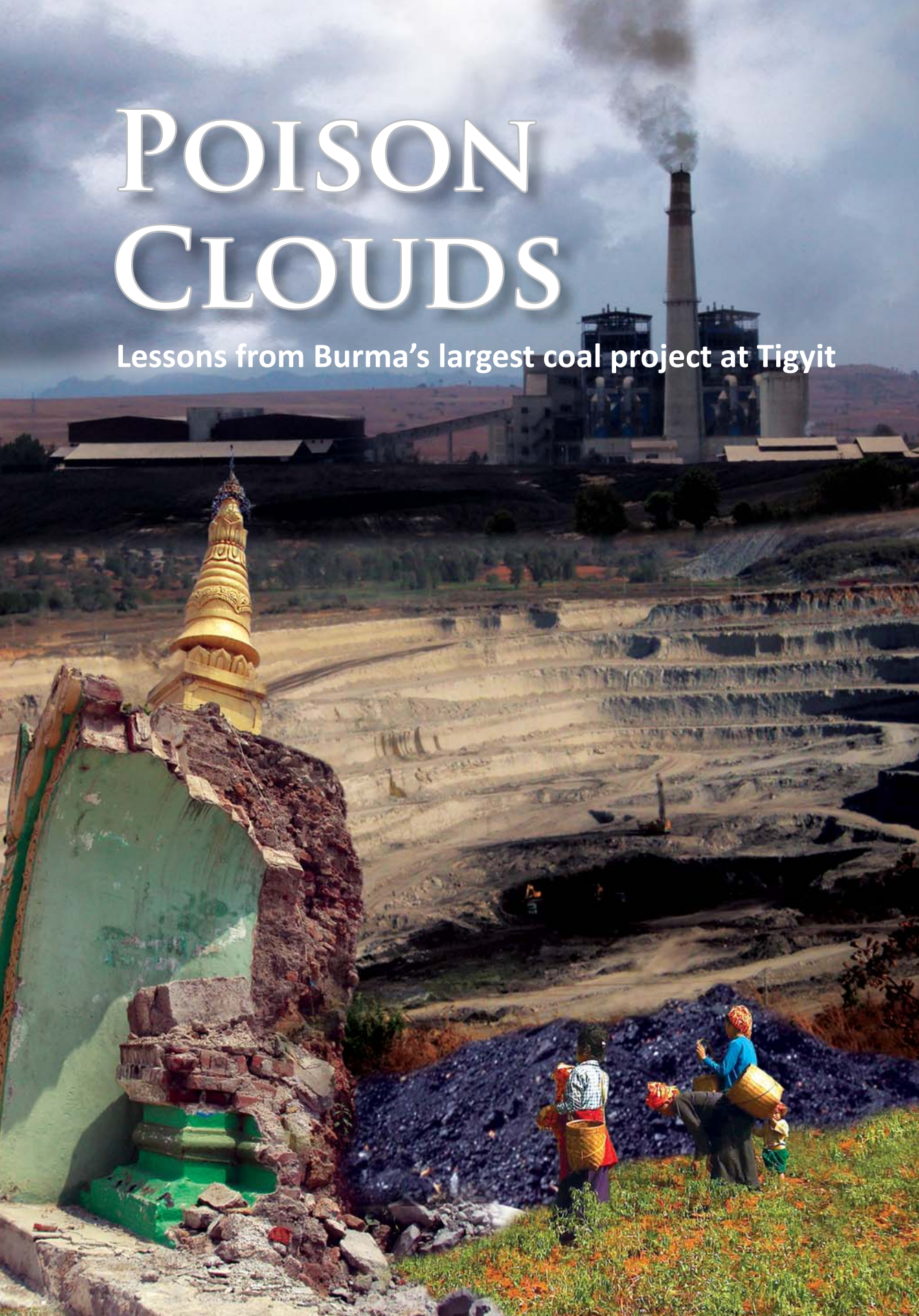


POISON CLOUDS

Lessons from Burma's largest coal project at Tigyit





Published in 2011

Contact: pyorg.net@gmail.com

Website: www.pyo-org.blogspot.com

All photos are by PYO unless noted

About PYO

The Pa-Oh Youth Organization (PYO) was set up in 1998 striving for peace and justice in Burma through empowering youth.

PYO published the report *Robbing the Future* in June 2009 after two years of research at the site of Burma's largest iron mine and the Pangpet No. 5 Steel Mill in Shan State. PYO continues to monitor the situation and educate communities of the environmental and social impacts about this and other mining projects.



Contact: kyoju2010@gmail.com

Kyoju Action Network

The Kyoju Action Network (KAN) was set up in 2010 with the aim of strengthening communities' capacity to protect their natural resources. The meaning of "Kyoju" is "Green Fresh" in the Pa-Oh language.

TABLE OF CONTENTS

Introduction.....	5
Summary	7
Part I: Burma's coal industry	8
Rich in resources, poor in energy	9
Coal mines in Burma	9
<i>Table:</i> Major coal deposits in Burma	10
<i>Map:</i> Planned coal-fired power plants in Burma	12
Coal-fired power plants in Burma.....	13
Diagram: Stages of emissions in coal power plants.....	13
Southeast Asia's largest planned coal-fired power plant	13
Part II: The Tigyt Coal Project	14
Tigyt village and nearby area	17
Balu Creek	17
Inle Lake	18
<i>Map:</i> Tigyt coal project and Inle Lake.....	19
Tigyt coal mining	20
<i>Map:</i> Tigyt coal mine and power plant project	23
Investors.....	23
Tigyt coal power plant	24
The energy situation of local people	25
Tigyt power sent to Pinpet iron factory.....	25
Part III: Impacts to environment and communities	26
Forced relocation.....	28
Land confiscation.....	32
Electrified conveyor a menace to community	33
A law but no rule of law	34
Threats to farming lands	35
Rise of jobless people.....	35
Air pollution threatening health.....	37
What is fly ash?	39
Smoke from power plants causes acid rain	40
Mae Moh: Lessons from Southeast Asia's largest coal plant.....	41
Water pollution and water shortages	42
Noise pollution	44
Cultural destruction.....	44
Conclusion and Recommendations	47
Endnotes	48
Appendices	
The population within five miles of the coal mine and power plant.....	51
Villagers forced to relocate in 2003 by Tigyt coal project	52



Tigyit coal-fired power plant

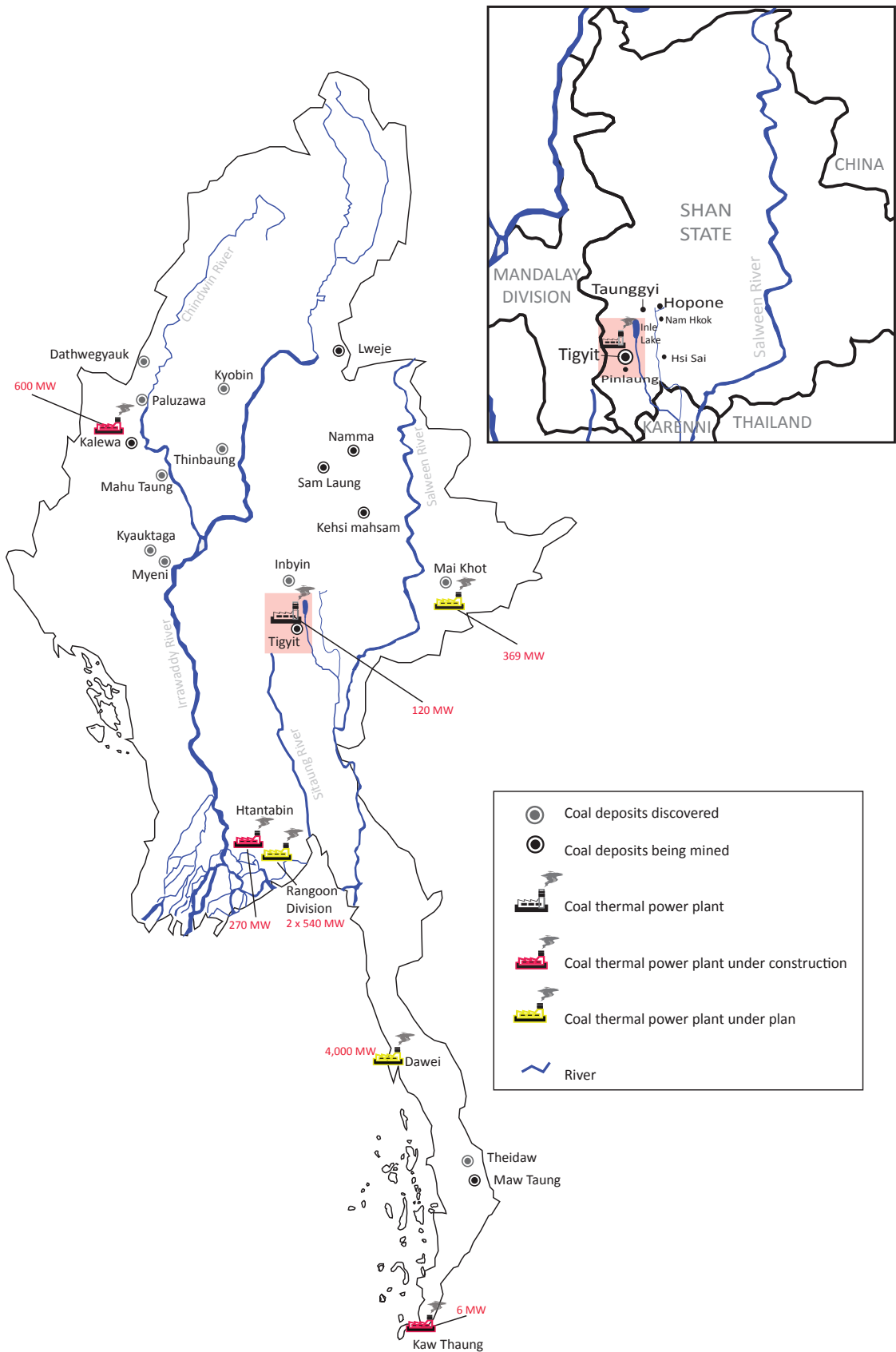
INTRODUCTION

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.

Burma is a country of chronic energy shortages yet continues to export vast amounts of energy resources to neighboring countries. Currently about 3% of the country's electricity is generated from coal, and much of that is used to power other mining operations or industrial zones, not domestic households. Plans to excavate coal in eastern Shan State for export to Thailand and to construct Southeast Asia's largest coal power plant for a massive Thai-run industrial estate in southern Burma follow these trends.

As Burma prepares to develop other coal deposits and to build more coal-fired power plants, it is of urgent importance to highlight the Tigyt 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.





SUMMARY

- Although Burma is rich in energy resources, the ruling military regime exports those resources, leaving people with chronic energy shortages. The exploitation of natural resources, including through mining, has caused severe environmental and social impacts on local communities as companies that invest in these projects have no accountability to affected communities.
- There are over 16 large-scale coal deposits in Burma, with total coal resources of over 270 Million tons (Mt). Tigyit is Burma's biggest open pit coal mine, producing nearly 2,000 tons of coal every day.
- The Tigyit coal mine and coal-fired power plant are located just 13 miles from Burma's famous Inle Lake, a heritage site of the Association of Southeast Asian Nations. Water polluted by the mine and waste from the power plant flow into the Lake via the Balu Creek but no study of the impact of the project on the Lake has been made public.
- Coal from the mine is transported to Burma's only operating coal-fired power plant in Tigyit. The plant uses 640,000 tons of coal per year to produce 600 Gigawatts of power with a capacity of 120 Megawatts. 100-150 tons of toxic fly ash waste is generated per day. The majority of power from the plant is slated for use at an iron mining factory that will be operated by Russian and Italian companies.
- Implementation of the mine and power plant began in 2002 by the China National Heavy Machinery Corporation (CHMC) and the Burmese companies Eden Group and Shan Yoma Nagar.
- Two nearby villages of Lai Khar and Taung Pola were forced to relocate for the project and over 500 acres of farmlands have been confiscated. Farming families facing eviction and loss of lands are going hungry and have turned to cutting down trees to sell for firewood or migrated in order to survive. Explosions from the mine have destroyed local pagodas.
- Air and water pollution is threatening the agriculture and health of nearly 12,000 people that live within a five mile radius of the project who may eventually have to move out. Currently 50% of the local population is suffering from skin rashes.
- The Pa-Oh Youth Organization and Kyoju Action Network have been monitoring the project since February 2010 and urges the companies and government to suspend operations pending full environment, social and health impact assessments. The organization also urges local communities not to sign documents without understanding them and to oppose corruption and exploitation which harms the communities' livelihoods and natural resources.



