



2017–2018 Minerals Yearbook

MALAYSIA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF MALAYSIA

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Note: In this chapter, information for 2017 is followed by information for 2018.

Malaysia's mineral industry produced primarily metallic ores and concentrates, and crude petroleum and natural gas in 2017. The country also produced a significant amount of refined tin, from both domestically produced and imported tin concentrates, and rare-earth-oxide compounds from imported rare-earth mineral concentrates. Although Malaysia was the 3d-ranked global producer of bauxite in 2015, it was the 10th-ranked producer in 2017 (not including United States production), following the Government's prohibition on bauxite mining in 2016. Malaysia was the 11th-ranked global producer of mined tin and was estimated to rank 7th in tin ore reserves, accounting for 5% of global reserves. The country also was the third-ranked producer of refined tin, the eighth-ranked producer of mined rare earths, and the ninth-ranked producer of manganese ore (Thomson Reuters, 2016; Bray, 2017, 2019; Anderson, 2018, 2019; CRU Tin Monitor, 2018, p. 12; Corathers, 2019; Gambogi, 2019).

Malaysia's real gross domestic product (GDP) increased by 5.9% in 2017 compared with an increase of 4.2% in 2016. This increase in growth was driven by the increased value of the country's exports, particularly semiconductors. In 2017, Malaysia was the seventh-ranked global exporter of semiconductors. The increases in global commodity prices also contributed to Malaysia's increased export value, including the prices of crude petroleum, liquefied natural gas (LNG), and iron and steel products (Bank Negara Malaysia, 2018, p. 3, 16, 18).

Minerals in the National Economy

The mineral industry accounted for 8.4% of Malaysia's GDP in 2017, and the production value of mineral commodities increased by 1.1% in 2017 compared with an increase of 2.2% in 2016. The decrease in the rate of growth was largely due to Petrolia Nasional Bhd. (PETRONAS) (Malaysia's state-owned petroleum company) voluntarily decreasing petroleum production during the year to be aligned with an Organization of the Petroleum Exporting Countries (OPEC) agreement to reduce global petroleum production in 2017. In 2017, 99,000 people were employed by the mining and quarrying sector compared with 96,000 in 2016 (Reuters Africa, 2016; Bank Negara Malaysia, 2018, p. 18, 25, P5).

Government Policies and Programs

Malaysia's mineral industry is governed by the Mineral Development Act 1994 and the State Mineral Enactment. The Mineral Development Act 1994 defines the powers of the Federal Government to regulate and inspect mineral exploration, mining, and related activities. The State Mineral Enactment gives the States the power to issue mineral prospecting and exploration licenses and mining leases. Mine and quarry operators are required to pay value-based royalties to the State

in which their operation is located. Royalty rates depend on the mineral commodity and the assessment of each of the individual States. The petroleum industry is governed by the Petroleum Development Act 1974, which established PETRONAS. The act grants exclusive rights in the ownership, exploration, and extraction of petroleum, both onshore and offshore, in Malaysia to PETRONAS. The Environmental Quality Order 1987 governs environmental aspects of the mineral industry. Under the order, all mining leases larger than 250 hectares require an environmental protection plan that must be approved by the Department of the Environment (Malaysian Chamber of Mines, 2018a, b).

On January 1, 2017, two amendments to the Mineral Development Act 1994 came into effect. The Mineral Development (Licensing) Regulations 2016 established regulations that require a license to possess, purchase, sell, store, or transport any mineral ores, as well as carry out any mineral processing activities. These regulations require a mineral storage license holder to comply with an approved mineral storage plan and a mineral-processing license holder to comply with an approved mineral-processing scheme. The Mineral Development (Effluent) Regulations 2016 set parameters for the concentration of contaminants in effluent from onshore mineral exploration and mining activities. Exceeding these parameters is punishable by fine not to exceed \$24,700, imprisonment not to exceed 5 years, or both (Attorney General's Chambers of Malaysia, 2016a, 9–14; 2016b, p. 22–26).

Following the rapid expansion of bauxite mining in 2014 and 2015 and resultant environmental damage and water contamination, the Government passed a 3-month prohibition on bauxite mining in January 2016. The prohibition was extended multiple times through all of 2016 and 2017. The export of bauxite remained legal throughout the prohibition in an effort to clear bauxite that had been stockpiled at ports. In December, the Government announced that the prohibition would be extended an additional 6 months on January 1, 2018. The ban caused a dramatic decrease in bauxite production in 2016 and 2017; however, bauxite was still produced in the country owing to illegal mining activities (Thomson Reuters, 2016; Aluminium Insider, 2017; Bernama, 2017a; Chow, 2017a, b).

