



2011 Minerals Yearbook

MALAYSIA

THE MINERAL INDUSTRY OF MALAYSIA

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Malaysia's economy was dependent on exports of manufactured goods and on the service sector. The slow recovery in the world economy affected the Malaysian economy, which grew at a moderate pace in 2011. The country's gross domestic product (GDP) increased by 5.1% compared with an increase of 7.2% in 2010. Malaysia's economic growth was driven mainly by domestic demand (business and household spending). Private investment increased by 6.9% and accounted for the major share of the GDP growth. Private consumption strengthened, especially as a result of spending by civil servants, who received a 1-month bonus during the second half of the year. In rural areas, households benefited from higher rubber and palm oil prices. The manufacturing sector grew by only 4.5% as demand weakened for manufactured products in most of the industrialized countries in the Western Hemisphere. Electrical and electronic products were Malaysia's major export commodities; the volume of these exports decreased by 2.4%. Exports of chemical and petroleum products, on the other hand, increased by 7.4% in 2011. The output value of the mining and quarrying sector contracted by 5.7% as a result of the decrease in output of crude oil and condensates. Owing to Government-initiated fiscal stimulus projects in 2010, the output of the construction sector increased by 3.5% (Bank Negara Malaysia, 2012, p. 15–31).

Minerals in the National Economy

Malaysia had identified mineral resources of barite, bauxite, clays, coal, copper, gold, ilmenite, iron ore, monazite, natural gas, petroleum, silica, silver, struverite (tantalum), tin, and zircon. During the 20th century, mineral production played an important role in Malaysia's national economy; after many years of exploitation, however, such minerals as barite, bauxite, copper, ilmenite, iron ore, and tin were either depleted or the capacities to produce them had decreased significantly in recent years. In terms of its contribution to the country's economy, the mining and quarrying sector accounted for 6.3% of the GDP in 2011 compared with 8.8% in 2006. A total of 19,297 people were employed in the mining and quarrying sector in 2010 (the latest year for which data were available) (Department of Statistics, 2011; 2012a; 2012b, p. v).

Government Policies and Programs

In Malaysia, the mineral activities are governed by the Mineral Development Act 1994 and the State Mineral Enactment. The Mineral Development Act 1994 defines the power of the Federal Government to regulate mineral exploration, mining, and related activities, including the authority to conduct inspections. The State Mineral Enactment gives the States the power to issue mineral prospecting and exploration licenses and mining leases. Apart from paying a corporate tax to the Federal Government, 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 on the assessment of each of the individual States.

Low or zero import duties are applicable for most minerals. Import duties can be waived for certain mineral processing equipment. The Malaysian Investment Development Authority also provides incentives for certain minerals that are used for processing and manufacturing products.

Production

Malaysia produced bauxite, coal, feldspar, gold, ilmenite, iron ore, mica, natural gas, petroleum, struverite (tantalum), tin, and zircon. Malaysia had been one of the major tin-producing countries in the world; owing to depleted reserves and lower ore grades, however, tin concentrate production had decreased in recent years. The country depended on imported tin concentrates and crude tin mainly from Australia and Indonesia to meet its demand for feedstocks for its smelter and refinery. In 2011, production of such commodities as bauxite, coal, gold, ilmenite, iron ore, rutile, tin, and zirconium increased by more than 10% whereas production of barite, feldspar, kaolin, and manganese decreased by more than 10% (table 1).

Structure of the Mineral Industry

Malaysia's mineral industry consisted of a small mining sector of coal and ferrous and nonferrous metals. Metallic and nonmetallic mineral processing facilities were operated by private companies incorporated in Malaysia. Oil and gas exploration, production, and processing activities were owned and operated by Petroliaam Nasional Berhad (Petronas), which was a state-owned company, and by joint ventures of Petronas and foreign companies. Foreign investors were permitted to have 100% equity stake in companies operating in Malaysia or to form joint ventures with local companies (table 2).