PART ONE: BURMA'S COAL INDUSTRY



Rich in resources, poor in energy

Burma is an ethnically diverse nation with a population of 59.12 million.¹ Agriculture is the main livelihood of 70% of the population.² The country has been ruled by a military dictatorship system since 1962. Currently, state power is still held by the military which are behind the United Solidarity and Development Party (USDP). This party won the recent 2010 election among widespread allegations of vote fraud.

Although Burma is rich in energy resources, people suffer chronic energy shortages and are forced to depend primarily on firewood, charcoal and biomass for their energy needs. The ruling military dictatorship has signed numerous agreements with foreign companies to export energy resources to neighboring countries of China, Bangladesh, Thailand, and India.³ Although the sale of these resources, particularly natural gas, has been contributing greatly to the national budget for over a decade, the education and health systems throughout the country remain among the worst in the world.

The exploitation of natural resources through mining, logging and dam projects has caused severe impacts on local communities and increased tensions in conflict areas. Due to the lack of rule of law in Burma, the companies that invest in these projects can act without any accountability to affected communities. The projects are therefore causing large scale loss of livelihoods and abuses, directly contributing to refugee flows and the migration of hundreds of thousands of young people across Burma's borders to neighboring countries. This is making more and more people vulnerable to human trafficking in the region.

9

Coal mines in Burma

According to Burma's Ministry of Mining, there are over 16 large-scale coal deposits in Burma, with total coal resources of over 270 Million tons (Mt), mostly of sub-bituminous rank, and mainly in the northern regions (see table on following page).

Coal mining projects are operated by the Mining Enterprise No. 3 [ME-3], a state entity under the Ministry of Mining, together with domestic and overseas corporations. The Ministry of Mining reported that in 2011 state-owned enterprises will operate 2.81% of the country's coal mines, joint venture operations will account for 43.87% and local private companies will operate 53.32%.⁴ These are spread throughout at least 82 coal mining blocks across the country.⁵

Joint venture operations with foreign companies often involve the export of coal resources to neighboring countries. Thailand, for example, is a major importer of Burmese coals. The Thai company Saraburi Coal Co., Ltd. is licensed to excavate the Maw Taung coal mine in Taninthayi Division and export the extracted coal to Thailand. Coal from the Mai Khot (Mong Kok) mine in eastern Shan State will also be exported to Thailand. Coal resources are also often used to fuel operations at other foreign-operated or joint venture projects, such as the Monywa copper mine or the Pinpet steel mill (see section on coal power plants). With coal also slated to fuel industrial zones, it is unclear how much of Burma's coal resources will reach ordinary consumers and households facing chronic fuel and energy shortages.

Major coal deposits in Burma⁶ (according to the Myanmar government)

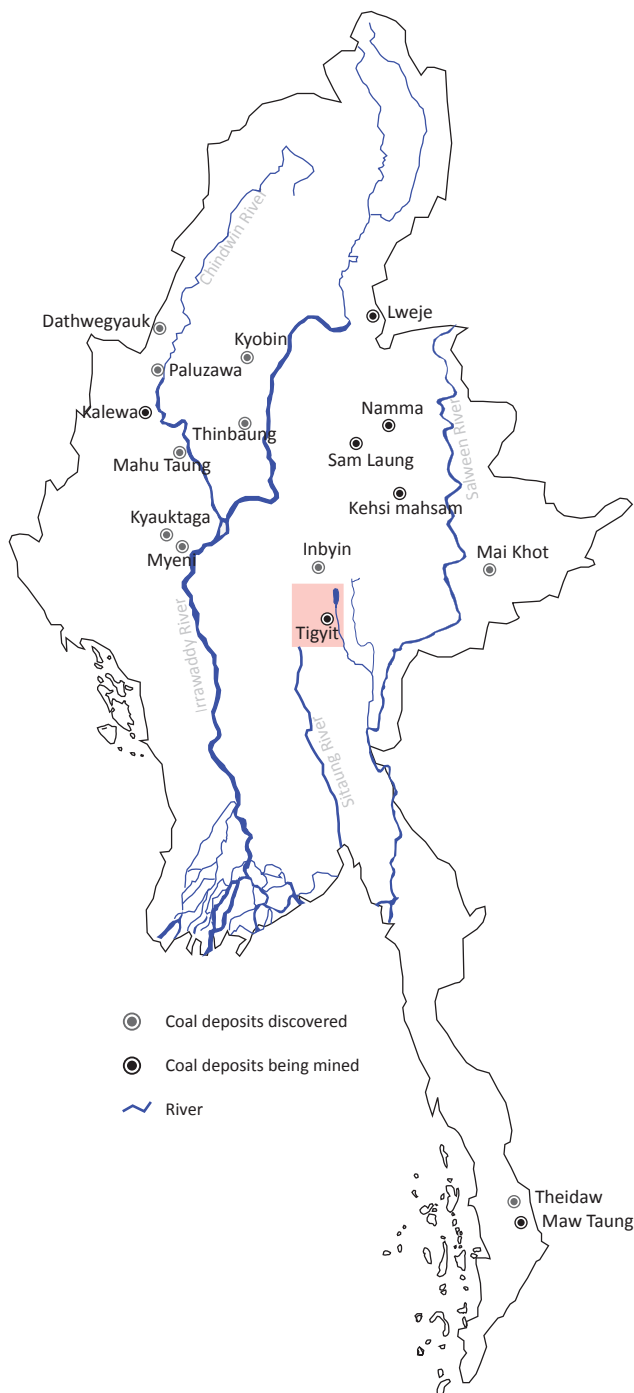
No	Location	Township	State/ Division	Million Tons	Rank of Coal
1	Paluzawa/ Chaungzone	Kalewa/ Mawleik	Sagaing	89.00	Sub- Bituminous
2	Kalewa	Kalewa	Sagaing	87.78	Sub- Bituminous
3	Dathwegyauk	Tamu	Sagaing	33.91	Sub- Bituminous
4	Mahu Taung	Kani	Sagaing	0.80	Lignite
5	Kyauktaga	Natmauk	Magway	0.54	Sub- Bituminous
6	Myeni	Paung	Magway	0.25	Sub- Bituminous
7	Thinbaung	Khin Oo	Sagaing	0.08	Lignite
8	Kyobin	Kawlin	Sagaing	0.03	Sub- Bituminous
9	Lweje	Moemaik	Kachin	Large Deposit	-
10	Tigyit	Pinlaung	Shan	20.20	Lignite
11	Kehsi Mahsam (Kehsi Mansam)	Kehsi Mahsam	Shan	37.00 ⁷	Sub- Bituminous
12	Namma	Lashio	Shan	2.80	Lignite
13	Sam Laung (Sam Lau)	Tibaw	Shan	1.60	Lignite
14	Inbyin	Kalaw	Shan	0.22	Sub- Bituminous
15	Maw Taung	Taninthayi	Taninthayi	3.60	Sub- Bituminous
16	Theindaw / Kawmabyin	Taninthayi	Taninthayi	2.00	Sub- Bituminous
Total				277.81	

* Mai Khot (Mong Kok) coal mine in eastern Shan State is not included in the Ministry of Mining list even though it is one of the largest coal deposits in the state.

Coal: the dirtiest fossil fuel

Coal is a fossil fuel created from the remains of plants that lived and died millions of years ago.⁸ Coal is the most carbon-rich of all fossil fuels and generates 70% more carbon dioxide (CO₂) than natural gas for every unit of energy produced.⁹ This carbon dioxide is dangerous to human health and greatly contributes to global warming.

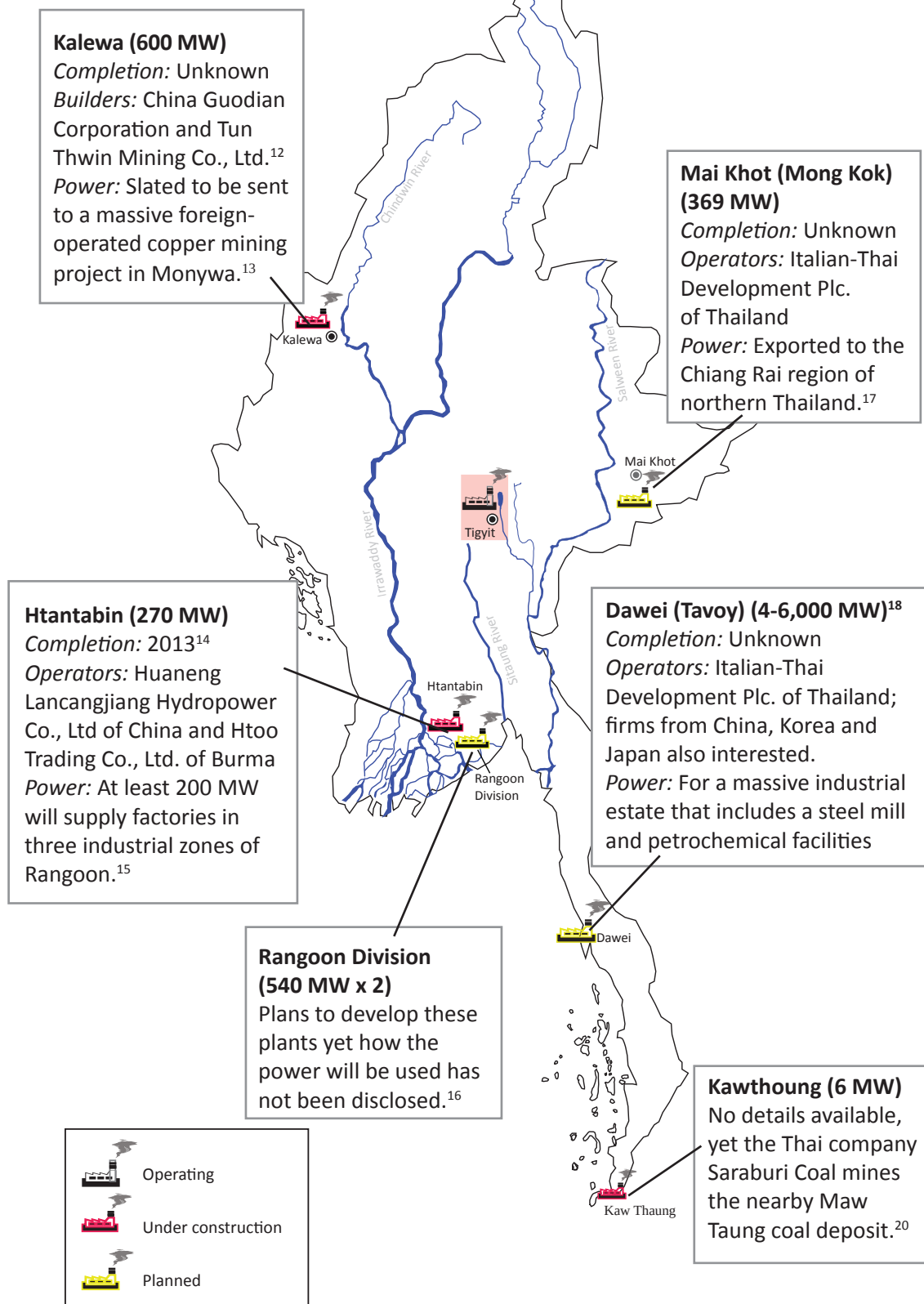
	Companies (where known)	Mine Status
	Tun Thwin, Htoo Thit & ME-3	Actively mining
	MEC	Actively mining
	ME-3, Ayeyarwaddy Myitpyar, Bamboo Result Co. Ltd.	Actively mining
	Shan Yoma Nagar, Eden Group, Shwe Than Lwin	Actively mining
	ME-3	
	AAA International	Actively mining
	Saraburi, MEC	Actively mining

