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The Mineral Industry of Burma

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In 2015, Burma (also known as Myanmar) produced a variety of mineral commodities, including antimony, cement, coal, copper, lead, manganese, natural gas, nickel, petroleum, petroleum products, precious and semiprecious stones, tin, tungsten, and zinc. On July 30, Cyclone Komen brought heavy rains that caused widespread flooding and landslides across 12 out of 14 States and regions in the country. Chin and Rakhine States and the Magway and Sagaing regions were declared natural disaster areas. Basic infrastructure around the country, such as roads and bridges, was severely damaged or destroyed, which impeded traffic within and among the affected areas. In the aftermath, the performance of the mineral industry was affected as many mineral facilities were located in the areas (tables 1, 2; ReliefWeb.com, 2016).

According to data published by the Central Statistical Organization, since the opening of Burma's economy in 2011, many sectors of the country's economy had seen a surge in foreign direct investment (FDI). FDI in fiscal year 2015 (April 1, 2014, to March 30, 2015) amounted to $8 billion invested in a total of 211 projects. In fiscal year 2016, FDI amounted to $9.5 billion invested in a total of 213 projects, including $4.8 billion invested in 13 projects in the oil and gas sector and $28.9 million invested in 1 project in the mining sector. Investors in fiscal year 2016 included those from Singapore (55 projects), China (43), Japan (25), Hong Kong (23), and India (5), among others. Burma's leading investor was Singapore, which invested about $4.2 billion, followed by China ($3.3 billion), Hong Kong ($231 million), India ($224 million), and Japan ($220 million) (Central Statistical Organization, 2016).

In recent years, many legal instruments had been introduced in Burma's legal and regulatory framework, mainly to encourage the participation of foreign and local investors in the country's economy. In June 2015, a new draft of the Myanmar Company Law was published to replace the Myanmar Companies Act of 1914. The new company law was drafted by the Department of Investment and Company Administration of the Ministry of National Planning and Economic Development with the assistance of the Asian Development Bank. The new law is intended to update the previous version of the law by incorporating consistent international best practices (Greenlee, 2015).

Other legal instruments include the Foreign Investment Law of 2012, the Foreign Investment Rules of 2013, and Notification No. 49/2014 (New Notification) of August 2014, which were issued by the Myanmar Investment Commission (MIC). According to the Myanmar Ministry of Mines, the set of laws and notifications related to FDI were created to attract interest from investors and include such provisions as tax exemptions, tax holidays, and income tax relief, granting full venture ownership to foreign investors, and a Government promise not to nationalize businesses while the contract is in place. The Ministry of Mines recommended amending the country's Mining Law in the near future so that it is in accordance with international standards, reforming the banking system to better support foreign investors, and increasing the country's technical expertise as way to increase productivity and efficiency throughout the mining sector (Aung, 2014; Finch, undated).

Minerals in the National Economy

According to the Asian Development Bank, the mining sector contributed 6.3% to Burma's gross domestic product (GDP) in 2015 compared with 7.4% (revised) in 2014. The construction sector contributed 6.1% to the GDP compared with 5.8% in 2014 (Asian Development Bank, 2016, p. 1).

Burma's total trade value for fiscal year 2016 was $27.7 billion, of which exports totaled $11.1 billion, and imports, $16.6 billion. In 2015, the value of natural gas exports was $4.3 billion; jade exports were valued at about $569.5 million, and base metal and ore exports were valued at $360.2 million. The major mineral products imported by Burma were base metals and manufactured goods valued at $1.9 billion; cement valued at $331.6 million; and coal and coke valued at $89.4 million. Burma's main trading partner in 2015 was China. Burma exported 41.3% ($4.6 billion) of its total exports to China, and imported 38.6% ($6.4 billion) of its total imports from China. Other trading partners included Japan, Singapore, and Thailand (Central Statistical Organization, 2016).