Production

In 2017, Malaysia's production of silicomanganese and ferromanganese increased substantially by 999% and 350%, respectively, owing to the commencement and production rampup of three ferroalloy plants in 2016 and 2017. Other significant increases in production included that of zirconium (gross weight of zircon), by 144%; iron ore (Fe content), 113%; manganese (mined, Mn content), 75%; ilmenite and leucosene, 47%; ferrosilicon and rutile, 38% each; silver (mined, Ag content), 31%; subbituminous coal, 27%;

rare-earth compounds, 24%; lignite, 18%; raw steel, 16%; petroleum refinery products, 14%; and aluminum metal (primary) and kaolin, 13% each. Notable decreases in production included that of monazite concentrate (both gross weight of monazite and xenotime minerals and rare-earth-oxide equivalent), by 84% each; bauxite, 33%; anthracite and niobium-tantalum (struverite concentrate), 21% each; cement, 16%; and direct-reduced iron (DRI), 13%. Data on mineral production are in table 1.

Structure of the Mineral Industry

Malaysia's mines, quarries, and metallic and industrial mineral-processing facilities were operated by private domestic companies and subsidiaries of international companies incorporated in Malaysia. The mining and quarrying sector was regulated by Malaysia's Ministry of Natural Resources and Environment. PETRONAS, together with its subsidiaries, operated as an integrated petroleum and gas company in Malaysia and internationally. PETRONAS engaged in the exploration, development, production (extraction, liquefaction, manufacturing, and refining), transportation, and sale (trading and marketing) of crude petroleum and natural gas products. It also owned and operated a network of retail gasoline and diesel stations. Table 2 is a list of major mineral industry facilities (Petroliam Nasional Bhd, 2018, p. 2, 4–5, 8–13).

Mineral Trade

In 2017, Malaysia's exports were valued at MYR935 billion¹ (\$231 billion), which was an increase of 18.9% compared with that of 2016. The export value of electrical and electronic products, which remained Malaysia's leading export category by value, accounted for 37% of the total value of exports, and increased by 19% in 2017. Exports of metallic ores and concentrates were valued at \$1.43 billion, which was an increase of 20% from their value in 2016. The country exported 23 million metric tons (Mt) of iron ore, which was the leading metallic ore exported, by value, and accounted for \$955 million of the total value of exports. Malaysia also exported 25,920 metric tons (t) of refined tin valued at \$549 million in 2017. Exports of industrial minerals were valued at \$175 million, a 16% increase compared with the value in 2016; refined petroleum exports were valued at \$17.8 billion, a 32% increase; LNG, \$10.0 billion, a 24% increase; and crude petroleum, \$6.9 billion, a 30% increase. Exports of coal (unspecified) totaled 1.02 Mt in 2017, which was an increase of 171%, and were valued at \$60 million, an increase of 277% (Malaysia External Trade Development Corp., 2018, p. 1, 17; Ministry of Natural Resource and Environment Malaysia, 2018, p. 8–9, 32, 51, 54, 114).

Singapore remained the leading destination of Malaysian exports, accounting for 14% of the total value of exports in 2017; China (excluding the Hong Kong Special Administrative Region of China), 13%; the United States, 9%; Japan, 8%; and Thailand, 5%. China received a substantial amount of Malaysia's mineral exports by volume, including monazite

and gold concentrates, 100% of each; bauxite, nearly 100%; ilmenite, 98%; iron ore and manganese ore, 90% each; coal, 60%; and kaolin, 41%. Singapore received nearly 100% of the sand and gravel exported by Malaysia as well as a substantial share of its crushed stone exports (70%) and silica sand exports (75%). The United States imported 26% of the volume of Malaysia's tin metal exports; India, 16%; Japan, 14%; and the Republic of Korea, 7% (Malaysia External Trade Development Corp., 2018, p. 1, 17; Ministry of Natural Resource and Environment Malaysia, 2018, p. 8, 16, 26, 32, 36, 41, 52, 56, 66, 103, 114).

Malaysia's imports were valued at about \$207 billion, which was an increase of 19.9% from the value in 2016. The import value of electrical and electronic products, which remained the country's leading import category, accounted for 30% of the value of total imports and increased by 20% in 2017 compared with that of 2016. Imports of metallic ores and concentrates were valued at \$1.91 billion, which was an increase of 34%. Malaysia imported 21.9 Mt of iron ore at a value of \$809 million, 1.0 Mt of manganese ore and concentrates at a value of \$258 million, and 35,234 t of tin ore and concentrates at a value of \$450 million. Imports of industrial minerals were valued at \$184 million, which was an increase of 3%. Malaysia imported 1.3 Mt of gypsum valued at \$32 million, 142,730 t of kaolin valued at \$28 million, and 131,225 t of phosphate valued at \$32 million. Imports of coal (unspecified) totaled 34.1 Mt in 2017, which was an increase of 41%, and were valued at \$2.7 billion, an increase of 82%. The value of the country's imports of refined petroleum products was \$18.7 billion, which was an increase of 44% (Malaysia External Trade Development Corp., 2018, p. 1, 20; Ministry of Natural Resource and Environment Malaysia, 2018, p. 8, 32, 36, 52, 88, 92, 100, 114).