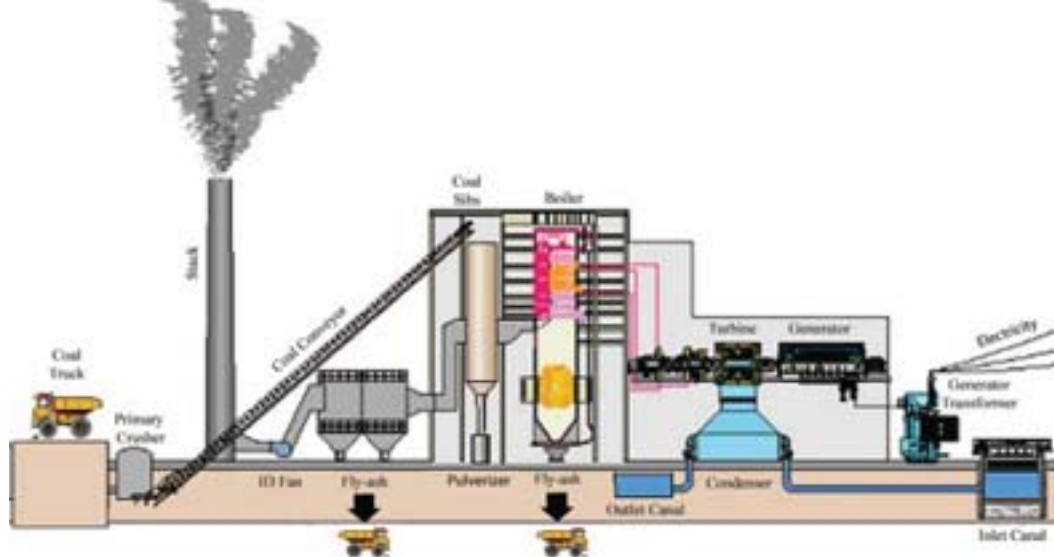


Lignite: the dirtiest coal

There are four main types of coal, ranging from hard and black coals such as anthracite and bituminous to soft and brown types such as sub-bituminous and lignite.¹⁰ Lignite, a soft brown coal, is the most polluting of all types, producing the most carbon dioxide emissions per unit of energy than any other type coal. Lignite is also more susceptible to spontaneous combustion than other types of coal.

Map: Coal-fired thermal power plants planned in Burma





Stages of emissions in coal power plants

When coal is used for electricity generation, it is usually crushed and then burned in a furnace with a boiler. The furnace heat converts water in the boiler to steam. The steam is then used to spin turbines which turn generators and create electricity. After the coal burns in the furnace, it produces a toxic waste product called fly ash which must be disposed off (see What is Fly Ash?). Smoke from the fire in the furnace is released into the sky from the smoke stack. This smoke contains poisonous gases that are dangerous to human health and contribute to acid rain. The carbon dioxide emissions contribute to global warming.

Coal-fired thermal power plants in Burma

Burma has had several coal-fired power plants in its history, beginning with a 30 Megawatt (MW) plant built during the British colonial period in Alone, Rangoon. That plant was closed in 1990. In 2008, only 3.32% of Burma's electricity was produced from coal.¹¹ Much of this is slated for other mining operations as opposed to domestic households. Burma's planned coal power plants will supply power to foreign-owned projects and industrial zones in the country or will export power to neighboring countries (see map).

Southeast Asia's largest coal-fired power plant planned in Burma

Italian-Thai Development Plc., a large Thai construction firm, inked a multi-billion dollar deal with Burma in November 2010 for the development of a deep sea port in Dawei (Tavoy) which includes plans for Southeast Asia's largest coal-fired power plant with the capacity of between 4,000 to 6,000 MW. The plans have been developed amid protests and court cases that have delayed operations of the massive Map Ta Phut coal plant and petrochemical complex in the Thai coastal town of Rayong. Building in Tavoy is appealing for Thailand because there is less environmental oversight and people can be more easily forced off their lands. Indeed, just weeks after the deal was signed, 19 villages received orders to move out to make way for the project.¹⁹



Project diagram for the coal-fired plant planned in Dawei



PART TWO: THE TIGYIT COAL PROJECT





Chili crop drying in the sun near Tigyt



Chili farm outside of Tigyt

Tigyit village and nearby area

Tigyit village, which has a population of nearly 3,000, is located on the main road between Taunggyi, Pinlaung, and Nay Pyi Taw in Pinlaung Township, southern Shan State. It is 13 miles southwest of Inle Lake and 22 miles south of Kalaw Town, both popular tourist destinations. The villagers are Shan, Pa-Oh, Taung Yoe, and Burman, and most practice Buddhism. The majority of villagers over 40 years old are illiterate in Burmese. There are twenty-five villages, or nearly 12,000 people, within a five mile radius of Tigyit.

The tea produced in Tigyit and Pinlaung is famous in Burma, and the area produces substantial potato exports for the cities of Rangoon, Mandalay and Taunggyi. Rotational crop fields of rice, potatoes, cabbage, garlic, chili and tea use water from Balu Creek and the stream from Naung Tarar. Tigyit lies within the 1,422 square mile watershed area of Inle Lake, located 13 miles (21 kilometers) west of the Lake.²¹

Upper Balu Creek

Balu Creek, also known as Indein Creek, originates northwest of Pinlaung town. It flows for 40 miles before reaching the west bank of Inle Lake.²² It is one of the three main creeks that flow into the famous lake. 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 NEO Energy Oasis Development Company.²³ 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.



Fish from local creeks on sale in Tigyit



The Balu Creek flows into Inle Lake



© Yuzo Uda

Inle Lake

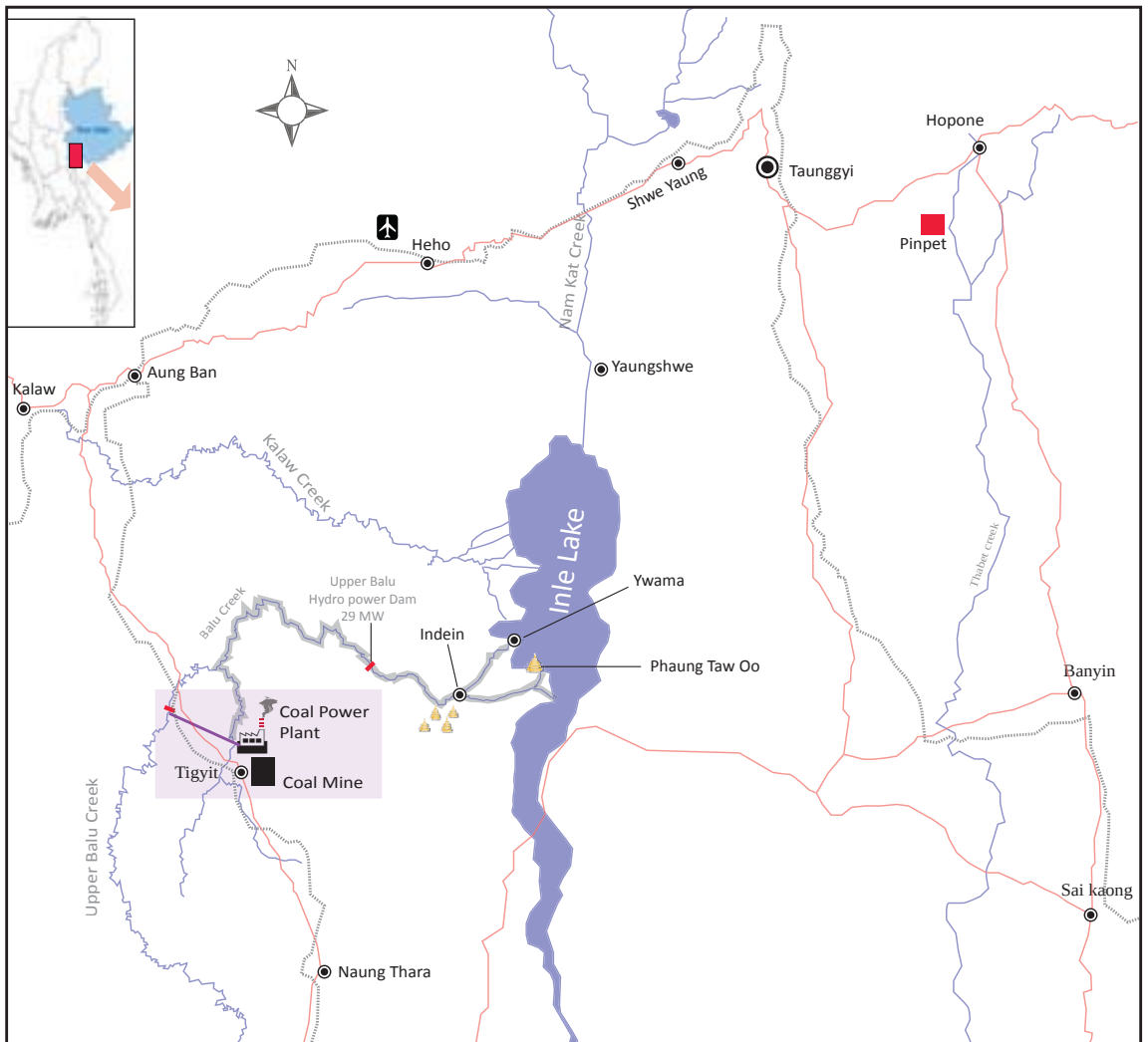
Inle Lake is Burma's second-largest freshwater lake and one of the country's primary tourist destinations. It is also listed as a Heritage Park by the Association of Southeast Asian Nations (ASEAN). Inle is famous for the distinctive rowing style of the ethnic Intha fishermen who wrap one leg around their boat's oar.

The biodiversity value of the lake is rated as high. It is a critical habitat for a number of endemic species including nine species of fish that are found nowhere else in the world.²⁴ The lake is also rich in birdlife; 254 species of birds have been recorded.²⁵ There are about 400 villages in the Inle Lake area with a total population of about 170,000.

Although 29 streams and creeks flow into Inle Lake, Balu, Thantaung and Nan Kat are the main creeks flowing into the lake.²⁶ The estuary of Balu Creek is one of the most important fish habitats of Inle Lake.²⁷

The water surface area and water quality of the lake has been steadily declining largely due to the high number of floating gardens which utilize chemical fertilizers and pesticides.²⁸ This was compounded in the summer of 2010 when the water level of the lake dropped to its lowest level in 50 years.²⁹ The high level of pollution and the rapid loss of surface area put the future of the lake into serious question.

Map: Tigyit coal project and Inle Lake



Legend

- | | | | |
|--|----------------|--|-----------------------------|
| | City / Village | | Coal power plant |
| | Airport | | Coal mine |
| | River | | Pinpet iron & steel factory |
| | Road | | Dam |
| | Railway | | Water pipe |
| | Lake | | Water pollution |
| | Pagoda | | |

Tigyit coal mining

Tigyit is Burma's biggest open pit coal mine, producing nearly 2,000 tons of coal every day. The main mine is an open cast pit, covering an area of over 500 acres that continues to expand. Smaller amounts of coal are also extracted by an underground tunnel system which involves four feet square holes under farm lands.