Production

During 2015, Burma's mineral industry reported sharp increases and decreases in the production of minerals compared with that of 2014. In 2015, Burma's mineral industry reported production increases for jade (126%), tungsten concentrate (67%), tin ore and concentrate (64%), copper (41%), refined gold (29%), and nickel (26%). Mineral production decreases in the industrial minerals sector were reported mainly for barite (88%), ruby (44%), spinel (42%), sapphire (33%), and rock salt (31%). Other mineral production decreases were reported for manganese (71%), petroleum refinery products (22%), tin-tungsten concentrate (21%), and crude petroleum (19%). Mineral production decreases, mainly in the industrial minerals sector, could be attributed to the aftermath of Cyclone Komen where floods and landslides affected the infrastructure of the mining areas (table 1).

Structure of the Mineral Industry

The mineral sector in Burma included mining and mineral processing industries, which are mainly Government owned, although the surge in FDI had increased foreign investors' participation in the country's mineral industry. According to the Ministry of Mines, in 2014, the country hosted three types of mining permits—exploration, large scale, and small scale, of which 485 were active exploration licenses, 132 were for

large-scale mining, and 1,089 were for small-scale mining (Aung, 2014). Table 2 is a list of Burma's major mineral industry facilities.

Commodity Review

Metals

Copper.—In 2015, Myanmar Wanbao Mining Copper Ltd. (MWMCL) was developing the Letpadaung deposit, which is located in Letpadaung, Sagaing Division. The Letpadaung deposit is part of the Monywa copper project, which also includes the Kyisintaung and the Sabetaung copper deposits. In 2015, MWMCL continued the construction of the Letpadaung Mine, which was expected to be commissioned by the end of 2015. The project had a projected annual production of about 140,000 metric tons (t) of copper. In July 2013, the production-sharing contract for the Monywa copper project was amended as follows: Mining Enterprise No. 1 (ME1), which was a Government subsidiary under the Ministry of Mines, owned a 51% stake, and the remaining 49% was held by MWMCL and business partner Myanmar Economic Holdings Ltd. (MEHL) (Myanmar Wanbao Mining Copper Ltd., 2016).

Iron and Steel.—In March 2015, Millcon Plc. of Thailand announced that it had received a license from the Government of Burma for the construction of a steel factory with the capacity to produce 90,000 metric tons per year (t/yr) of steel. A joint venture between Millcon (45%), General Engineering Plc. Co. Ltd. of Thailand (45%), and Thiha Co. of Burma (10%) was formed for the construction of the facility to be located in the Thilawa Industrial Estate special economic zone. Construction of the project, which had an estimated cost of $15 million, was expected to be completed at the end of 2015 and to be commissioned by early 2016 (DealStreetAsia.com, 2015; Tephaval, 2015).

Nickel.—In September 2015, the Government of Burma imposed a temporary ban on ferronickel exports while the Government renegotiated the distribution of profits from ferronickel sales. The Government was in talks with the Dagongshan ferronickel smelter's administration, which was made up of China-owned companies China Nonferrous Metal Mining (Group) Co. Ltd. (CNMC) and Taiyuan Iron & Steel (Group) Co. Ltd. As a result of low nickel prices, Burma was seeking higher proceeds from the sale of ferronickel. From January to September, the country exported about 15,621 t of ferronickel to China. The ferronickel plant, which was located in Thabeikying, Mandalay Division, had a production capacity of 85,000 t/yr and was operated by CNMC under a production-sharing contract with state-owned Mining Enterprise No. 3 (MetalBulletin Daily, 2015).

Industrial Minerals

Cement.—In 2015, Siam Cement Group (SCG) of Thailand was building a cement plant in Mawlamyine city in Mon State. The new plant would have a design capacity of 1.8 million metric tons per year (Mt/yr) of cement. SCG was expecting the plant to be commissioned in 2016. In September 2015, local cement producer Arr Thit Man announced plans to increase the production capacity of its cement plant located in Kyaukse, Mandalay Division. The company planned to double the cement production capacity to 3.65 Mt/yr from 1.825 Mt/yr. The project was expected to be commissioned in 2016 (Global Cement, 2015a, b).

