

# Coal Deposits and Coal Mining in Myanmar

**Prof. Dr. Myo Nyunt**

Rector, Technological University (Mandalay)

\*Authors to correspondence should be addressed via email: [nyuntster@gmail.com](mailto:nyuntster@gmail.com)

## ABSTRACT:

Coal The new Government of Myanmar combined the Ministry of Mines and the Ministry of Environmental Conservation and Forestry whereas the country's resources remain the same. Coal reserves of Myanmar are estimated over 500 million tons. The coal deposits that have been found are in Shan, Kayah, Kachin and Chin States and Sagaing, Magway, Mandalay, Bago and Tanintharyi Regions. Operating coal mines are Lweje mine in Kachin State, Dathwegyauk mine and Kalewa mine in Sagaing Division, Namma mine, Tigyt mine and Samlaung mine in Shan State, and Tavoy (Dawei) Ban Chaung project in Tanintharyi Region. The electricity demand of the country may support the need to run coal mines and coal-fired power plants; yet on the one hand, there have been reporting of environmental and health impacts from coal mines and coal-fired power plants. Thus Myanmar has to make critical decision to ban or approve new coal mines and power plants. Public opinions and public consultations required by environmental legislation delay the new operations of coal mines and related power plants. This paper aims to present Myanmar's coal deposits and some coal mines that have been operated currently, and general public opinions that affect the officials' willingness to fulfill the electricity needs.

**KEY WORDS:** Coal deposits, coal mines, coal uses, environmental impacts, legislation

## 1. Introduction

Myanmar's mineral resources normally attract international investors while some more detailed studies indicate limited and inexact resources. One study says that a good variety – 58 minerals – occur in Myanmar. Regarding coal, some descriptions show that Myanmar coal reserves amount over 500 million tons. Coal occurrence is said to scatter around the country but there is no potential for large scale development. Coal mining industry is running for some small-scale enterprises and cement production. Sensitive environmental awareness and weak legislative functions suppress the development coal-fired power stations in the country.

## 2. Mineral Database

For the mineral database the Department of Geological Survey and Mineral Exploration (DGSE) has carried it out in GIS and in word text file and excel format. Text file format is in Myanmar language and is updated every year at the end of March of fiscal year. GIS format is underway and not yet completed. Another data base construction is ASEAN mineral database establishment as an ASEAN member country. But it is not very progressive due to the internet access problem and only about 40 deposits has been recorded. (Lwin S. , 2012) Part of this work can be seen as illustrated in Figure 1.

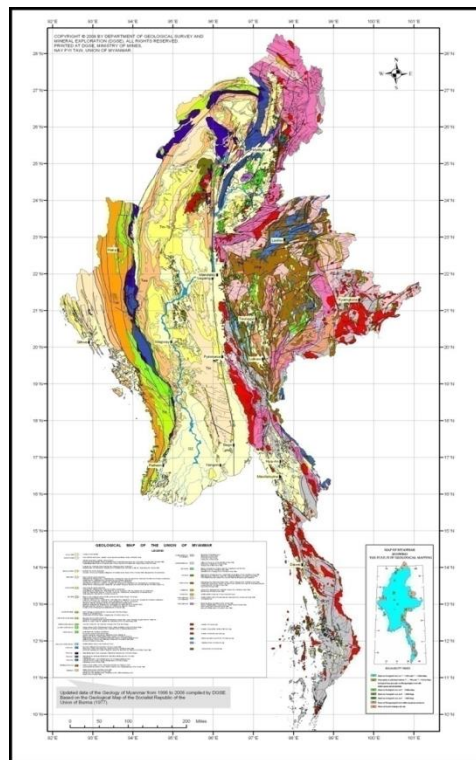


Figure.1 Digital geological map of Myanmar (Lwin S. , 2012)

### 3. Coal Resources

The academics and intellectuals who study mineral resources of Myanmar often refer to a retired geologist from DGSE for his work on mineral belts of Myanmar as shown in Figure 2. (Thiha, 2006)