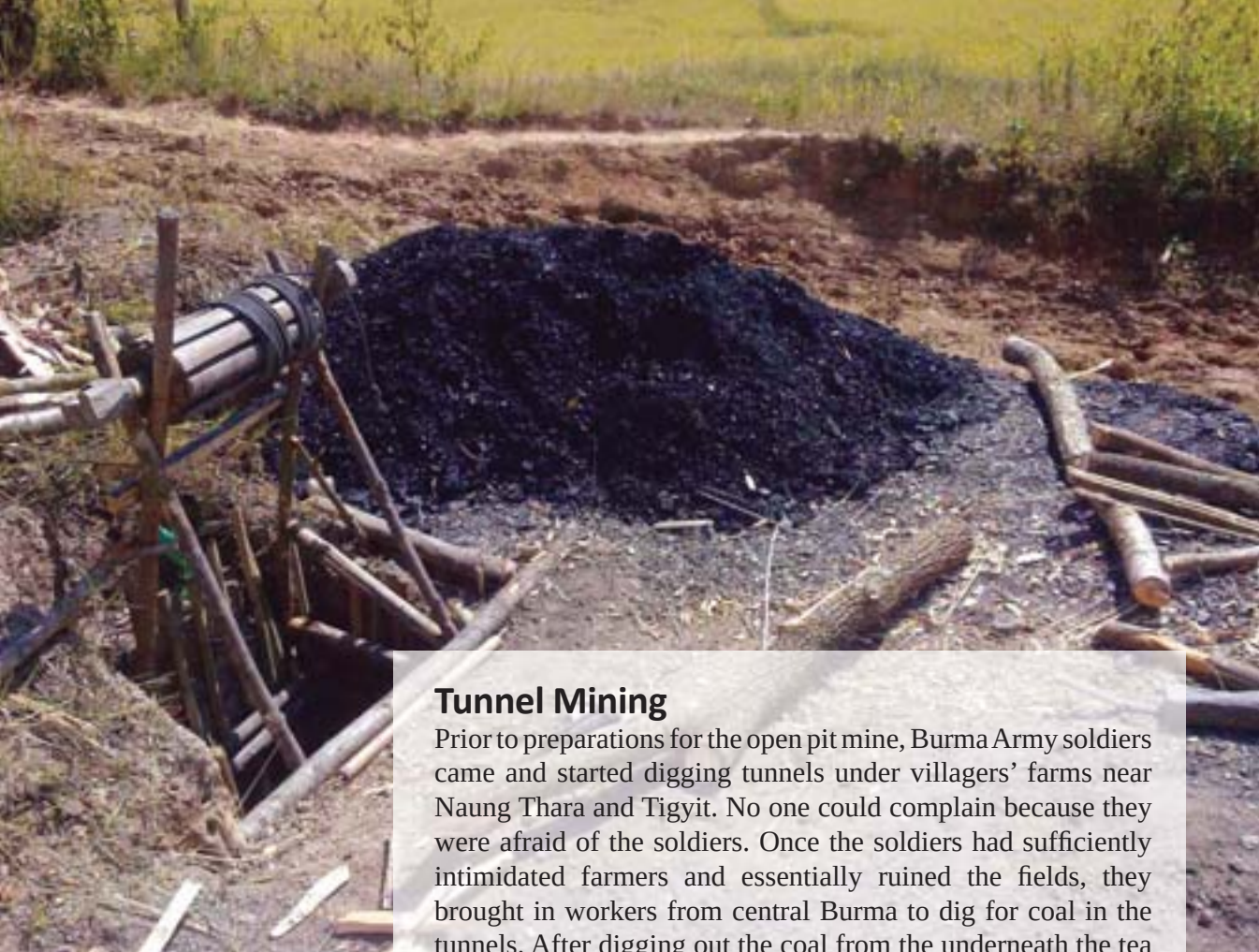
The open pit mine at Tigyit

Open Pit Mine

In 2002, digging began to prepare the open cast mine. Heavy machines first bulldozed any brush or trees and cleared off the layer of top soil, destroying numerous farms in the process. Workers then proceeded to use dynamite to blast into the ground and create an open pit. The blasts shook the ground until it collapsed down. The powerful force from the explosions also cracked buildings in Tigyt village.

Fact box: Tigyt Coal Mining

First discovered	1989
Excavation preparations begin at open cast mine	2002
Deposit potential	20.7 million tons ³⁰
Mine area to date	544 acres
Type of coal	Lignite and Sub-bituminous ³¹
Type of mining	Open cast and underground tunnel
Amount extracted	1,750 to 2,000 tons of coal per day
Size of deposit	2 miles long in length, depth of 6 to 69 feet ³²
Use of coal	Coal transported to the Tigyt coal-fired power plant by truck and by a 6 kV conveyor belt.
Estimated investment	US\$ 10 million (for excavation to date)



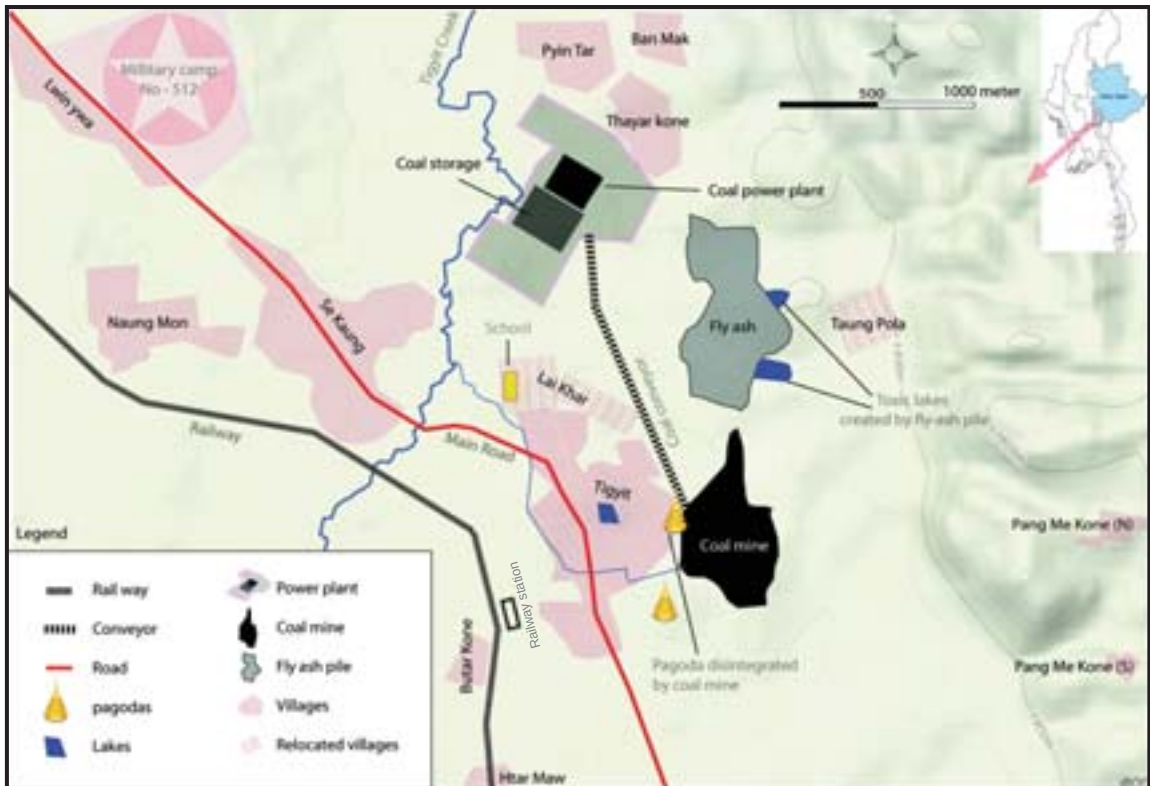
Tunnel Mining

Prior to preparations for the open pit mine, Burma Army soldiers came and started digging tunnels under villagers' farms near Naung Thara and Tigyt. No one could complain because they were afraid of the soldiers. Once the soldiers had sufficiently intimidated farmers and essentially ruined the fields, they brought in workers from central Burma to dig for coal in the tunnels. After digging out the coal from the underneath the tea farms and paddy fields, the workers piled it on and beside the farms, destroying the soil quality and any chance of cultivating crops. Today the underground tunnel mining is done north of Plone Tan village's temple, east of Phara Prain village, east of Naung Thara town and in Choung Plaung village.



Tunnel mines destroy paddy fields

Map: Tigyit coal mine and power plant project



23



Eden Company signboard for Tigyit project

Investors

The mine was originally contracted by China National Heavy Machinery Corporation (CHMC), Shan Yoma Nagar Company,³³ ME-3, Shwe Than Lwin Company, Eastern Development Company, Eden Company, A-One Company and Special Region (6) Business Group.³⁴ After two years of excavation, Shwe Than Lwin, A-1 and Special Region (6) Business Group withdrew from the project as the project wasn't generating enough profit. There was a rumor that Shan Yoma Nagar Company also transferred all its shares

to Eden Company in April 2010 but there has been no formal confirmation of this.³⁵ According to the CHMC website, the company operates open pit mines in Myanmar, but the updated status of the company's contract cannot be confirmed.



Tigyit coal power plant

Tigyit is currently Burma's only operating coal-fired power plant. In September 2001 the regime's Vice-Senior General Maung Aye arrived and chose the place for the power plant, instructing local military to confiscate over 100 acres of local farm lands. No compensation was provided. The CHMC of China and Eden Group of Myanmar built the plant under the supervision of the Energy Ministry. Construction began in September 2002 and was completed in April 2005.³⁶

The plant has two 60 megawatt turbines and produces 600 gigawatt hours (Gwh) electricity annually, using 640,000 tons of coal per year from the Tigyit coal mine just one and a half miles away.³⁷ The electricity is transmitted to a substation in Kalaw. According to Mizzima News, 65 MW of the electricity is slated for transmission to the Pinpet iron factory (see box).³⁸ The plant also exports electricity to the nearby Nagar cement plant.³⁹ Electricity from the Tigyit power plant therefore supplies power to companies which are further exploiting natural resources.

Fact box: Tigyit Coal Power Plant

Power plant operators	China National Heavy Machinery Corporation Company (CHMC), Eden Group of Myanmar and Myanmar Electric Power Enterprise (MEPE)
Investment costs	US\$ 42.93 million ⁴⁰
Power production	120 megawatts capacity; produces 600 gigawatt hours (Gwh) of electricity annually
Coal usage	640,000 tons of coal per year ⁴¹
Fly ash waste generated	100 to 150 tons daily ⁴²
Water source	Balu Creek, which flows into Inle Lake

Energy situation for local people

Although the project has provided some electricity to Tigyt village, villagers have lost their lands and livelihoods and now face dangers to their health. Due to the encroachment of the mine they face imminent forced relocation, after which the short-term electricity provided will be of no use.

The hospital in Hopone town has limited and intermittent electricity and medical centers in Taunggyi must use generators for surgeries; patients need to pay extra fees for this. Meanwhile the Pinpet steel mill plant and large chicken farms contracted to foreign companies between Hopone and Taunggyi cities can use electricity 24 hours each day through the Kalaw substation which receives power from Tigyt.

Tigyt power sent to Pinpet iron factory

Burma's largest iron ore deposit will be mined at Mount Pinpet, ten kilometers from the Shan State capital of Taunggyi and 40 miles from Tigyt. Excavation will displace 7,000 people and completely destroy the mountain. A massive iron processing factory is under construction in Pinpet under rampant rumors that the deposit contains not only iron but also uranium. Over 7,000 acres of fertile farm lands have been confiscated to make way for the factory compound, officially named the Pangpet Number 5 Steel Mill. In order to run operations, the mill will use 65 MW of power from the Tigyt coal power plant. The Pinpet factory is located in an active fighting area; Burma army soldiers patrolling for project security tortured and killed villagers in both 2009 and in February 2010. The Pinpet project is a joint project of Russian, Italian and Burmese companies.⁴³ Pinpet will also import over 13,000 tons of coal per day for 75 years from the Kehsi Mahsam (Kehsi Mansam) coal mine in central Shan State.⁴⁴



Pinpet iron factory under construction

PART THREE: IMPACTS TO ENVIRONMENT AND COMMUNITIES





Farmers and their children must now deal with polluted water



“Before the big company came, almost everyone from our village had cattle-carts and buffalos. We didn’t have to worry about feeding them either as there was plenty of food for them. After we were relocated, we lost our farm lands and also now it’s harder to feed cattle. Most of us have sold out all our cattle and buffalos.”
(Interview #2)

Forced relocation

Two villages have been relocated for the coal project and several others are now under imminent threat of forced eviction as the dump site from the coal mine encroaches and no one knows how much the mine itself will expand.

Taung Pola Village

Taung Pola, a village of 24 households, was evicted by the local Ya Ya Ka (village State Peace and Development Council) forces in 2003 when the coal mine project began preparations for excavation. No assistance or resettlement program was provided for them; compensation was minimal. In order to save resettlement costs, some villagers chose to stay on their farmlands close to their old village. The relocated villagers now stay east of their old village on a hill. Local authorities named the new village Mya Sane Taung but local residents still insist on calling it Taung Pola (the former village name). The residents may soon have to move again as the piles of waste from the coal mine are getting bigger and closer to the new village.