Mineral Fuels

Petroleum and Natural Gas.—In 2015, exports of natural gas, in terms of value, remained about the same as in the previous year and accounted for about 39% of Burma's total exports. In 2015, the production of natural gas increased by 4% compared with that of 2014; production in 2014 had increased by 35% (revised) compared with that of 2013. The modest increase in 2015 could be attributable in part to the continued production at the Shwe natural gas project and the Zawtika natural gas project as they moved toward reaching their respective design capacities, although the slowdown in production could also be attributed to the drop in daily production rates at the Yetagun gasfield. According to a sales agreement with PTT Exploration and Production Public Co. Ltd. (PTTEP) of Thailand (19.32%), the Yetagun gasfield was to supply 11 million cubic meters per day of natural gas (reported as 400 million cubic feet per day), but owing to declines in the production rate since 2014, the supply averaged about 10 million cubic meters per day (reported as 360 million cubic feet per day). The Yetagun gasfield, which started production in 2000, was built at an estimated cost of $700 million and had a mine life of 30 years. As of 2015, Yetagun had 14 wells in operation, and it was estimated that 60% of the reserves had already been withdrawn. During 2015, the operator of the Yetagun gasfield, Petronas Carigali Myanmar Inc. of Malaysia (40.91%), was planning to reassess the gas reserves in order to renegotiate the sales agreement (table 1; Shin, 2015).

The Shwe project consisted of the Shwe, the Shwe Phyu, and the Mya offshore gasfields, which are located in Block A1 and Block A3 off the coast of Rakhine State in the Bay of Bengal. Commercial gas production from the Mya field started in August 2013 and was followed by the startup of production from the Shwe field in January 2014. The combined natural gas reserves of the three fields was estimated to be 128 billion cubic meters (Offshore Technology, undated a).

The Shwe gasfield exclusively supplied natural gas to China National Petroleum Corp. (CNPC). The natural gas supply fed a 900-kilometer twin oil and gas pipeline that ran from Kyaukphyu in Rakhine State, Burma, to the town of Ruili in Yunnan Province, China. The pipeline had a transmission capacity of 12 billion cubic meters per year of gas, but in 2014, it transmitted only about 3 billion cubic meters of gas into China. The oil portion of the pipeline has also been underused owing mainly to delays in the construction of a new refinery, which was pushed to be finalized by the end of 2016. The refinery, which would have a refining capacity of 200,000 barrels per day, was to be located in Kunming, Yunnan Province, China, and was to be fed with crude petroleum coming from Burma through the Shwe pipeline (Brown, 2015).

The Zawtika natural gas project included the Gawthaka, the Kakonna, and the Zawtika offshore gasfields, which are located

in Block M9 and Block M11 in the Gulf of Martaban. The project, which was developed at a cost of $2 billion, started gas production in March 2014; by August of the same year, it started exporting gas to Thailand at a rate of 6.8 million cubic meters per day (reported as 240 million cubic feet per day). The combined natural gas reserves for the Zawtika project were estimated to be 57 billion cubic meters (Offshore Technology, undated b).

Burma's main offshore gasfields were Shwe, Yadana, Yetagun, and Zawtika, from which about 57 million cubic meters of gas (reported as 2 billion cubic feet) were produced daily. From the country's gasfield production, about 37 million cubic meters (reported as 1.3 billion cubic feet) was exported to Thailand, about 13.2 million cubic meters (reported as 465 million cubic feet) was exported to China, and the remainder was used to satisfy domestic demand. Burma's onshore gasfields produced about 1.6 million cubic meters of gas (reported as 55 million cubic feet) daily (Shin, 2015).

In 2013 and 2014, the Government awarded 16 onshore and 20 offshore oil and gas exploration blocks in the Bay of Bengal, the Gulf of Martaban, and the Rakhine basin. Exploration and drilling activities at the concessions were projected to start in 2016 (Nyein, 2015).