In 2017, China remained Malaysia's leading source for imports, accounting for 20% of the total value of Malaysia's imports; Singapore, 11%; Japan and the United States, 8% each; and Taiwan, 7%. Brazil accounted for 96% of the volume of iron ore imported by Malaysia in 2017. South Africa accounted for 69% of the volume of manganese imports; China, 15%; Australia, 8%; and Gabon, 6%. Australia accounted for 26% of the volume of tin ore and concentrate imports; Nigeria, 25%; the Democratic Republic of the Congo [Congo (Kinshasa)], 13%; the Republic of the Congo [Congo (Brazzaville)], 12%; and Brazil, 11%. Thailand accounted for 94% of the volume of gypsum imports; Iran, 4%; and the United Arab Emirates, 2% (Malaysia External Trade Development Corp., 2018, p. 1, 20; Ministry of Natural Resource and Environment Malaysia, 2018, p. 8, 32, 36, 52, 88).

Commodity Review

Metals

Bauxite and Alumina.—Despite the prohibition on bauxite mining, an estimated 2.0 Mt of bauxite was produced in 2017 as a result of illegal mining. Bauxite was reported to be mined in the State of Pahang and stockpiled at the Port in Kuantan. Stockpiles at the port were estimated to be 2.95 Mt of bauxite at the end of 2016 and 2.15 Mt in March 2017. Stockpiles remained an immediate environmental concern, as rain during

¹Where necessary, values have been converted from Malaysia ringgit (MYR) to U.S. dollars (US\$) at an annual average exchange rate of MYR4.0440=US\$1.00 for 2017 and MYR4.1300=US\$1.00 for 2018.

the monsoon season could cause polluted runoff from the stockpiles and further contaminate nearby rivers (Thomson Reuters, 2016; Chow, 2017a, b).

The Malaysian Anti-Corruption Commission (MACC) investigated illegal bauxite mining through 2017 and, on August 12, announced that it would seize all bauxite stockpiled on private and public lands in Pahang. The MACC estimated that 10 Mt of bauxite was stockpiled at multiple locations throughout Pahang. On December 21, the MACC withdrew the seizure order following the Ministry of Natural Resource and Environment's announcement that it planned to introduce new mining legislation and extend the prohibition for an additional 6 months. The MACC stated that miners could apply for approval permits that would allow them to transport bauxite to the stockpiles in Kuantan for export legally (Bernama, 2017a, b; Reduan, 2017).

Ferroalloys.—The rapid expansion of ferromanganese and silicomanganese production in 2017 was due to the commencement and rampup of three ferroalloy plants between 2016 and 2017. All three plants were part of the Samalaju Industrial Park in Bintulu, Sarawak. Pertama Ferroalloys Sdn. Bhd. (Asia Minerals Ltd. of China, 60%; Nippon Denko Co., Ltd. of Japan, 25%; Carbon Capital Corp. Sdn. Bhd., 8%; Shinsho Corp. of Japan, 7%) began producing ferrosilicon in mid-2016 and silicomanganese in late 2016. Pertama reported that its plant reached commercial production in mid-2017. The plant's reported capacity was 120,000 metric tons per year (t/yr) of silicomanganese, 60,000 t/yr of ferrosilicon, and 50,000 t/yr of ferromanganese (both low and mid carbon) (Asia Minerals Ltd., 2016, p. 4, 10; Pertama Ferroalloys Sdn. Bhd., 2018).

Sakura Ferroalloys Sdn. Bhd. (Assmang Ltd. of South Africa, 54.36%; Sumito Corp. of Japan, 26.64%; China Steel Corp. of Taiwan, 19%) operated a two-furnace ferroalloy plant at the Samalaju Industrial Park. Sakura's first furnace began production in April 2016, and the second furnace began production in September 2016. The plant's reported capacity was 107,000 t/yr of ferromanganese and 67,000 t/yr of silicomanganese. The rampup of the plant continued in 2017, and the plant was expected to reach full capacity by the end of the year (Kilian, 2017; Sumitomo Corp., 2017; Sakura Ferroalloys Sdn. Bhd., 2018).

OM Materials (Sarawak) Sdn. Bhd. (OM Sarawak) (OM Holdings Ltd. of Singapore, 75% and Cahya Mata Sarawak Bhd., 25%) began producing silicomanganese in December 2016 and ferromanganese in January 2017 at its Samalaju Smelting Complex. OM Sarawak had been producing ferrosilicon since the complex was first commissioned in September 2014. The complex's reported capacity was 210,000 t/yr ferrosilicon and 300,000 t/yr of manganese alloys (ferromanganese and silicomanganese). In 2017, OM Sarawak operated 15 of its total of 16 furnaces (9 for ferrosilicon and 6 for manganese alloys) and produced 175,540 t of ferrosilicon and 173,911 t of manganese alloys. The final furnace was expected to be commissioned in mid-2018 (Roskill, 2017; OM Holdings Ltd., 2018, p. 11–12).