“It was rainy season. We requested them to postpone the relocation process, but they rejected our proposition. The companies said they need to implement their project immediately and we had to move. We encountered a lot of difficulties during the relocation. We had to break down our houses in the rain. The roads were too muddy and it was too difficult for us to transport our properties from one place to another. Their compensation was at most 150,000 kyat (less than US\$150) per house, smaller houses got less. It was not even enough for transportation fees to move to the new place. As we were forced to relocate in rainy season, we couldn’t build our new houses; we could only build huts and had to live in those huts. The companies promised to build clinics, a library, and schools for us but none of those promises have been fulfilled yet. They said they would build a well, but actually they just repaired the existing old well. Some said we may be relocated again, but this time I would rather die rather than leave this place.” (Interview #4)

“While we were relocating, some women cried so much that they fainted. For several months after relocation, people were confused and got disoriented as they had lost their lands and didn’t know what to do next.” (Interview #2)

Lai Khar village

In 2003, Lai Khar village, population of 200, was forced by mining companies from Tigyt coal mine to relocate. Those companies didn’t provide any resettlement program to the villagers. The villagers from neighboring villages – Tigyt and Pyin Thar – had to help the relocated Lai Khar villagers to settle north of Tigyt monastery. Lands that were owned by Tigyt and Thar Yar Kone villagers were confiscated by local authorities for the Lai Khar villagers to settle in.

Tigyt set to be subsumed by coal pit

When the authorities originally measured the area of the Tigyt coal deposit, it included half of Tigyt village but the village was not relocated because the abbot of Tigyt Monastery appealed to the local authorities and the eastern regional military headquarters. However, the mined area is now only about 40 meters away from the village. The villagers are suffering from air pollution, water pollution and noise hazards released from the mining operation on a daily basis and may be forced to move out soon.

Waste piles encroach

Piles of waste dumped in huge piles from the coal mine are getting closer and closer to Thar Yar Kone, a village of nearly 400 people. The piles are so big that they are now higher than the village. If there were a heavy rain in the rainy season, the village could be covered by mudslides from the piles. The local authorities have been trying to force out the villagers many times already, at first ordering only a few families to move out. The village has stayed united, however, and refused to move.



Piles of waste from the coal mine beside the homes of Taung Pola village



The power plant looms in the background of Thar Yar Kone village



The open pit mine encroaches on farm fields of Tigyit village



A farmer waters his crops while piles of mine waste loom in the background



The power plant at the edge of farm fields

32

“The place where the power plant is located used to be our Tigyit villagers’ farming lands. The soils over there were so good for agriculture that we could plant different seasonal crops the whole year. As the power plant factory is owned by the government, they confiscated our land without any compensation. Now that we have no farming land to support our livelihood, my wife has to support our family by buying vegetables from the north market and selling them in south market.” (Interview #3)

Land confiscation

The coal mine and power plant currently use over 500 acres of local farm lands from Tigyit, Taung Pola, Pyin Thar, Lai Khar, and Bar Min Kone villages. Shan Yoma Nagar and Shwe Than Lwin companies, together with local authorities, pressured and intimidated farmers from these villages into “selling” their farm lands at a cheap price. Some lands were taken outright by the Ministry of Mining. Without their lands, villagers have had to sell their cattle and are now going hungry.

“We used to farm five acres of land. Before the companies came, we had surplus rice from our fields every year. We didn’t need to worry for food. After we harvested paddy, we continued to plant potatoes, tomatoes and other vegetables. We could earn about 300,000 kyat every year (US\$300). Yet they just gave us only 30,000 (US\$30) per acre for compensation. What can we do with such a small amount of money? Now they are digging in our ground both day and night. I only have land here and I don’t have any other place. And now I have nothing to eat. I cannot plant my fields next year; they already ordered us to leave these farms.” (Interview #4)

“When the companies confiscated our farm lands for the coal mining project, they cooperated with the village authorities. They gathered all the villagers together and demanded everyone’s signatures. But nobody knows what they signed for. After everyone had signed, they said that all our villagers’ lands are now owned by the companies and they will compensate twenty thousand kyat (US\$20) for an acre of land. Some villagers were so shocked that they hit their chests and cried out loud. Others decided not to take the compensation as the money was so little that nothing could be done with it. The authorities were happy about it and they even said, ‘If you don’t take the money, then we will get the land for free.’” (Interview #4)

Even when meager compensation was provided for lands, this was also confusing for villagers as lands are customarily shared:

“Firstly, when they give compensation to us we were really confused because we don’t know exactly which lands belong to whom. In our culture, we just share our land to our children and grandchildren. We don’t have exact limits of our land.” (Interview #9)

Electrified conveyor a menace to community

Coal from the mine pit is transported to the power plant by a 1.5 mile long conveyor belt which is charged with 6 KV of electricity. Authorities announced that if the conveyor dysfunctions because of cows or buffalos, then the owner of the animal will be prosecuted. Since the announcement, local people have not dared to release their domestic animals such as cows and buffalos to the fields to feed them. Although the conveyor that carries coal is covered by roofing, the conveyor that carries dumped soils is not covered. The electrified belt runs alongside a community road and is a danger to children and travelers as well as domestic animals.



Box: A law but no rule of law

The Myanmar Mines Law of 1994 requires a mining operator to gain permission from land users before beginning a project. This was clearly not done in Tigyt. Villagers were either not informed at all about what was going to happen, did not understand what was happening, or were intimidated by authorities.

Below is the text of Chapter 5, Section 14:

The holder of permit for mineral production within an area under the Ministry's administrative control or which does not lie within the Mineral Reserve Area or Gemstone Tract, shall carry out such production only after coordinating and receiving agreement from the individual or organization having the right of cultivation, right of possession, right of use and occupancy, beneficial enjoyment, right of succession or transfer of the said land.⁴⁵

At the same time, according to the Myanmar Mining Rules of 1996, in order to receive a mineral exploration permit, an environmental protection plan must be submitted. Section F of the Rules also states that:

Although the Environmental Law has not been enacted, it is a requirement for all large scale mining projects to undertake Environmental Impact Assessment (EIA) as part of their feasibility study and the foreign companies either follow the World Bank standards or standards not lower than those existing in their countries.⁴⁶

There has been no public release of any Environmental Impact Assessment and local people have no way of knowing if any environmental protection plan has been submitted to the Mining Ministry for the Tigyt coal project.

Threats to farming lands

The coal mine uses an open pit mining system which is destroying farming lands with heavy machinery 24 hours a day. Companies are also extracting coal through an underground tunnel system underneath tea farms near Naung Thara village. They dig four feet square holes and tunnel under the fields, leaving villagers in constant fear of land collapses.

The extracted coal is piled alongside and on farm fields before it is transported to the power plant. The coal destroys the quality of the soil and the piles block water flow into the fields. Waste water and ash are dumped in nearby waterways; the contaminated water also destroys farm soils.

“The soils in my fields are now very hard to plow because they (the company) dumped water from the coal mining site into Tigyt creek. In rainy season, water floods the fields and brings the coal sediment into the field. Because of those coal sediments, the soil becomes very hard and difficult to plow as well as less productive.” (Interview #7)

Rise of jobless people

Farmers from six villages have had their lands taken and need to find another means of survival. Some villagers are still allowed to work on some of the confiscated lands where the mine hasn't reached yet but they are anxious about their future.

The companies boast that the coal project is creating jobs for local people. Yet the entire project only employs 500 staff while over one thousand villagers have been deprived of their farming livelihood. The majority of employees at the mine and power plant are not local; only a few local men are employed as truck drivers.



Coal dumped just beside paddy fields

In order to survive, families have taken to cutting down trees and bush to sell firewood, which is further degrading the surrounding environment. Some women have tried to get jobs selling vegetables while some of the young men have migrated to other areas to look for jobs.

As the local villagers lose their income sources, they can't afford to enroll their children in school. In order to support the family, the children either have to work together with their parents, take care of their siblings or manage household work.

"The company has confiscated all the farm lands west of our village (Bar Min Kone village). However, villagers are still allowed to work on those farms before the mining site expands to there. The former officer didn't allow any villagers to use the land but the new officer allows us to use it. Even though they allow us to use the land, we don't want to spend effort to use fertilizers because they could destroy the land at any time. Without fertilizer, the crop productivity is very low. In previous years, we always had surplus rice; we could even sell some for extra money. Next year, they might not allow us to work there anymore. Now, I collect and sell firewood. If there are no more trees in the future, I don't know what I am going to do." (Interview #9)

36

"We always had plenty of water and a good irrigation system around our village (Thar Yar Kone village). But to earn our livelihood, we don't have any more farms to rely on. Moreover, the coal ash pile is also getting closer and closer to our village and we don't know what to do now. As our lands were taken, we have nothing else to do and don't know how to support ourselves. Day after day the lands are buried under the ground by the coal mine. I have no idea where to find land for me to cultivate, it is all gone under the coal pile. Now there is only one job for me to do - to look for firewood east of the mountain and sell it. I can't find another job in my village because there is no job available." (Interview #5)



Villagers now cut trees to sell for firewood



Air pollution threatening health

Trucks transporting coal all day constantly emit plumes of dust that pollute local villages. The dust spreads and settles on the water sources, houses and vegetable fields, threatening the well-being of people's health. Children from Taung Pola village have to pass the mining area every day in order to go to school in Tigyt. They have to walk through the clouds of dust and in the rainy season walk through the muddy paths.

37

Coal mine waste is discarded on the farm lands between Pyin Thar and Taung Pola villages east of the plant. The ash is also a threat to health (see What is Fly Ash). At the same time piles of coal at the power plant often spontaneously combust, emitting noxious gases into the air. It is also known that coal-fired power plants emit mercury, selenium, and arsenic into the air, which are extremely harmful to human health and the environment.

“Sometimes the coal suddenly burns itself at the coal storage place near the power plant. If that happens, a horrible smell is released; the smell is even worse than the smell of burning tires. The smell is brought to nearby villages by air and as some nearby villagers couldn't stand the smell anymore, they moved to safer places.”
(Interview #11)

Since last year, more and more people in villages surrounding the coal plant have been experiencing skin rashes. Now about 50% of the nearby population have skin rashes (see photo). The company at the project has not provided any assistance for people suffering this condition.





There are many vegetable fields around the coal mine and power plant which are covered in coal dust. When farmers tried to complain to the company about their cabbages being destroyed, the company sent a Captain from the Burma Army to talk to the villagers. He told them: “Pesticides get stuck on the vegetable skins and you wash and eat them anyway. In the same way you can wash away the coal dust covering your cabbages and it is no problem.”

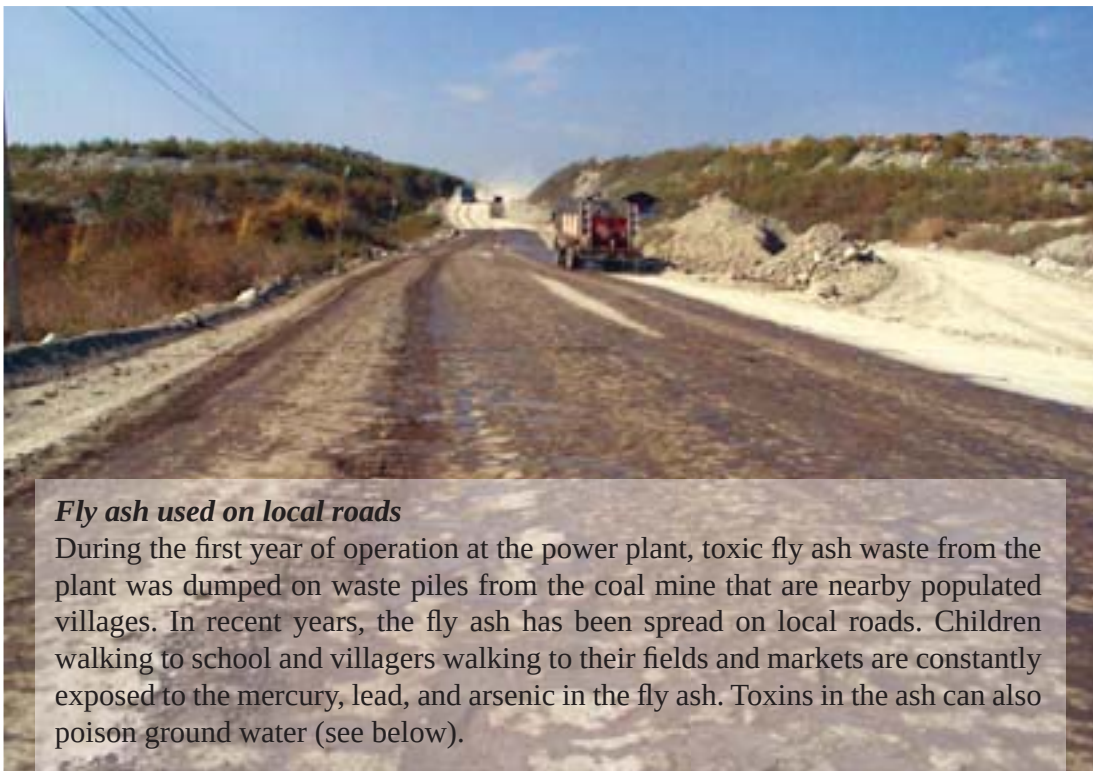
It seems there is one health worker hired by the company to work in the surrounding communities. But according to one villager, this position is just for show:

“There is one health worker from military. I forgot if he is a Major or Captain. Sometimes he went to villages and checks the communities’ health. The company just hires him so they look good though, they don’t actually provide health services, they just want full marks on their project.” (Interview 15)

Many health effects from the mine and power plant are long term and may not manifest for several more years or even in the next generation. Staff at government health clinics approached for this report replied that they did not have the authority to discuss the local situation.