Mineral Trade

The major export products were automotive parts, chemicals, electronics, and machinery. The volume of mineral commodity exports had declined in recent years. In 2011, the total trade increased to \$410.1 billion; of that amount, exports increased by 9.2% to \$225.1 billion and imports increased by 8.5% to \$185.0 billion. Electrical and electronic products continued to be Malaysia's leading export category and accounted for 34.1% of the total exports. The category palm oil and palm oil based products was the second leading export revenue category and accounted for 12.0%. The export share of liquefied natural gas (LNG) and petroleum products was 7.2% and 4.8%, respectively. Malaysia exported 24.8 million metric tons (Mt) of LNG, which was an increase of 8.2% from that of 2010. The country exported 12.5 Mt of crude oil, which had a total value of \$10.2 billion, or 4.0% of the total exports. Malaysia's

crude oil was exported to (in descending order of export value) China, Singapore, Japan, the European Union, the United States, Thailand, Hong Kong, India, the Republic of Korea, and Australia and accounted for 77% of the country's total exports in 2011. Malaysia's major import product category was machinery and transport equipment, which accounted for 44.6% of the total imports. China continued to be Malaysia's leading trading partner in 2011 (Department of Statistics, 2012a).

Commodity Review

Metals

Aluminum.—Malaysia did not have an aluminum refinery or smelter; most of its bauxite output, therefore, was exported to other Asian countries, and Malaysia imported unwrought aluminum to meet its demand. Press Metal Sarawak Sdn Bhd (a subsidiary of Press Metal Berhad) completed the construction of a 120,000-metric-ton-per-year (t/yr) aluminum smelter in Mukah in the State of Sarawak; the smelter was fully operational by yearend 2010. Press Metal had chosen the Aluminum Corp. of China Ltd. (Chalco) as its technical partner for the first phase of the \$300 million aluminum smelter project. Chalco's Guiyang Aluminum and Magnesium Research Institute installed the GY-200 aluminum smelting technology, which was equipped with 208 210-kiloampere prebaked cells. The company signed a memorandum of understanding with Sarawak Energy Berhad to supply 510 megawatts (MW) of electricity-generating capacity for the smelter by 2010. After the smelter was fully operational, the company started the construction of its second potline, which would double the smelter's output capacity. The second potline was scheduled to be completed in 2012 and would be fully operational in about 18 months. Sumitomo Corp. of Japan acquired a 20% share in the aluminum project and had sales rights to some of the output. Sumitomo would have the option to obtain an additional 5% interest in Press Metal Sarawak. Press Metal intended to add another potline to the smelter (China Metal Bulletin, 2012).

In 2008, the Government gave its approval for Sarawak Aluminium Co. (SALCO), which was a joint venture between Malaysian Cahya Mata Sarawak Berhad (CMS) and Rio Tinto Alcan (a subsidiary of Rio Tinto Ltd. of Australia), to build an aluminum smelter in Similajau, which is located about 60 kilometers (km) from the town of Bintulu in the State of Sarawak. The joint venture signed a memorandum of understanding with Sarawak Energy Bhd to supply power for the SALCO smelter. Rio Tinto Alcan was to install the Pechiney (AP) 37 aluminum smelting technology for the SALCO smelter. Aluminum output capacity was to be 720,000 t/yr, and the capacity would eventually be expanded to 1.5 million metric tons per year (Mt/yr). The company would process aluminum into products, such as cables and semimanufactured products, for the domestic and export markets. The total investment of the aluminum project was expected to be \$2 billion. The construction of the smelter was scheduled to begin in early 2009, and the smelter was expected to commence operations by the fourth quarter of 2010 and to reach full production in 2011. Raw material (alumina) would be imported from the Yarwun Alumina Refinery in Gladstone, Australia. In early 2012, CMS

and Rio Tinto agreed to terminate the development of the aluminum smelter in Sarawak because of an issue of power supply with Sarawak Energy (Sharidan, 2012).