In late 2015, Woodside Petroleum Ltd. Co. of Australia discovered gas at the Shwe Yee Htun-1 exploration well in Block A–6, which is located in the Rakhine basin. The company announced that further analysis would be conducted in the near future, although no other details were released. Woodside also held permits in the following blocks—A–4, A–6, A–7, AD–2, AD–5, and AD–7 (Rigzone News, 2016).

Outlook

In 2015, Burma was challenged by widespread flooding and landslides brought on by Cyclone Komen that severely affected the infrastructure in many parts of the country as well as the economy. In the near future, recovery expenses are expected to be prominent part of Burma's national budget as the country invests in the reconstruction of infrastructure.

Production of industrial minerals is expected to increase in the near future as new developments and expansion projects progress and start to be commissioned, such as construction of the SCG plant in Mon State and the expansion at Arr Thit Man's Kyaukse plant, both of which were expected to be commissioned in 2016. The demand for cement will likely be directly influenced by the Government's infrastructure plans in the aftermath of Cyclone Komen.

According to company reports, the Millcon steel factory is expected to come online in 2016. Also in 2016, it is expected that the Dagongshan smelter and the Government will reach an agreement to lift the temporary ban on the exports of ferronickel to China. It is likely that natural gas production will remain stable as the Shwe and Zawtika projects reach their designed production capacities.

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TABLE 1
BURMA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2011 [e]	2012	2013	2014	2015
METALS						
Antimony, mine output, Sb content[3]		5,600	5,900	7,200	3,300	3,000
Copper:						
Mine output, Cu content		9,000	19,000 [e]	25,000	33,200	46,900
Metal, refined		9,000	19,000 [e]	25,000	33,200	46,900
Gold, refined[4]	kilograms	NA	787	893	1,315 [r]	1,692
Lead, mine output, Pb content[5]		8,700 [6]	9,800	11,700	18,000	18,000
Manganese:						
Gross weight		586,000	286,300	393,800	241,800	70,200
Mn content		234,400 [6]	114,500	157,500 [r]	96,700	28,100
Nickel, mine output, Ni content[e]		800	5,000	9,000	21,000	26,400
Ferronickel:[7]						
Gross weight		NA	--	4,800	59,000	60,000
Ni content		NA	--	1,200	15,300	15,600
Tin, mine output of ores and concentrates[8]		2,200	2,100	9,000	35,000	57,300
Tungsten, mine output, W content:						
Of tungsten concentrate		-- [6]	1	--	3	5
Of tin-tungsten concentrate[8]		140	130	140	108 [r]	85
Total		140	131	140	111 [r]	90
Zinc, mine output, Zn content[5]		9,300 [6]	10,000	4,800	6,100	6,100
INDUSTRIAL MINERALS						
Barite		30,000	21,539 [3]	31,295 [3]	23,060	2,836
Clay, bentonite		NA	--	1,552	NA	700
Cement, hydraulic		538,000	922,074 [4]	1,120,783 [4]	1,317,163 [4]	1,399,072
Gypsum		50,000	38,579	60,510 [4]	104,994	99,860
Gemstones, precious and semiprecious:						
Jade	kilograms	45,000,000	19,080,442 [4]	15,061,927 [4]	16,684,386	37,615,566
Ruby	do.	870,000	852,033 [4]	443,510 [4]	496,945 [r, 4]	280,298
Sapphire	do.	1,500,000	1,351,916 [4]	1,142,291 [4]	1,214,687	819,865
Spinel	do.	620,000	514,052 [4]	466,138 [4]	525,594	306,192
Salt:						
Brine		100,000	NA	NA	NA	NA
Crude, rock salt[4]		NA	207,261	169,109	187,616	129,478
Stone:						
Dolomite		2,000	170 [4]	400 [4]	2,200	2,200
Limestone, crushed and broken[e]	thousand metric tons	3,200	5,500	6,700	7,900	8,400
MINERAL FUELS AND RELATED MATERIALS						
Coal, lignite		300,000	471,022 [4]	380,272 [4]	386,732	419,862
Natural gas, marketed	million cubic meters	12,500	13,225 [4]	13,657 [4]	18,499 [r]	19,212
Petroleum:						
Crude	thousand 42-gallon barrels	6,400	6,197 [4]	6,115 [4]	5,851	4,766
Refinery products[9]	do.	5,000	4,029 [4]	3,054 [4]	3,090	2,403

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. NA Not available. -- Zero.