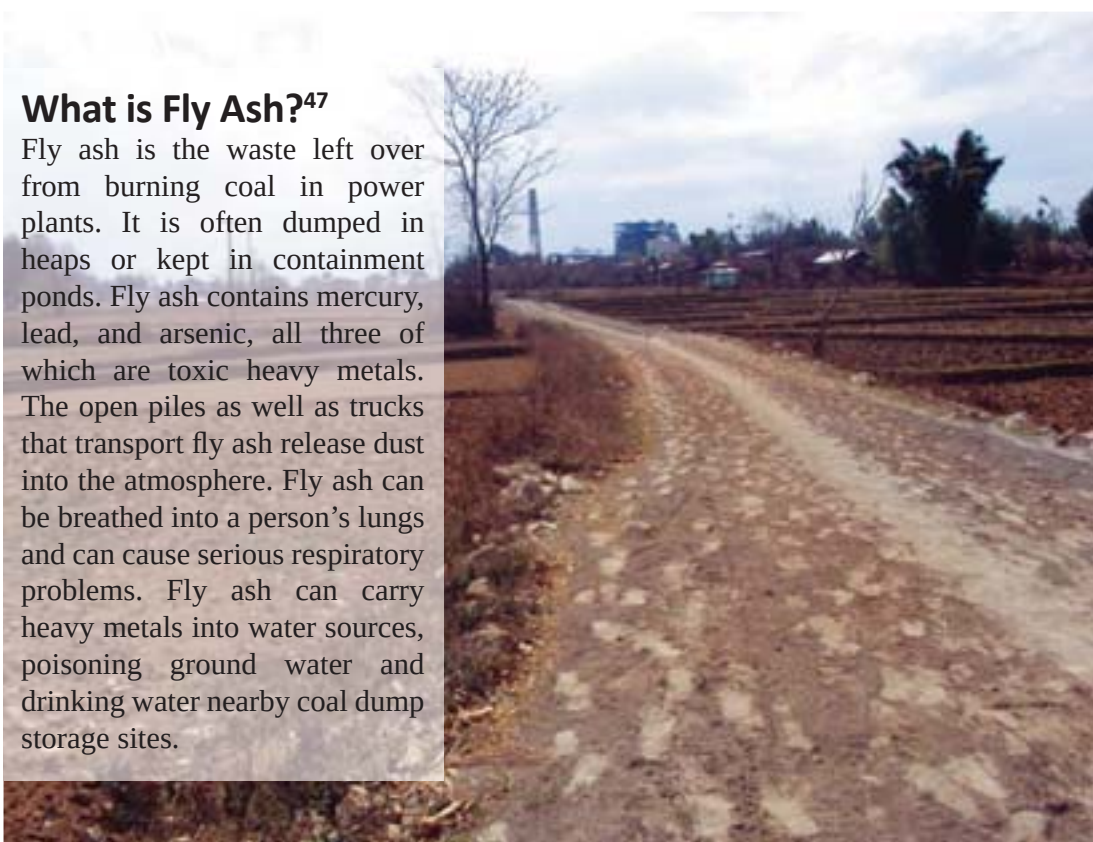
Health conditions for workers at the mine and power plant

Workers do not receive any accident or health insurance. They used to block their nose and mouth with a simple cloth while working but found it difficult to breathe and have since discarded this practice. They are required to get their blood checked once per month and if any worker is found to have jaundice, they are immediately fired and the company will hire a replacement worker. PYO has also learned of several accidents due to landslides at the mine since 2000. Five workers near Phara Prain village have died and seven people east of Naung Thara town have died.



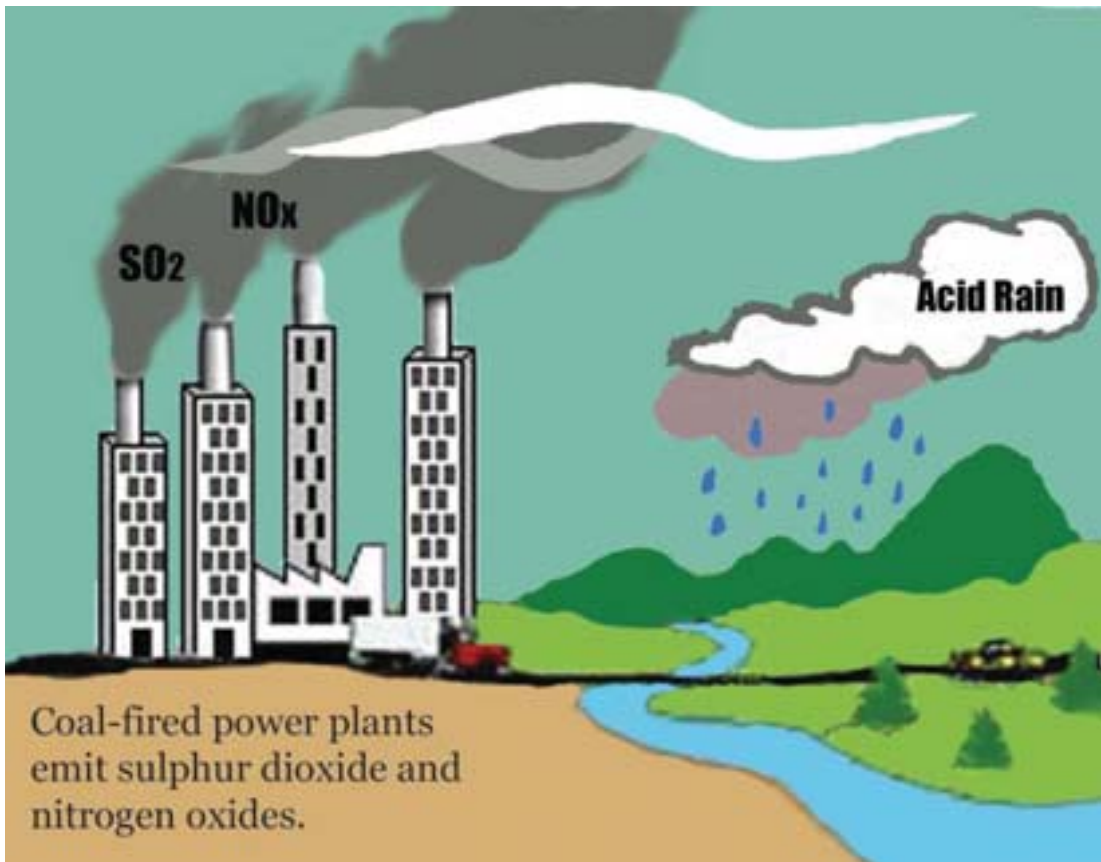
Fly ash used on local roads

During the first year of operation at the power plant, toxic fly ash waste from the plant was dumped on waste piles from the coal mine that are nearby populated villages. In recent years, the fly ash has been spread on local roads. Children walking to school and villagers walking to their fields and markets are constantly exposed to the mercury, lead, and arsenic in the fly ash. Toxins in the ash can also poison ground water (see below).



What is Fly Ash?⁴⁷

Fly ash is the waste left over from burning coal in power plants. It is often dumped in heaps or kept in containment ponds. Fly ash contains mercury, lead, and arsenic, all three of which are toxic heavy metals. The open piles as well as trucks that transport fly ash release dust into the atmosphere. Fly ash can be breathed into a person's lungs and can cause serious respiratory problems. Fly ash can carry heavy metals into water sources, poisoning ground water and drinking water nearby coal dump storage sites.



Smoke from power plants causes acid rain⁴⁸

“Acid rain” is a broad term used to describe several ways that acid material falls out of the atmosphere. Coal power plants emit sulfur dioxide (SO_2) and nitrogen oxides (NOx); these gases are the primary causes of acid rain. When the power plant stack releases the smoke of SO_2 and NOx , the gases react in the atmosphere with water, oxygen and other chemicals to form various acidic compounds. When these fall to the earth as acid rain, it acidifies lakes and streams, damages plants and forests, and harms public health. A device called a scrubber in the smokestack can help reduce SO_2 emissions from the power plant, but it is uncertain if the Tigyt plant has such a device.

Mae Moh: lessons from Southeast Asia's largest coal-fired power plant⁴⁹

“At the beginning, we thought nothing would happen. However, after a few years, villagers began to suffer throat cancer. We have also seen cows and buffalos die after eating grasses. Sometimes acid rains pour and kill the crops we planted.” - Maliwan Najwirot, Secretary, Occupational Health Patients Rights Network of Mae Moh

The Mae Moh Coal Power Plant in northern Thailand is considered the largest coal-fired plant in Southeast Asia. It is fueled by an open pit lignite coal mine that produces 40,000 tons per day and has a total capacity of 2,625 megawatts (MW).

The Mae Moh power plant releases an estimated 1.6 million tons of sulfur gas into the air everyday. Overall, more than 30,000 people have been displaced by the plant and mine, thousands have acquired severe respiratory problems, and nearly 300 villagers have died due to respiratory illnesses, lung cancer, and blood poisoning. People within a 7 kilometer radius of the plant have fallen ill with breathing difficulties, nausea, dizziness and inflammation of eyes and nasal cavities.

Fly ash waste and acid rain from the power plant have also contaminated the crops of the villagers, causing them to wilt and die. In October 2003, the State Natural Resources and Environmental Policy and Planning Office found high levels of arsenic, chromium and manganese in almost all water sources within the vicinity of the plant.

Villagers from Mae Moh have been fighting for their rights even though they are facing tremendous difficulties. In May 2004, the Thai Provincial court awarded US\$142,500 to the villagers for crop damages caused by the coal power plant. This compensation is just a small recognition of how disastrous the plant has been to the lives of local people but it cannot replace the lives lost and damage done.



*Patient with
respiratory illness,
Mae Moh, Thailand*
© Greenpeace /
Shailendra Yashwant

Water pollution and water shortages

The dumped soil from the coal mine is piling up so high that the piles have become like hills and are blocking water flows, creating polluted and stagnant lakes. In the rainy season, rain water stagnates behind these piles creating ponds. Water slowly erodes the dump piles and coal storage piles at the factory, sending waste into Tigyt creek. The farm lands behind the dumped soil piles are flooded by this dirty water.

Toxic fly ash waste from the power plant that is dumped on coal mine waste piles or spread on local roads is also running off into local water sources, some of which eventually flows into Inle Lake.

As the coal mine has deepened, it has reached the water source underneath the ground and water emerges in the coal mine. This water is pumped out and poured into Tigyt Creek, which flows through Balu Creek into Inle Lake. Therefore, the water from Tigyt Creek is always polluted by the water behind the dump site, fly ash runoff, and the water pumped out from the coal mine. Villagers nearby the creek used to use it for bathing but can no longer. However the polluted water is still used for agriculture, potentially contaminating food crops.

As the mine waste concentration is too high in local creeks, farm fields become too hard. Villagers have also said that the land productivity is getting lower.