Copper.—Without any refined copper production, Malaysia relied on imported copper to meet its demand. In 2010 (the latest year for which data were available), Malaysia imported 24,426 metric tons (t) of refined copper and copper alloys and 13,151 t of copper scrap and exported 16,569 t of refined copper and copper alloys and 37,336 t of copper scrap. In 2006, Malaco Mining Sdn Bhd explored for copper and gold in the State of Pahang. After 3 years of exploration, Malaco discovered a copper deposit at Sri Jaya, and the Mengapur Mine began production in 2009; however, no production was recorded in 2010 and 2011. Monument Mining Ltd. of Canada through its Malaysian subsidiary Monument Mengapur Sdn Bhd acquired a 70% interest in the Mengapur polymetallic mine. The Mengapur Mine is located 130 km from Monument's wholly owned Selinsing Gold Mine. Monument planned to invest a significant amount of capital to develop the open pit mine and processing facilities based on base- and precious-metals production. Normet Engineering Pty Ltd. completed a mineral resource study of the Mengapur deposit in 1990 and estimated that the deposit contained about 224 Mt of ore with average grades of 6.54% sulfur, 0.25% copper, 8.86 grams per metric ton (g/t) silver, and 0.16 g/t gold (Minerals and Geoscience Department, 2011, p. 18–22; Monument Mining Ltd., 2012).

Gold.—Approximately 16 gold mines were operating Malaysia; all were located in the States of Kelantan, Pahang, and (or) Terengganu. More than 90% of mined gold was from the State of Pahang, mainly the Penjom gold mine at Penjom, the Selinsing gold mine in Sg. Koyan, and Raub Australian Gold Mining Sdn Bhd's gold mine in Raub. The Penjom gold mine was owned by Specific Resources Malaysia Sdn. Bhd. (a wholly owned subsidiary of Avocet Mining plc of the United Kingdom). Specific Resources estimated that the mine's reserves would be depleted by 2018. Avocet Mining decided to concentrate its mining effort in the Africa region and sold its assets in Southeast Asia to J & Partners, L.P. (a private company registered in the Cayman Islands) for \$200 million. The transaction was completed in 2011 (Avocet Mining plc, 2011).

Raub Australian Gold Mining (which was a subsidiary of Peninsular Gold Ltd. of the United Kingdom) was continuing with its gold development project at Raub in the State of Pahang. The area around Raub had been the site of extensive gold mining in the past, and the company identified 6.3 t (202,000 troy ounces) of gold in 8.6 Mt of tailings. The company completed the construction of a 0.9-Mt/yr-capacity carbon-in-leach processing plant to recover gold from the tailings in 2011, and the total processing capacity increased to 2 Mt/yr. In 2011, the company recovered 446 kilograms (kg) (14,355 troy ounces), which was about 8% less than that of 2010 owing to a lower recovery rate and lower tonnage throughput. The reduced tonnage throughput was the result of shutdowns of the plant for major maintenance and preparation of a feeding modification of the new circuit. The company started the exploration of the Tersang area, which is located about 20 km north of Raub and could potentially have up to 31.2 t (1 million troy ounces) of gold resources (Peninsular Gold Ltd., 2011, 2012).

Singapore-listed CNMC Goldmine Holding Ltd. contracted China's Central South University to explore the Sokor area in the State of Kalantan in 2007 and started the construction of a gold mine to begin gold production in 2010. In 2011, the company produced 96 kg (3,097 troy ounces) of gold. The company announced that the Sokor operation area contained 15.6 t (503,000 troy ounces) of gold and identified four gold deposits within 10 square kilometers—Manson's Lode, New Discovery, Rixen, and Sg Ketubong. The four deposits contained a total measured, indicated, and inferred resource of 8.59 Mt at a grade of 1.7 g/t of gold (Asia Miner, 2012).