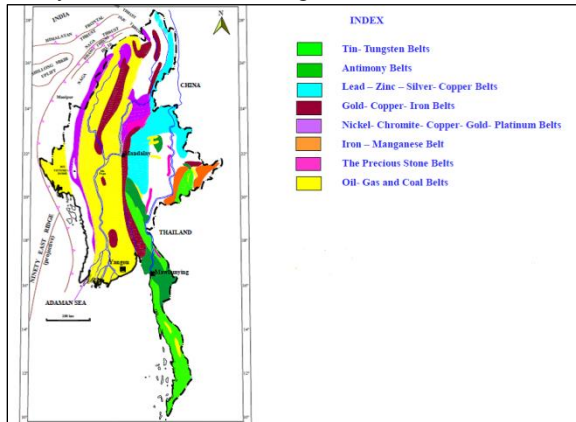


Figure.2 Mineral belts of Myanmar (Thiha, 2006)

Saw Lwin from the DGSE, classified coal reserves of Myanmar to be rich in his study for database building for mineral resources. He placed coal in second rich category as follows.

Mineral Richness of Myanmar (Lwin S., 2012)

General Category	Minerals
Very Rich	:Jade, ruby, sapphire, limestone
Rich	:Copper, lead, zinc, tin, tungsten, gold, coal, barite
Fairly rich	:Antimony, silver, nickel, gypsum, iron, manganese
Poor	:Chromite, PGM, radioactive minerals, diamond, fertilizer minerals, fluorite, bauxite, mercury, kaolin, feldspar, quartz, betonics, mica, REE

The updated information from the Ministry summarized coal resources in Myanmar as follow:

- No. of Coal Occurrences: 565 Nos.
- Type of Coal: Lignite to Sub-bituminous
- Total Coal Resources: 542.568 million tons (P1 + P2 + P3 + P4)
- Proven Coal Reserves: 235.126 million tons (P1 + P2)

As to their occurrence, Nay Zar Lin, Executive Engineer from the Ministry of Natural Resources and Environmental Conservation succinctly stated the location of coal deposits in respective States and Regions as shown in Table 1.

Table.1 Coal resources in respective states and regions of Myanmar (Lin, 2016)

No.	State/ Region	Coal Resource (Million Tons)				Total (Million Tons)	Remark
		Proved Ore (P-1)	Probable Ore (P-2)	Possible Ore (P-3)	Potential Ore (P-4)		
1	Kachin	-	0.04	0.3	0.01	0.35	Lignite
2	Kayin	-	-	0.06	-	0.06	Sub-bituminous
3	Kayar	-	-	-	0.001	0.001	Sub-bituminous
4	Sagaing	4.68	18.000 3.00	127.118 2.222	100.140 0.810	249.938 6.032	Sub-bituminous Lignite
5	Tanintharyi	-	2.000 2.000	0.240 2.000	1.000 19.000	3.24 23	Sub-bituminous Lignite
6	Bago	-	-	0.01	0.001	0.011	Lignite
7	Magway	-	0.678 2	0.800 1.200	1.4 1.55	2.878 4.75	Sub-bituminous Lignite
8	Mandalay	-	-	0.1	-	0.1	Sub-bituminous
9	Rakhine	-	-	0.01	-	0.01	Lignite
10	Shan	-	165.000 37.7279	4.200 43.710	4.370 15.6805	173.570 77.1184	Sub-bituminous Lignite
11	Ayeyarwaddy	-	-	0.01	1.5	1.51	Sub-bituminous
	Total	4.68	230.4459	161.98	145.425	542.5684	

### 4. Coal mining

Of the six Mining Enterprises under the Ministry of Natural Resources and Environmental Conservation, No.3 Mining Enterprise is responsible for production of coal. There are two operating state-owned coal mines namely Kalewa and Namma the annual combined production which is about 50,000tons. Geological mapping, prospecting and exploration of minerals including coal are undertaken by DGSE. The Department of Mines is the government authority responsible for implementation of the policy, legislation and enforcement of law, rules and regulations in the mining sector.