“As water emerged in the coal mine, the pond behind Pyone Tan monastery dried up. We don’t know if the water source of that pond is the same as the one in the coal mine site. Tube wells in Tigyt village also dried up. We could only get water after the Abbot from Tigyt monastery re-filled the pond with water from a mountain stream.” (Interview #6)

Unmonitored and unregulated contaminants from the mine and the power plant are flowing into Inle Lake via Tigyt creek and Balu creek. Given recent decreasing levels of water in the Lake, the contamination will also be increasingly concentrated. Therefore, Tigyt coal mining is threatening the health of the ecosystem and the survival of species in Inle Lake.

Water is also diverted from Balu Creek to use at the power plant and sometimes hot water is released on local farms.

The coal sediment and waste which flows through Balu Creek into Inle Lake also collects behind Moe Bye Dam which is then released further downstream, passing Moe Bye and Loi Kaw Towns. A 29-megawatt dam being constructed on the upper Balu Creek will also trap pollutants from the Tigyt coal mine behind the dam which will then be released downstream when sluice gates open.



Unnatural lakes formed by dump piles from the coal mine lie stagnant and polluted



This community water source dried up when the coal mine excavation reached the water table and water emerged in the mine

Noise pollution

Coal is extracted every day and night and noise from the mine is troubling children and the elderly. Explosions from the mine site and noises from the power plant are also causing troubles to students who can't concentrate on their studies.

“The noise from power plant gets louder and louder as it gets later in the night time. Like human beings, I think cows and buffalos cannot sleep either because they often make strange noises during the night. Before the power plant was constructed, they have never made such strange noises.” (Interview #2)

Vibrations from explosions at the coal mine have cracked local villagers' houses, schools and pagodas. Shattered rocks and stones from the explosions have left gaping holes in house rooves. The flying stones have also hit villagers.



Cultural destruction

The ancient pagoda of Tigyt village crumbled and disintegrated from the force of explosions at the mine which caused the earth to shake. The destruction incensed local villagers. To avoid confrontations between villagers and the company workers, the Abbot of Tigyt monastery had to mediate and resolve the problem. Later the villagers gathered broken pieces of the pagoda, placed them in its old place, and fenced off the area (see photo).

The company promised that they would rebuild the pagoda when the soil became more stable and strong. However, as there are constant vibrations of explosions from mine site, the land will never become stable. Whether or not the pagoda is rebuilt, villagers believe that the project is upsetting local spirits and that there could be retribution:

“After the Pagoda collapsed, a monk dreamed that one man from the ‘Village Peace and Development Council’ (Ya Ya Ka) would die. Not long after that, one man died. Now, a monk dreamed again that two men are going to die. Also, when workers tried to take out the banyan tree by truck, their truck couldn't move. But, when they replanted the banyan tree it was easy for them to move their truck. Now a snake is living and waiting on the banyan tree.” (Interview #10)

“When the pagoda collapsed, a fight between villagers and company workers almost broke out. Most villagers were so angry, some were crying. We always celebrate our traditional festival at the pagoda and many people join; it’s a time for a reunion among relatives. Now we have nowhere to hold the festival. One monk said we should rebuild the pagoda but now the land is not strong enough to support it.” (Interview #10)





Residents posted banners at their homes warning a potash mining company against entering the village in Udonthani, Thailand

When people speak out, projects can be stopped

In May 2000, Golden Triangle Hydro Electric Power Pte Ltd began construction of a 12 MW 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 2001.⁵⁰



The market in Tigyt

Conclusion

If the Tigyt coal mine continues to go ahead, nearly 12,000 people living within five miles of the mine and workers will face health problems and breathing difficulties similar to the Mae Moh communities of northern Thailand. Villagers losing their traditional livelihoods and farm lands day by day will become impoverished and displaced. Polluted water from the coal mine flowing into Balu Creek will contaminate Burma's cherished Inle Lake.

We therefore call on

Government and companies to:

1. Stop the coal mining project to properly assess health, social and environmental impacts
2. Join with environment experts to inspect the water pollution between Tigyt coal mine and Inle Lake
3. Give enough compensation for already impacted families

And local communities to:

1. Avoid signing documents without fully understanding them and without suitable compensation
2. Oppose corruption and exploitation which harms the communities' livelihoods and natural resources

Endnotes

- ¹ “Myanmar population hits over 59 mln in 2009” July 1, 2010, <http://english.peopledaily.com.cn/90001/90777/90851/7049436.html>, accessed on 15 September 2010.
- ² *Ibid.*
- ³ ပြည်သူ့အများစု ကျပ် (၁၀၀) တန်ဖိုး အားကိုးနေရတဲ့ (မျိုးဝင်းဇော်) ၁၄ စက်တင်ဘာ ၂၀၁၀။ www.khitpyaing.org/index.php?route=detail&id=4464 accessed on 15 September 2010.
- ⁴ *Development in Myanmar Energy Sector, Energy Planning Department, Ministry of Energy, Union of Myanmar*, SEF-2, Ho Chi Minh City in Viet Nam, 22 October 2008 at <http://www.adb.org/Documents/Events/Mekong/Proceedings/SEF2-Annex6.4-Myanmar-Presentation.pdf>, accessed on June 28, 2010
- ⁵ “More private companies cooperate with Myanmar gov’t in mineral extraction,” http://news.xinhuanet.com/english2010/business/2010-07/06/c_13385989_4.htm, accessed on August 27, 2010.
- ⁶ *Coal Sub-sector* accessed on 23 September 2010 at <http://www.energy.gov.mm/coalsubsector.htm>
- ⁷ “Iron and steel industry being improved....” NLM, pg.4, 22 March 2010.
- ⁸ *Coal, the NEED project*, http://www.need.org/needpdf/infobook_activities/SecInfo/CoalS.pdf (accessed 28 July 2010)
- ⁹ *Coal power is the biggest culprit*, WWF, http://wwf.panda.org/about_our_earth/aboutcc/cause/coal/
- ¹⁰ *What is Coal?* World Coal Institute <http://www.worldcoal.org/coal/what-is-coal/> (accessed 28 July 2010)
- ¹¹ *Country report: Progress of power development plans and transmission interconnection projects, Myanmar*, Greater Mekong sub-region, eighth of regional power trade coordination committee (RPTCC-8), eighth meeting of focal group (FG-8), seventh meeting of planning working group (PWG-7), Luang Prabang, Lao PDR, 25-27 November 2008.
- ¹² “Chinese corporation, local company to implement Mawlaik hydropower, Kalewa coal-fired thermal power plant projects,” NLM, 28 May 2010, “Electric power projects to improve public living status,” NLM, 28 October 2010.
- ¹³ *Future project (Gas/Coal)*, http://www.aseanenergy.org/energy_sector/electricity/myanmar/future_electricity_projects.htm accessed on November 12, 2010. In June 2010 Norinco, a major Chinese weapons producer, signed a cooperation agreement with Burma’s regime for the Monywa mining project just weeks after selling the dictatorship heavy military artillery. See မုံရွာ ကြေးနီသတ္တု တူးဖော်ရေးအတွက် တရုတ်-မြန်မာ လက်မှတ်ထိုးပွဲ (သိန်းလင်း), Myanmar Times (Burmese Version) at <http://www.myanmar.mmtimes.com/2010/property/473/buss02.html>, accessed on August 27, 2010 and “Norinco sold Burma arms pre-copper deal,” Democratic Voice of Burma, 29 June 2010.
- ¹⁴ *Improve Electricity for Yangon Industry* at <http://www.mmtimes.com/2010/news/515/n51501.html>, accessed on August 27, 2010.
- ¹⁵ The zones are Hlaing Tharyar, Shwe Pyi Thar and Shwe Lin Pan. *Improve Electricity for Yangon Industry* at <http://www.mmtimes.com/2010/news/515/n51501.html>, accessed on August 27, 2010.
- ¹⁶ “Only when people rely on own strength will modern and developed nation emerge; achievements of development projects will reflect better inter-relationship among national people and contribute to flourishing of Union Spirit,” Senior General Than Shwe addresses Special Projects Implementation Committee Meeting, NLM, 7 March 2010 at <http://myanmargeneva.org/10nlm/mar/n100307.htm>, accessed on August 27, 2010.
- ¹⁷ Summary of Thailand power development plan 2010-2030, http://www.egat.co.th/thai/files/Report%20PDP2010-Apr2010_English.pdf, accessed on August 27, 2010.
- ¹⁸ “Thai company signs Myanmar port deal,” Agence France-Presse, 4 November 2010, Ital-Thai project documents, and ထားဝယ် ရေနက်ဆိပ်ကမ်း စီမံကိန်းသည် အရှေ့နှင့် အနောက်စီးပွားရေး စင်္ကြံနှင့် အရေးပါလာမည် ဖြစ်ရာ ...တရုတ် ...” (ဇွဲမောင်မောင်)။, The Myanmar post
- ¹⁹ “An Industrial Project That Could Change Myanmar,” New York Times, 26 November 2010.
- ²⁰ NLM, 7 March 2010 at <http://myanmargeneva.org/10nlm/mar/n100307.htm>, accessed on August 27, 2010.

- ²¹ အင်းလေးကန်နှင့် မိုင် (၂၀) ဝန်းကျင် စိမ်းလန်းစိုပြည်ရေး မြင်ကွင်းများ။ Kyaymon News (The Mirror), 30 September 2010 pg. 20.
- ²² At Indein village, the Balu creek diverges into two creeks. 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 the Lake.
- ²³ “Only when people rely on strength will modern and developed nation emerge,” New Light of Myanmar (NLM), 7 March 2010, pg. 6.
- ²⁴ အင်းလေးကန်၌ ကမ္ဘာတွင် မျိုးစိတ်သစ် ဖြစ်လာဖွယ်ရှိသော ဖားသုံးမျိုး တွေ့ရှိထား။ Weekly Eleven News Journal, Vol-3 No-51, pg. 9, 2008.
- ²⁵ <http://birding.sstmyanmar.com/inle-wetland-bird-sanctuary-ecotourism-asean-heritage-site-myanmar-and-southeast-asia>
- ²⁶ အင်းလေးကန်နှင့် မိုင် (၂၀) ဝန်းကျင် စိမ်းလန်းစိုပြည်ရေး မြင်ကွင်းများ။ Kyaymon News (The Mirror), pg. 11, 20, September 30, 2010.
- ²⁷ ရှမ်းပြည်နယ်တောင်ပိုင်းတွင် ငါးစားသုံးမှု မြင့်တက်ကာ အင်းလေးကန်ဒေသမှ ငါးဖမ်းယူရရှိမှု လျော့နည်း။ http://www.news-eleven.com/index.php?option=com_content&view=article&id=4495:2010-08-26-09-18-43&catid=45:2009-11-10-07-45-41&Itemid=113 accessed on November 12, 2010.
- ²⁸ During the 65-year period from 1935 to 2000, the net open water area of Inle Lake decreased from 69.10 km² to 46.69 km², a loss of 32.4%. Roy C. Sidle, Alan D. Ziegler and John B. Vogler (April 2007). “Contemporary changes in open water surface area of Lake Inle, Myanmar”. Sustainability Science 2 (1): 55–65. doi:10.1007/s11625-006-0020-7. ISSN 1862-4065. <http://www.springerlink.com/content/a2t64l5768505464/>.
- ²⁹ “Water surface area of Inlay Lake shrunk from 40 square miles to 27 in summer,” Reported by Nay Pyi Taw News Crew, Eleven Media Group, accessed on 16 September 2010 at http://eversion.elevenmediagroup.net/index.php?option=com_content&view=article&id=674:water-surface-area-of-inlay-lake-shrunk-from-40-square-miles-to-27-in-summer&catid=43:biweekly-eleven-eversion&Itemid=110
- ³⁰ “More Equipment arrives for Shan State coal mine,” Myanmar Times, 4 May 2004 at <http://www.myanmar.gov.mm/myanmartimes/no211/MyanmarTimes11-211/012.htm>, accessed on August 2010.
- ³¹ “Construction project of Tikyit coal-fire power station inspected in Pinlaung,” NLM, 20 July 2003, accessed on August 27, 2010 at <http://mission.itu.ch/MISSIONS/Myanmar/03nlm/n030710.htm>,
- ³² *Ibid.*
- ³³ “Tigyit coal-fire power station that will fulfill the electricity needs,” NLM, 16 September 2003, <http://www.myanmar.gov.mm/Article/Article2003/sep/Sept16b.htm>, About CHMC introduction <http://www.chmc2003.com:8640/gsjj.htm> accessed on August 27, 2010.
- ³⁴ “MEPE plans coal-fired power station,” Myanmar Times, 24 September 2001. <http://www.myanmar.gov.mm/myanmartimes/no82/myanmartimes5-82/News/new.htm>, accessed on August 27, 2010.
- ³⁵ Interview # 12
- ³⁶ “Of the two turbines of Tikyit coal-fired power plant, one is generating electricity at full capacity as it was completed in 2004, The other one will start generating power beginning April last week,” NLM, April 16, 2005, accessed on 20 September 2010 at http://www.myanmar.gov.mm/NLM-2005/April05/enlm/April16_h2.html
- ³⁷ *Country report: Progress of Power Development Plans and Transmission Interconnection Projects, Myanmar*, Greater Mekong Sub-region eighth meeting of regional power trade coordination committee (PRTCC-8), eighth meeting of focal group (FG-8) and seventh meeting of planning working group (PWG-7), Luang Prabang, Lao PDR, 25-27 November 2008.
- ³⁸ “Russian business presence becoming stronger in Burma,” Mizzima News at <http://www.mizzima.com/news/inside-burma/1422-russian-business-presence-becoming-stronger-in-burma-.html>, accessed on November 13, 2010.
- ³⁹ “\$21m Cement Factory Underway,” Myanmar Times, August 8-14, 2005 at <http://www.myanmar.gov.mm/myanmartimes/no278/MyanmarTimes14-278/b002.htm> accessed August 28, 2010.