Rare Earths.—Lynas Malaysia Sdn. Bhd., which was a wholly owned subsidiary of Lynas Corp. Ltd. of Australia, owned and operated the Lynas Advanced Materials Plant (LAMP) located outside of Kuantan, Pahang; the plant

processed rare-earth concentrates produced at Lynas Corp.'s Mount Weld rare-earth operation in Western Australia, Australia. The LAMP produced 17,264 t of rare-earth-oxide (REO) compounds in 2017, which was an increase of 24% from production in 2016. This increase was a result of the completion of the fourth and final solvent extraction train in March 2016. Of the total REO compounds produced, about 31% were neodymium-praseodymium compounds (Lynas Corp. Ltd., 2017a, p. 5; 2017b, p. 5; 2018, p. 4).

Tin.—In 2017, there were a total of 18 tin mines operating in Malaysia and 16 mineral-processing plants, of which 14 were re-treatment plants for tin mine tailings (also known as amang). The State of Perak accounted for 82% of Malaysia's tin concentrate production; Pahang, 15%; Johor, nearly 3%; and Kedah, less than 1%. The re-treatment plants recovered monazite (rare-earth ore mineral), ilmenite and rutile (titanium ore minerals), struverite (tantalum-niobium ore mineral), and zircon as byproducts. Xenotime had been recovered in past years as well, although no xenotime production was reported in 2017 (Ministry of Natural Resource and Environment Malaysia, 2018, p. 42, 49, 54, 58).

The Malaysia Smelting Corp. Bhd. (MSC) operated its smelter at Butterworth, Penang, and was the sole producer of refined tin metal in the country. MSC continued to be the third leading supplier of refined tin in the world, despite operating its smelter at well below its capacity of 40,000 t/yr. MSC produced refined tin from both domestic and imported ore and concentrate. Through its subsidiary Rahman Hydraulic Tin Bhd., MSC operated Malaysia's leading tin mine in Klian Intan, Perak, which produced 2,226 t of tin concentrate (Sn content) in 2017 (Ministry of Natural Resource and Environment Malaysia, 2018, p. 54; Malaysia Smelting Corp. Bhd., 2018, p. 6, 24).

MINERAL INDUSTRY HIGHLIGHTS IN 2018

In 2018, Malaysia's real GDP increased by 4.7%. The output of the mining sector, which accounted for 7.9% of total real GDP, decreased by 1.5% owing to decreased natural gas production. Malaysia remained the 3d-ranked global producer of refined tin and the 11th-ranked producer of mined tin. Malaysia was the 9th-ranked global producer of manganese ore, the 10th-ranked producer of mined rare earths, and the 11th-ranked producer of bauxite (not including United States production) (Bank Negara Malaysia, 2019, p. 18, Annex P1; CRU Tin Monitor 2019, p. 15; Anderson, 2020; Bray, 2020; Corathers, 2020; Gambogi, 2020).

In 2018, significant increases in production included that of anthracite, by 58%; ilmenite and leucoxene, 41%; DRI, 32%; ferrosilicon, 26%; silicomanganese, 23%; silver (mined, Ag content), 21%; gold (mined, Au content), 19%; ferromanganese, 18%; rutile, 14%; and tin (mined, Sn content), 10%. Notable decreases in production included that of bauxite, by 75%; rare-earth mineral concentrate (rare-earth oxide equivalent), 67%; zirconium (gross weight of zircon), 37%; manganese (mined, Mn content), 18%; iron ore (Fe content), 15%; and LNG, 11% (table 1).

During the year, Malaysia's total exports were valued at \$242 billion, which was a 6.7% increase compared with the

value of exports in 2017. Mining goods exports were valued at \$21.2 billion, which accounted for 8.8% of total exports and was a 7.1% increase compared with those of 2017. The value of LNG exports decreased by 3.1% and accounted for 46% of the value of mining goods exports. This decrease was due to the shutdown of the natural gas pipeline between the Sabah Oil and Gas Terminal and Petronas LNG Complex following a gas leak in January. The pipeline was reported to be repaired by August. Higher petroleum prices led to a 29% increase in the value of crude petroleum exports. Crude petroleum accounted for 42% of the value of mining goods exports. The value of petroleum products exports increased by 6.4% to \$18.5 billion and accounted for 9% of manufactured goods exports (Jaganathan, 2018; Malaysia External Trade Development Corp., 2019, p. 7–8, 12).