Myanmar's coal production is found to have increased significantly since 1999-2000 amounting over 100000 tons /year. Before that the production was around 50000 tons/year. In 1956, Kalewa state-owned underground coal mine started to operate and in 1974 Namma state-owned open-pit mine was commenced. Myanmar has adopted the market-oriented economic system in 1988 and Joint-venture practices started in 1991. In 2011, the Government transferred all state-owned mines to private companies. Up to 2016, the Ministry has issued 40 large scale production permits, 56 small scale production permits and 151 exploration permits.

Normally, the mining method employed to extract the coal depends on the following criteria: (1) seam thickness, (2) the overburden thickness, (3) the ease of removal of the overburden, (4) the ease with which a shaft can be sunk to reach the coal seam, (5) the amount of coal extracted relative to the amount that cannot be removed, and (6) the market demand for the coal. In Myanmar, both surface mining and underground mining methods are used. In surface mining the layers of rock or soil overlying a coal seam are first removed after which the coal is extracted from the exposed seam. In underground mining, a shaft is dug to reach the coal seam. Currently, underground mining accounts for approximately 60 percent of the world recovery of coal. In 2015-2016 Fiscal Year, 17% of 419,862 tons,

the total coal production for the year, was extracted by underground mining methods.

“Coal Resources Development in Myanmar,” stated the results of chemical analysis of coal from some Myanmar mines, which are shown in Table 2.

### 5. Coal Uses

Myint Lwin, a deputy director of the Department of Mines, in his presentation about

Table 2. Chemical analysis of coal deposits in Myanmar (Lwin M. , 2009)

Sr.	Location		Chemical analysis				
	Region	Township	Fixed Carbon (%)	Volatile (%)	Moisture (%)	Ash (%)	Calorific value (Btu/lb)
1	Kyobin	Kawlin	38.19	31.17	7.15	23.48	9580
2	Kalewa	Kalewa	52.51	38.62	9.7	8.87	11720
3	Kaungdin	Gangaw	20.57	37.25	5.88	27.17	-
4	Thinbaung	Khin-U	34.04	43.88	3.76	18.32	10620
5	Myeni	Pauk	38	50	14	8	10500
6	Kyauktaga	Pauk	33	-	16	10	10000
7	Kywezin	Hinzada	65.7	21.4	1.2	11.7	11020
8	Namma	Lashio	34.54	44.31	8.64	20.69	10082
9	Minpalaung	Yangon	59.6	27.95	0.71	11.74	12230
10	Myinka	Kalaw	53.93	21.4	1.36	23.31	10480
11	Inbyin	Kalaw	65.57	26.12	3.75	4.42	11470
12	Inwun	Kalaw	76.25	15.28	6.2	2.17	13310
13	Tegyit	Pinlaung	33.81	34.4	18.15	13.27	9169
14	Naungtaya	Pinlaung	33.23	42.35	8.13	16.29	10910
15	Dhesunpa	Bago	18.56	46.55	3.24	31.65	8650
16	Kawmapyin	Tanintharyi	47.65	45.85	8.43	13.64	12310
17	Tawkywein	Namtu	36.32	35.13	14.23	11.28	-

Generally, the coal from mines is used in cement factories, steel production, briquetting, electricity and

others. For the coal usage of Myanmar, Myint Lwin (2009) traced back from 1998 to 2009 and his finding is summarized in Table 3.

Table 3 .Coal production and consumption in thousand tons (Lwin M. , 2009)

Fiscal Year	Production	Consumption					Export
		Cement	Steel	Briquetting	Electricity	Others	
1998-99	53.61	24.79	26.08	13.03	Nil	0.4	-
1999-00	122.49	17.53	24.68	7.06	Nil	1.08	90.36
2000-01	571.14	64.83	20.78	42.7	Nil	4.4	401.88
2001-02	571.14	64.83	7.76	26.9	Nil	2.18	531.25
2002-03	550.2	76.12	9.33	28.71	Nil	6.24	439.87
2003-04	925.42	133.78	10.82	38.26	Nil	5.3	737.26
2004-05	992	51.34	24.08	25.63	88.64	2.43	799.88
2005-06	1182.5	136.87	20.44	30.46	340.26	31.17	623.3
2006-07	1313.62	140.52	25.67	39.64	507.19	85.39	515.21
2007-08	1117.29	202.16	15.36	48.12	472.76	150.3	228.59
2008-09	564.48	227.25	18.61	30.47	245.06	43.09	43.09

Coal-fired power is a potential alternative to electricity source of Myanmar. Despite that, environmental activities arise at the same time and become one issue for coal power supply. Most opponents to coal say that Myanmar coal mines should be abandoned and reclaimed rather than expanded.