- ⁴⁰ “Tigyit coal-fire power plant station that will fulfill the electricity needs,” New Light of Myanmar, 16 September 2003 at <http://www.myanmar.gov.mm/Article/Article2003/sep/Sept16b.htm>, NLM, 16 April 2005 http://www.myanmar.gov.mm/NLM-2005/April05/enlm/April16_h2.html accessed on August 27, 2010.
- ⁴¹ *Country report: Progress of Power Development Plans and Transmission Interconnection Projects, Myanmar*, Greater Mekong Sub-region eighth meeting of regional power trade coordination committee (PRTCC-8), eighth meeting of focal group (FG-8) and seventh meeting of planning working group (PWG-7), Luang Prabang, Lao PDR, 25-27 November 2008.
- ⁴² “အင်းလေးကန် မိုင် (၂၀) ပတ်ဝန်းကျင် စိမ်းလန်းသိုပြေရေးအတွက် သစ်တောများ ထိန်းသိမ်းရေးနှင့် တိကျစွာ ကျောက်မီးသွေးပြာ” သတင်း ဆောင်းပါး။ (ရဲလင်းအောင်- အင်းလေး), NLM, 24 July 2008.
- ⁴³ See PYO’s report *Robbing the Future* (June 2009) and update briefer *Save our Mountain Save our Future* (October 2010) at <http://pyo-org.blogspot.com>
- ⁴⁴ “Iron and steel industry being improved...”, NLM, 22 March, 2010, p#4: accessed 20 September 2010 at <http://myanmargeneva.org/NLM2010/eng/3Mar/n100322.pdf>
- ⁴⁵ The Myanmar Mines Law, The State Law and Order Restoration Council (The State Law and Order Restoration Council Law No 8/94), 6th September, 1994 accessed at <http://www.mining.com.mm/> on November 10, 2010.
- ⁴⁶ Status and Current Issues of Mining Regulatory Regime in Myanmar, Soe Mra, Director General, Department of Mines, Ministry of Mines at <http://www.freewebs.com/myanmarmines/regulatory.htm>. Accessed November 30, 2010.
- ⁴⁷ *Bokoshe: The Toxic Truth* accessed on September 25, 2010 at <http://www.oklahomalovesgreen.com/page.html>, “Is coal ash poisoning Charlotte area drinking water? by Rhiannon Bowman (published 09.07.10) assessed September 25, 2010 at http://charlotte.creativeloafing.com/gyrobase/is_coal_ash_poisoning_charlotte_area_drinking_water_/Content?oid=1041443, “Coal Ash Contaminates Groundwater and Drinking Water Sites in 21 States” http://current.com/news/92665216_coal-ash-contaminates-groundwater-and-drinking-water-sites-in-21-states.htm
- ⁴⁸ “What is acid rain and what causes it?” accessed on September 25, 2010 at http://www.policyalmanac.org/environment/archive/acid_rain.shtml
- ⁴⁹ “The Grievous Mae Moh Coal Power Plant,” 2 February 2008 at <http://developmentdebacles.blogspot.com/2008/02/grievous-mae-moh-coal-power-plant.html>
- ⁵⁰ “Tachilek Power Plant: Skepticism over work halt,” The Nation, 20 December 2001. www.burmalibrary.org/TinKyi/archives/2001-12/msg00008.html, accessed on June 28, 2010. “Chronology of Thai Anti-power Plant Struggle Against Burma,” Bangkok Post, 24 June 2001.

Appendix 1

Population within five miles of the coal mine and power plant

No	Villages	Ethnicity	Households	Population
1	Pang Me Kone (N)	Pa-Oh	75	452
2	Pang Me Kone (S)	Pa-Oh	33	186
3	Taung Pola (New place)	Pa-Oh	27	149
4	Thar Yar Kone	Pa-Oh	77	395
5	Pyan Sar	Pa-Oh	36	185
6	Sae Khaung	Pa-Oh, Shan, Taung Yoe	210	1,173
7	Naung Mon	Pa-Oh, Taung Yoe	101	580
8	Tha Pnew Mau	Pa-Oh, Shan	57	287
9	Pharar Bwar (S)	Pa-Oh, Shan	104	540
10	Pharar Bwar (N)	Pa-Oh, Shan	32	138
11	Pharar Prain	Pa-Oh, Shan	47	186
12	Pharar Prain	Pa-Oh, Shan	65	321
13	Min Thwe Chaung	Pa-Oh, Shan	83	358
14	Tup Kone	Pa-Oh, Shan	87	396
15	Pak Hkaw Kone	Pa-Oh, Shan, Taung Yoe, Burmese	49	191
16	Tigyit	Pa-Oh, Shan, Taung Yoe, Burmese	499	2,907
17	Pharar Ngak Choo	Pa-Oh	79	368
18	Hti Katoo or Lwin Ywar	Pa-Oh, Taung Yoe, Burmese	108	941
19	Par Lai	Pa-Oh	42	231
20	Kom Tein	Pa-Oh, Taung Yoe	40	206
21	Lai Khar	Pa-Oh, Burmese	48	274
22	Loi Twe (S)	Pa-Oh, Taung Yoe	57	374
23	Loi Twe (N)	Pa-Oh, Taung Yoe	36	218
24	Ban Mart	Pa-Oh	23	124
25	Moon Pin	Pa-Oh, Taung Yoe	70	412
	Total		2,085	11,592

Appendix 2

Villagers forced to relocate in 2003 by Tigyit coal project

No	Name	Age	Family members	Village Name	Compensation (in kyat)
1	Jan Phar Maw Poe	63	10	Taung Pola	170,000
2	Jan Phar Maung Bom	48	7	Taung Pola	120,000
3	Jan Phar Maung Joi	52	10	Taung Pola	120,000
4	U Hin	73	3	Taung Pola	120,000
5	U Koum	48	6	Taung Pola	120,000
6	U Bwein	40	7	Taung Pola	100,000
7	U Chit Maung	41	3	Taung Pola	120,000
8	Daw Shwe Hla	62	1	Taung Pola	120,000
9	Daw Htok	61	1	Taung Pola	50,000
10	Chara Htak Man	57	5	Taung Pola	120,000
11	Hla Jin	37	2	Taung Pola	50,000
12	U Maung	63	6	Taung Pola	100,000
13	U Ba	48	9	Taung Pola	120,000
14	U Kyaw	40	6	Taung Pola	100,000
15	U Kyaw Hla	45	6	Taung Pola	100,000
16	Mur Phra Tok	64	2	Taung Pola	100,000
17	Than Hla	27	1	Taung Pola	50,000
18	Aung Thar	42	7	Taung Pola	50,000
19	U Bel	75	2	Taung Pola	100,000
20	U Chit Kaung	42	4	Taung Pola	100,000
21	U Pwein	40	7	Taung Pola	100,000
22	Ta Aung	45	3	Taung Pola	50,000
23	Ma Own	50	6	Taung Pola	50,000
24	U Poo	n/a	4	Taung Pola	120,000
25	U Daung	75	5	Lai Khar	120,000
26	Jan Phar Lok	59	6	Lai Khar	120,000
27	Jan Phar Aung Kyi	58	10	Lai Khar	120,000
28	Jan Phar Poe Thoung	61	5	Lai Khar	120,000
29	Jan Phar Poe Yee	36	5	Lai Khar	120,000
30	Jan Phar One	52	7	Lai Khar	120,000
31	Jan Phar Yai	60	11	Lai Khar	120,000

No	Name	Age	Family Members	Village Name	Compensation (in kyat)
32	Jan Mur Own Kyi	59	5	Lai Khar	120,000
33	Jan Mur Bo	70	5	Lai Khar	120,000
34	Jan Phar Tun Aung	34	5	Lai Khar	120,000
35	Jan Phar Twat Jin	52	5	Lai Khar	120,000
36	Jan Phar Kan	n/a	5	Lai Khar	n/a
37	Jan Mur Pu	passed	7	Lai Khar	n/a
38	Jan Phar Poe Min	passed	4	Lai Khar	n/a
39	Jan Mur Own Lwin	n/a	8	Lai Khar	n/a
40	Jan Phar Baw	62	5	Lai Khar	120,000
41	Jan Phar Aung Law	52	5	Lai Khar	120,000
42	Jan Mur Bel	47	5	Lai Khar	120,000
43	Jan Phar Nge	60	9	Lai Khar	120,000
44	Jan Phar Tun Tin	52	6	Lai Khar	120,000
45	Jan Phar Nge Pay	56	6	Lai Khar	50,000
46	Jan Phar Maung Kak	61	7	Lai Khar	120,000
47	Jan Phar Maung Myo	32	6	Lai Khar	120,000
48	Jan Phar Aung Chan	39	6	Lai Khar	120,000
49	Jan Phar Thain Tan Oo	31	5	Lai Khar	120,000
50	Jan Phar Myo Nyein	31	4	Lai Khar	120,000
51	Jan Phar Kyaw Kyaw	26	4	Lai Khar	100,000
52	Jan Mur Pu Lu	46	2	Lai Khar	120,000
53	Jan Phar Sein Tun	46	5	Lai Khar	120,000
54	Jan Phar Aung Kyaw	53	6	Lai Khar	120,000
5	Jan Phar Sai Htoo	54	5	Lai Khar	120,000
56	Jan Phar Tun Yee	38	5	Lai Khar	120,000
57	Jan Phar Jet Thoung	51	4	Lai Khar	120,000
58	Jan Phar Maung Nu	40	4	Lai Khar	100,000
59	Jan Phar Soe Naing	33	3	Lai Khar	100,000
60	Jan Phar Ta Tun	36	3	Lai Khar	120,000
61	Jan Phar Sun Win	29	3	Lai Khar	50,000
62	Jan Phar Sein Loi	47	1	Lai Khar	120,000
63	Khun Maung Win	23	1	Lai Khar	50,000
	Total		321		6,280,000 (US\$ 6,280)



Just thirteen miles from Burma's famous Inle Lake, the country's largest open cast coal mine and largest operating coal-fired power plant are wreaking havoc. Up to 2,000 tons of lignite, the most polluting type of coal, is excavated per day at the mine. The coal is sent to be burned at the nearby power plant which produces 100-150 tons of toxic fly ash daily. Electricity produced at the power plant is sent to an other mining project. This follows the trend in Burma's energy sector of exploiting natural resources not for the development of the country's people but for sale to the highest bidders. Burma is currently planning to develop several other coal deposits and build new coal-fired power plants.



Kyoju Action Network



Pa-Oh Youth Organization