The 2016 ban on bauxite mining was extended multiple times in 2018 and was set to expire at the end of December 2018. In March, the Ministry of Water, Land and Natural Resources estimated that 10 Mt of bauxite remained stockpiled in Pahang. China imported about 555,000 t of bauxite from Malaysia in 2018 (Chow, 2018; Reuters Staff, 2018; Alumina & Aluminum Monthly, 2019, p. 14).

In June, OM Sarawak commissioned the 16th furnace at its Samalaju Smelting Complex. This furnace was designed to produce ferrosilicon. The complex produced 242,341 t of ferromanganese and 220,515 t of ferrosilicon in 2018. OM Sarawak began several improvement projects to the complex in the fourth quarter of 2018, including a new sintering plant. Pertama Ferroalloys continued the rampup of its ferromanganese smelter and reached full capacity of 22,000 metric tons of ferroalloys per month in October 2018 (Wong, 2018; OM Holdings Ltd., 2019, p. 10, 12).

In 2018, Lynas produced 18,556 t of REO compounds at the LAMP, which was an increase of 7.5% from production in 2017. This increase was due to the rampup in the September quarter of the eighth solvent-extraction train. In October, the Government appointed a committee to review Lynas' disposal of the waste produced at the LAMP. The LAMP produced two forms of waste: water leach purification residue (WLP), which was radioactive, and neutralization underflow residue (NUF), which was nonradioactive. The committee released its report on December 4, which found the LAMP operated in compliance with all regulations. The report recommended that Lynas immediately identify a permanent disposal facility location for the WLP and begin construction. The report stated that if a suitable location could not be found, the company should prepare to export all WLP produced since operations began in 2012. On December 4, Malaysia's Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) imposed a new condition on Lynas' storage license renewals, which were set to expire in March and September 2019. According to the new condition, Lynas was required to export all WLP by September 2, 2019 (Lynas Advanced Materials Plant Operations Evaluation Executive Assessment Committee, 2018, p. 91–95; Lynas Corp. Ltd., 2019, p. 3–4, 6–7).

Outlook

Malaysia's GDP is expected to grow by between 4.3% and 4.8% in 2019, and the mining and quarrying sector is forecast

to grow by 0.8% owing to an anticipated increase in natural gas production. The prohibition on bauxite mining is expected to be extended into 2019 as bauxite stockpiles remain an environmental issue. Production of rare-earth compounds is expected to continue to increase as Lynas invests in improving the LAMP; however, the company faces legal issues with disposal of the LAMP's waste products. The condition set by the MESTECC led to uncertainty as to whether the LAMP will be able to operate legally after the September 2019 deadline. The continued rampup of the ferroalloy plants is expected to make Malaysia a regionally significant producer of ferromanganese, ferrosilicon, and silicomanganese in the next few years (Bank Negara Malaysia, 2019, p. 83–84, 86; Lynas Corp. Ltd., 2019, p. 10).

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TABLE 1
MALAYSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²		2014	2015	2016	2017	2018
METALS						
Aluminum:						
Bauxite		3,665,000	35,000,000 ^c	3,000,000 ^{r,c}	2,000,000 ^c	500,000 ^c
Aluminum, refinery, primary ^c		400,000	400,000	620,000	700,000	750,000
Ferrous alloys:						
Ferromanganese		--	--	58,801	264,555	312,420
Ferrosilicon		8,641	104,554 ^r	126,261	174,540	220,515
Silicomanganese		--	--	20,975	230,535	283,414
Gold, mine, Au content	kilograms	4,308	4,732	2,249 ^r	2,124	2,520
Iron ore, mine:						
Gross weight	do.	9,615	1,625	1,914 ^r	3,920	3,354
Fe content	do.	6,010 ^r	1,020 ^r	1,150 ^r	2,450	2,090
Iron and steel:						
Direct-reduced iron	thousand metric tons	1,007 ^r	957 ^r	656 ^r	570	750
Raw steel	do.	4,316	3,784	2,764	3,215	3,200
Manganese, mine:						
Gross weight		835,429	501,827 ^r	700,717 ^r	1,226,106	1,000,000 ^c
Mn content ^c		326,000	196,000 ^r	273,000 ^r	478,000	390,000 ^c
Niobium and tantalum, mine, struverite concentrate ^c		255	86	77	61	60
Rare earths:						
Mineral concentrates, monazite and xenotime						
Gross weight		455	565	1,880	306	300 ^c
Rare-earth-oxide equivalent		240	310	1,100 ^r	180 ^c	60 ^c
Compounds, rare-earth-oxide equivalent		7,191 ^r	10,916 ^r	13,872 ^r	17,264	18,556
Silver, mine, Ag content	kilograms	533	945	1,075	1,404	1,700
Tin:						
Mine, Sn content		3,777	4,125	4,158 ^r	3,894	4,300
Smelter, primary		34,971 ^r	30,209 ^r	26,758 ^r	27,200	27,197
Titanium, mineral concentrate:						
Ilmenite and leucocene		8,159	5,814	4,316	6,363	9,000 ^c
Rutile		3,069	198	3,810	5,266	6,000 ^c
Zirconium, zircon		677	826	653	1,595	1,000 ^c
INDUSTRIAL MINERALS						
Barite		14,456	--	--	--	--
Cement, hydraulic	thousand metric tons	24,280	24,710	22,330	18,800	20,000 ^c
Clay:						
Kaolin		207,694	255,448	285,940 ^r	321,685	320,000 ^c
Unspecified	thousand metric tons	30,867	8,150	9,371	9,400 ^c	9,400 ^c
Feldspar		378,446	442,980	441,857 ^r	411,204	420,000 ^c
Lime ^c		1,400,000	1,500,000	1,600,000	1,600,000	1,600,000
Mica		5,659 ^r	4,788	4,716	4,787	5,000 ^c
Sand and gravel, industrial, unspecified		1,923	9,003	10,353	10,000 ^c	10,000 ^c
Stone, sand and gravel, construction:						
Sand and gravel, unspecified	thousand metric tons	29,862	40,578	46,665	47,000 ^c	47,000 ^c
Stone:						
Crushed, unspecified	do.	136,162 ^r	158,744 ^r	182,556	180,000 ^c	180,000 ^c
Dimension, limestone	do.	23,948 ^r	24,164 ^r	27,187	27,000 ^c	27,000 ^c
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	thousand metric tons	27	25	24	19	30
Lignite	do.	179	171	157	185	200
Subbituminous	do.	2,443	2,326	2,198	2,784	2,700
Liquefied natural gas	do.	26,057	25,154	25,273	27,082	24,090
Natural gas, marketable	million cubic meters	72,000 ^r	73,900 ^r	72,400 ^r	74,500	72,500