[1]Table includes data available through November 18, 2016.

[2]In addition to the commodities listed, copper matte, construction aggregates, diamond, feldspar, iron and steel, lead (antimonial and refined), nitrogen

[3]Data estimated from the United Nations Comtrade database for antimony ore and concentrate imported from Burma by China, India, Singapore, and Thailand.

[4]Data are for fiscal year ending March 31 of the following year.

[5]Data are for the production by the state-owned mining enterprises under the Ministry of Mines.

[6]Reported figure.

[7]Data estimated from the United Nations Comtrade database for ferronickel imported from Burma by China and the Netherlands.

[8]Data estimated from the United Nations Comtrade database for tin ore and concentrate imported from Burma by China, Malaysia, and Thailand.

[9]Includes diesel, distillate fuel oil, gasoline, jet fuel, kerosene, and residual fuel oil.

TABLE 2
BURMA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Cement		AAA Cement International Co. Ltd.	Cement plant in Kyaukse, Mandalay Region	180,000.
Do.		Arr Thit Man	Arr Thit Man cement plant, Kyaukse, Mandalay Division	1,825,000.
Do.		Dragon Cement Co., Ltd.	Cement plant in Pinlaung, Shan State	180,000.
Do.		Mandalay Cement Industries Co. Ltd.	Cement plant in Kyaukse, Mandalay Region	135,000.
Do.		Max Cement (subsidiary of Max Myanmar Holding Co. Ltd.)	Cement plant in Aung Nan Cho Village, Lewe, Naypyidaw Township, Mandalay Region	150,000.
Do.		Myanma Ceramic Industries	Cement plant in Kyangin, Ayeyarwady Region	363,000.
Do.		do.	Cement plant in Kyaukse, Mandalay Region	120,000.
Do.		do.	Cement plant in Thayet, Magway Region	170,000.
Do.		Myanmar Conch Cement Co. Ltd. (joint-venture between Myint Investment Group Co. Ltd. and Anhui Conch Cement)	No. 33 Kyaukse cement plant located in Kyaukse, Mandalay division	110,000.
Do.		Myanmar Economic Corp. Myaing Galay 1	Cement plant in Hpa An, Kayin State	240,000.
Do.		Myanmar Economic Corp. Myaing Galay 2	do.	1,200,000.
Do.		Naypyidaw Development Committee	Cement plant in Naypyidaw Township, Mandalay Region	150,000.
Do.		Tiger Head Cement (Myanmar)	Cement plant in Kyaukse, Mandalay Region	90,000.
Do.		Tun Thwin Mining Co. Ltd.	Kalay Cement Plant in Indinggyl Village, Kalay Township, Sagaing Division	NA.
Do.		Union of Myanmar Economic Holdings Ltd. Sin Min 1	Cement plant in Kyaukse, Mandalay Region	330,000.
Do.		Union of Myanmar Economic Holdings Ltd. Sin Min 2	do.	NA.
Do.		Yangon City Development Committee	Myodaw cement plant in Thazi, Mandalay Region	150,000.
Coal		Tun Thwin Mining Co. Ltd. and Mining Enterprise No. 3 (ME–3)	Paluzawa coal mine located in Kalewa area in Sagaing Division, near Kalewa in Sagaing Region.	100,000.
Copper		No. 1 Mining Enterprise (51%), and [Myanmar Yang Tse Copper Ltd. (Wanbao Mining Ltd.) and Union of Myanmar Economic Holding Ltd.] (49%)	Monywa copper project, S&K Mine, and Monywa solvent extraction electrowinning plant in Monywa region	40,000.
Fertilizer, urea		Myanma Petrochemical Enterprise (Government, 100%)	No. 1 fertilizer plant at Sale, 190 kilometers southwest of Mandalay Region	169,725.
Do.		do.	No. 2 fertilizer plant at Kyun Chaung, Magway Division	75,600.
Do.		do.	No. 3 fertilizer plant at Kyawzwa, Magway Division	219,000.
Do.		do.	No. 4 fertilizer plant at Myaungdaga	182,500.
Do.		do.	No. 5 fertilizer plant at Kangyidauk Township	182,500.
Gold	kilograms	National Prosperity Gold Production Group	Modi Momi Mine within the Modi Taung (Block 10), located about 385 km north of Yangon	1,400.