Their reports have described waste heaps, landslide danger, water and air pollution, effects on human health, agriculture, wildlife and rivers from the coal mines of Tigyit in Shan State and the Ban Chaung mine in Tanintharyi Region. According to a study (MAJE, 2017), coal-fired power plants that are running and pending are as follow:

Coal fired power plants in operation:	Proposed/pending coal fired power plants:
<ul style="list-style-type: none"> <li>• Shan State: Tigyit near Inle Lake. Coal mine and coal fired power plant. 120 MW</li> </ul>	<ul style="list-style-type: none"> <li>• Rakhine State: Kyauk Phyu Township. 1,320 MW</li> </ul>
<ul style="list-style-type: none"> <li>• Tanintharyi Region: Kawthaung. 8 MW</li> </ul>	<ul style="list-style-type: none"> <li>• Ayeyarwady Region: Ngayokkaung Township, south of Bassein. 660 MW</li> <li>• Ayeyarwady Region: Ngayokkaung Township. 300 MW</li> <li>• Mon State: Thanbyuzayat Township, Kyaikmayaw area. 40 MW</li> <li>• Mon State: Ye Township, Andin 1,280 MW</li> <li>• Rangoon (Yangon) area: Kungyangun, 300 MW</li> <li>• Yangon area: Kyauktan Township. 500 MW</li> <li>• Sagaing Region: Kalewa Township, 270 MW</li> <li>• Shan State: Kyaington, 500 MW.</li> <li>• Shan State: Mai Khot, 25 km northeast of Mong Hsat. 370 MW</li> <li>• Tanintharyi Region: Dawei District, Launglon Township, Botepyin. 500 MW</li> <li>• Tanintharyi Region: Myeik, 2,800 MW</li> </ul>

## 6. Legislation

Investors in mining in Myanmar have to do business in accordance with existing laws and rules. At least they have to be in line with the laws and regulations on investment, labour, mining and environmental conservation. The Union of Myanmar Mines Law was promulgated in September 1994 and the Myanmar Mines Rules relating to the law followed in December, 1996. The Environmental Conservation Law was promulgated in 2012, the Environmental Conservation Rules were issued in 2014, Environmental Impact Assessment Procedure in 2015 and National Environmental Quality (Emission) Guidelines in 2015.

## 7. Conclusion

Of the varieties of mineral commodity, coal is the second rich category in Myanmar. It is clearly seen that the electricity demand of the country calls for the development of coal-related power generation. Nevertheless, the existing condition and resource estimation in coal mining imply the necessity of more detailed exploration, good safety practices and developed mining technology. Royalties, rules and regulations, procedure and practices in mining, environmental conservation, Union and Regional level official involvement still form unattractive investment and business environment in the mineral industry.

## Bibliography

- [1] Lin, N. Z. (2016). Sustainable development of coal mining industry. Nay Pyi Taw, Myanmar.
- [2] Lwin, M. (2009). Coal resources development in Myanmar. Nay Pyi Taw, Myanmar.
- [3] Lwin, S. (2012). Database building in Ministry of Mines, Myanmar. Nay Pyi Taw, Myanmar.
- [4] MAJE. (2017). Coal Burns Burma: A compendium on dirty energy power plants and mining. [http://www.projectmaje.org/coal\\_report.htm](http://www.projectmaje.org/coal_report.htm)
- [5] Thiha, S. (2006). Mineral belts of Myanmar. Nay Pyi Taw, Myanmar.