See footnotes at end of the table.

TABLE 1—Continued
MALAYSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2014	2015	2016	2017	2018	
MINERAL FUELS AND RELATED MATERIALS—Continued						
Petroleum:						
Crude, including condensate	thousand 42-gallon barrels	223,000 ^r	242,000 ^r	243,000 ^r	237,000	236,000
Refinery products	do.	187,000	172,000	181,000	206,000	218,000

^eEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through December 3, 2019. All data are reported unless otherwise noted. Estimated data are rounded to no more than three significant digits.

²In addition to the commodities listed, ammonia, fertilizers, lead (secondary), magnesium metal, and salt may have been produced, but available information was inadequate to make reliable estimates of output.

TABLE 2
MALAYSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum, metal, primary	Press Metal Sarawak Sdn. Bhd. (Press Metal Berhad, 80%, and Sumitomo Corp., 20%)	Mukah, Sarawak smelter	120.
Do.	do.	Two smelters in Similajau, Sarawak	640.
Bauxite	AA Sawit Sdn. Bhd.	Pengerang, Johor	150. ^e
Do.	Johor Mining & Stevedoring Sdn. Bhd.	Teluk Ramunia, Johor	150. ^e
Do.	Tropical City Sdn. Bhd.	Pengerang, Johor	150. ^e
Do.	Multiple small producers	Pahang	NA.
Cement	Cement Industries of Malaysia Bhd. (United Engineers Malaysia Bhd., 53.97%, and others, 46.03%)	Kangar, Perlis	2,000 cement; 1,650 clinker.
Do.	do.	Bahau, Negeri Sembilan	1,580 cement; 1,300 clinker.
Do.	CMS Cement Sdn. Bhd. (Cahaya Mata Sarawak Bhd.)	Bintulu, Sarawak	750 cement.
Do.	do.	Kuching, Sarawak	1,000 cement.
Do.	Lafarge Malaysia Cement Bhd. (LafargeHolcim Ltd.)	Pasir Gudang, Johor	1,190 cement.
Do.	do.	Rawang, Selangor, Langkawi, Kedah	6,810 cement; 4,900 clinker.
Do.	do.	Kanthan, Perak, Langkawi, Kedah	5,370 cement; 3,300 clinker.
Do.	do.	Pasir Gudang, Johor	770 cement.
Do.	Tasek Corp. Bhd.	Ipoh, Perak	2,300 cement; 2,300 clinker.
Do.	YTL Cement Berhad (YTL Group, 100%)	Bukit Sagu, Pahang	1,300 cement; 1,200 clinker.
Do.	do.	Padang Rengas, Perak	3,400 cement; 3,000 clinker.
Do.	do.	Pasir Gudang and Westport, Johor	1,000 cement.
Clay, kaolin	Kongsimaju Sdn. Bhd.	Bidor, Perak	NA.
Ferroalloys:			
Ferromanganese	OM Materials (Sarawak) Sdn. Bhd. (OM Holdings Ltd., 75%, and Cahya Mata Sarawak Bhd., 25%)	Samalaju Industrial Park, Bintulu, Sarawak	150.
Do.	Pertama Ferroalloys Sdn. Bhd. (Asia Minerals Ltd., 60%; Nippon Denok Co., Ltd., 25%; Carbon Capital Corp. Sdn. Bhd., 8%; Shinsho Corp., 7%)	do.	50.
Do.	Sakura Ferroalloys Sdn. Bhd. (Assmang Ltd., 54.36%; Sumito Corp., 26.64%; China Steel Corp., 19%)	do.	107.
Silicomanganese	OM Materials (Sarawak) Sdn. Bhd. (OM Holdings Ltd., 75%, and Cahya Mata Sarawak Bhd., 25%)	do.	150.
Do.	Pertama Ferroalloys Sdn. Bhd. (Asia Minerals Ltd., 60%; Nippon Denok Co., Ltd., 25%; Carbon Capital Corp. Sdn. Bhd., 8%; Shinsho Corp., 7%)	do.	120.
Do.	Sakura Ferroalloys Sdn. Bhd. (Assmang Ltd., 54.36%; Sumito Corp., 26.64%; China Steel Corp., 19%)	do.	67.
Ferrosilicon	OM Materials (Sarawak) Sdn. Bhd. (OM Holdings Ltd., 75%, and Cahya Mata Sarawak Bhd., 25%)	do.	210.
Do.	Pertama Ferroalloys Sdn. Bhd. (Asia Minerals Ltd., 60%; Nippon Denok Co., Ltd., 25%; Carbon Capital Corp. Sdn. Bhd., 8%; Shinsho Corp., 7%)	do.	60.