See footnotes at end of table.

TABLE 2—Continued
BURMA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity[e]
Natural gas	million cubic meters	Total E&P Myanmar, 31.2%; Chevron Corp., 28.26%; PTT Exploration and Production Public Co. Ltd. (PTTEP), 25.5%; Myanma Oil and Gas Enterprise (MOGE), 15%	Yadana gasfield in Moattama, Gulf of Martaban	8,600.
Do.	do.	Petronas Carigali Myanmar Inc., 40.91%; Myanma Oil and Gas Enterprise (MOGE), 20.45%; PTT Exploration and Production Public Co. Ltd. (PTTEP), 19.32%; Nippon Oil Exploration (Myanmar) Ltd., 19.32%	Yetagun gasfield in Tanintharyi, Gulf of Martaban	4,600.
Do.	do.	Myanmar Petroleum Resources Ltd. and Myanma Oil and Gas Enterprise (MOGE)	Mann oilfield, south of Yangon, Yangon Region	40.
Do.	do.	Daewoo International, 51%; Oil and Natural Gas Corp. (ONGC) Videsh Ltd. of India, 17%; Myanma Oil and Gas Enterprise (MOGE), 15%; Gas Authority of India (GAIL) Ltd. of India, 8.5%; Korea Gas Corp. (KOGAS), 8.5%	Shwe gasfield off of Rakhine State coast	4,125.
Do.	do.	Petroleum Authority of Thailand Exploration and Production International (PTTEP International), 80%, and Myanma Oil and Gas Enterprise (MOGE), 20%	Zawtika Natural Gas Project (Gawthaka, Kakonna, and Zawtika offshore gasfields) in the Gulf of Martaban	3,100.
Nickel		China Nonferrous Metal Mining (Group) Co. Ltd. and Taiyuan Iron & Steel (Group) Co. Ltd.	Tagaung Taung (Dagongshan) nickel ore project (mine and smelter) at Thabeikying, Mandalay Division	25,000 (nickel) 85,000 (ferronickel).
Petroleum:				
Crude	thousand 42-gallon barrels	Myanmar Petroleum Resources Ltd. and Myanma Oil and Gas Enterprise (MOGE)	Mann oilfield, south of Yangon, Yangon Region	880.
Refined	do.	Myanma Petrochemical Enterprise (Government, 100%)	No. 1 refinery at Thanlyin (near Yangon)	7,300.
Do.	do.	do.	No. 2 refinery at Chauk, Magway Division	2,190.
Do.	do.	do.	No. 3 refinery at Thanbayakan	9,100.
Steel		Myanmar Posco Steel Co. Ltd. (POSCO, 70%, and Government, 20%)	POSCO steel plant in Mingalardon Township, Yangon Region	30,000.
Tin, ore and concentrate		No. 2 Mining Enterprise	NA	NA.
Do.		Government	Man Maw tin mine, Wa State	33,000.
Tungsten, ore and concentrate		No. 2 Mining Enterprise	NA	NA.
Zinc		No. 1 Mining Enterprise and Win Myint Mo Industrial Co. Ltd.	Namtu-Bawdwin lead-zinc mine in Namtu Township, Kyaukme District, Northern Shan State	NA.

[e]Estimated. Do., do. Ditto. NA Not available.