See footnotes at end of table.

TABLE 2—Continued
MALAYSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold:				
Mine output, Au content	kilograms	Monument Mining Ltd.	Bukit Selinsing Koyan, Pahang	2,000.
Do.	do.	PT J Resources Asia Pasifik Tbk (J&Partners, L.P., 100%)	Penjom, Pahang	2,500.
Do.	do.	Raub Australian Gold Mining Sdn. Bhd. (Peninsular Gold Ltd., 100%)	Raub, Pahang	700.
Refined	do.	Monument Mining Ltd.	Bukit Selinsing Koyan, Pahang	1,500.
Liquefied natural gas		Malaysia LNG Sdn. Bhd. [Petroleum Nasional Berhad (Petronas), 65%; Shell Gas N.V., 15%; Mitsubishi Corp., 15%; Sarawak State government, 5%]	Tanjung Kidurong, Bintulu, Sarawak	8,100.
Do.		Malaysia LNG Dua Sdn. Bhd. [Petroleum Nasional Berhad (Petronas), 60%; Shell Gas N.V., 15%; Mitsubishi Corp., 15%; Sarawak State government, 10%]	do.	7,800.
Do.		Malaysia LNG Tiga Sdn. Bhd. [Petroleum Nasional Berhad (Petronas) 60%; Shell Gas N.V., 15%; Nippon Oil LNG (Netherlands) BV, 10%; Sarawak State government, 10%; Diamond Gas Netherlands BV, 5%]	do.	6,800.
Natural gas	million cubic meters	ExxonMobil Exploration and Production Malaysia Inc.	Offshore Terengganu	16,400.
Do.	do.	Sabah Shell Petroleum Co. Ltd.	Offshore Sabah	1,100.
Do.	do.	Sarawak Shell Bhd.	Offshore Sarawak	29,200.
Iron ore		Bahatera Parmaslogam Rasharta (M) Sdn. Bhd.	Sokor, Kelantan	NA.
Do.		Berlian Impresif Sdn. Bhd.	Sungai Petani, Kedah	NA.
Do.		Bestagold Resources Sdn. Bhd.	Merbok, Kedah	NA.
Do.		Generasi Karisma Sdn. Bhd.	Maokil, Johor	NA.
Do.		Limemax Sdn. Bhd. (ZCM Minerals Sdn. Bhd., 100%)	Pelepah Kanan, Johor	NA.
Do.		LF Resources Corp. Sdn. Bhd.	Sungai Petani, Kedah	NA.
Do.		Permodalan Kedah Bhd.	Gurun, Kedah	NA.
Do.		SP Mega Mineral Sdn. Bhd.	Merbok, Kedah	NA.
Do.		SMGB Group Sdn. Bhd.	Galas, Kelantan	NA.
Do.		ZCM Resources Sdn. Bhd.	Jerantut, Pahang	NA.
Iron and steel:				
Direct-reduced iron		Lion DRI Sdn. Bhd. (The Lion Group, 100%)	Banting, Selangor	1,540.
Do.		Perwaja Steel Sdn. Bhd. (Kinsteel Bhd, 51%, and Maju Holdings Sdn. Bhd., 49%)	Kemaman, Terengganu	1,800.
Hot-briquetted iron		Amsteel Mills Sdn. Bhd. (The Lion Group, 100%)	Labuan Island, offshore Sabah	880.
Raw steel	do.	do.	Banting, Selangor	1,250.
Do.	do.	do.	Klang, Selangor	750.
Do.		Ann Joo Steel Bhd. (Ann Joo Group, 100%)	Prai, Penang	900.
Do.		Antara Steel Sdn. Bhd. (The Lion Group, 100%)	Pasir Gudang, Johor	600.
Do.		Kinsteel Sdn. Bhd.	Kuantan, Pahang	500.
Do.		Megasteel Sdn. Bhd. (The Lion Group, 100%)	Banting, Selangor	700.
Do.		Malaysia Steel Works Bhd.	Bukit Raja, Selangor	450.
Do.		Perwaja Steel Sdn. Bhd. (Kinsteel Bhd., 51%, and Maju Holdings Sdn. Bhd., 49%)	Kemaman, Terengganu	1,500.
Do.		Southern Steel Bhd. [Camerlin (a member of Hong Leong Group Malaysia), 40.75%; Natsteel Ltd., 27.03; others, 32.22%]	Prai, Penang	1,300.
Magnesium, metal		CVM Minerals Ltd.	Kamunting Raya, Perak	15.
Manganese, ore		Chini Highland Mining Sdn. Bhd.	Chini, Pahang	NA.
Do.		Pekan Mining Industries Sdn. Bhd.	do.	NA.
Mica		Tasik Mahir Sdn. Bhd.	Bidor, Perak	NA.
Do.		Techcera (M) Sdn. Bhd.	do.	NA.

See footnotes at end of table.

TABLE 2—Continued
MALAYSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Nitrogen, ammonia, N content		Asean Bintulu Fertilizer Sdn. Bhd. [Petroliam Nasional Berhad (Petronas), 63.5%; P.T. Pupuk Sriwidjaja Indonesia, 13%; Thai Ministry of Finance, 13%; Philippines National Development Co., 9.5%; Singapore Temasek Holdings Pte. Ltd., 1%]	Bintulu, Sarawak	395.
Do.		Petronas Fertilizer Kedah Sdn. Bhd. [Petroliam Nasional Berhad (Petronas), 100%]	Gurun, Kedah	378.
Do.		Petronas Ammonia Sdn. Bhd. [Petroliam Nasional Berhad, (Petronas), 100%]	Kerteh, Terengganu	370.
Petroleum:				
Crude	thousand 42-gallon barrels	ExxonMobil Exploration and Production Malaysia Inc.	Offshore Terengganu	140,000.
Do.	do.	Murphy Sarawak Oil Co. Ltd.	Offshore Sarawak	14,000.
Do.	do.	PETRONAS Carigali Sdn. Bhd.	Offshore Terengganu	8,000.
Do.	do.	Sabah Shell Petroleum Co. Ltd.	Offshore Sabah	22,000.
Do.	do.	Sarawak Shell Bhd.	Offshore Sarawak	55,000.
Refinery	do.	Malaysian Refining Co. Sdn. Bhd.	Melaka Refinery, Train 2	62,000.
Do.	do.	PETRONAS Penapisan (Melaka) Sdn. Bhd. (PP(M)SB)	Melaka Refinery, Train 1	36,000.
Do.	do.	PETRONAS Penapisan (Terengganu) Sdn. Bhd. (PP(T)SB)	Kerteh Refinery	17,000.
Rare-earth compounds, rare-earth-oxide equivalent		Lynas Malaysia Sdn. Bhd. (Lynas Corp. Ltd., 100%)	Kuantan, Pahang	22.
Tin:				
Concentrate, Sn content	metric tons	Delima Industries Sdn. Bhd.	Dengkil, Selangor	1,100.
Do.	do.	Maiju Sama Sdn. Bhd.	Puchong, Selangor	1,600.
Do.	do.	New Lahat Mines Sdn. Bhd.	Lahat, Perak	300.
Do.	do.	Omsam Telecommunication Sdn. Bhd.	Bakap and Batu Gajah, Perak	500.
Do.	do.	Rahman Hydraulic Tin Bhd. (Malaysia Smelting Corp. Bhd.)	Klian Intan, Perak	3,000.
Do.	do.	S.E.K. (M) Sdn. Bhd.	Kampar, Perak	400.
Do.	do.	Tasek Abadi Sdn. Bhd.	Senudong and Kampar, Perak	500.
Refined		Malaysia Smelting Corp. Bhd. (The Straits Trading Co. Ltd., 37.44%; Malaysia Mining Corp., 37.44%; others, 25.12%)	Butterworth, Penang	40.
Titanium dioxide		Tioxide Malaysia Sdn Bhd. (Huntsman Corp., 100%)	Kemaman, Terengganu	56.

^cEstimated. Do., do. Ditto. NA, not available.