Iron and Steel.—Malaysian iron ore production was from small-scale mines located in the States of Johor, Pahang, Perak, and Terengganu. The low-grade iron ores were consumed by the pipe-coating industry that supplied cement plants and the oil and gas sector. The high-grade iron ore was exported to China. In 2010, Malaysia exported 2.8 Mt of iron ore to China and imported 2.5 Mt of high-grade iron ore from, in descending order of amount received, Brazil, Chile, and Bahrain. The State Government of Terengganu approved iron ore mining concessions for Eastern Steel Sdn Bhd and Perwaja Holdings Bhd in Bukit Besi. In Terengganu, geologists estimated that more than 50 Mt of iron ore resources was located in the Bukit Besi area and that the iron content was about 70%. Perwaja planned to invest about \$130 million to build a pelletizing plant in Kemaman, where its direct-reduced iron plant was located. Perwaja intended to mine 2 Mt/yr iron ore and to produce 1.2 Mt/yr of pellets during its first year operation; it planned to increase the pellet production to 2.4 Mt/yr in 2013. The company estimated that production costs were about \$50 per metric ton of pellet, which was lower than the \$90 to \$120 per metric ton cost of imported pellet (Southeast Asia Iron and Steel Institute, 2012b).

Malaysian steel producers planned to invest about \$1.5 billion to expand iron production to 3.2 Mt. The Malaysian Iron and Steel Federation (MISF) estimated that the country's steel consumption was about 8.2 Mt in 2011, which was same level as in 2010; however, crude steel production was about 5.9 Mt in 2011. The Malaysian Government awarded a contract to Boston Consulting Group (BCG) to undertake an in-depth study of the country's steel sector. BCG recommended that the Malaysian Government provide an effective mechanism for the local producers to be competitive on the global market. In Malaysia, raw materials accounted for about 65% to 70% of the production costs, and the country was not self-sufficient in raw material supplies for its iron and steel sector. The volatility in the prices of raw materials posed a great challenge to local downstream steel producers to compete in the global market. Since the implementation of the Association of Southeast Asian Nations-China Free Trade Agreement in 2010, a significant amount of steel products imports from China competed for market share with similar steel products produced locally. BCG recommended that the Malaysian steel producers upgrade their production technology and improve their operational efficiency (Southeast Asia Iron and Steel Institute, 2012a).

Eastern Steel Sdn Bhd [a joint venture among Hiap Tech Ventures Bhd, 55%; China Shougang International Trade and Engineering Corp. (a subsidiary China Shougang Group),

40%; and Chinaco Investment Pte Ltd., 5%] planned to invest \$600 million to build an integrated steel complex in the Kemaman Heavy Industry Park, Trengganu. The phase one construction of a 300,000-t/yr coking plant and a 600-cubic-meter blast furnace to produce 700,000 t/yr of pig iron and 700,000-t/yr of crude steel started in 2011. The total cost of phase one of the project was projected to be \$250 million, and the project was scheduled to be completed in mid-2013. After the completion of phase two construction, Eastern Steel would have the capability to produce between 3 and 3.5 Mt/yr of steel products. The company planned to use domestic and imported iron ore as a feed for its blast furnace (Southeast Asia Iron and Steel Institute, 2011).

Magnesium.—CVM Minerals Ltd. (a subsidiary of Ho Wah Genting Bhd, which was incorporated in Hong Kong) started the construction of a magnesium smelter at the Kamunting Raya Industrial Park in the State of Perak. The 30,000-t/yr Pidgeon process smelter was designed by Beijing Tiefertech Engineering Co. Ltd. The construction of the smelter was divided into two phases. The first-phase construction of a 15,000-t/yr production line had been completed in June 2010. The raw material (dolomite) was sourced from CVM's Dolomite Hills, which is located about 60 km from the smelter and which had ore resources of 20 Mt. Owing to equipment and technical problems, the smelter was unable to achieve its production level. The smelter was shut down during the second half of 2011 and had undergone further technical testings to ensure that the smelter was operating efficiently to reduce operation costs. The company expected that the smelter would reach full capacity in 2013. The company did not release magnesium ingot output data for 2011 (CVM Minerals Ltd., 2012, p. 37).

Manganese.—Malaysia's manganese resources were located in Johor, Kelantan, Pahang, and Terengganu, and the manganese content was usually less than 50%. The volume of manganese output from Malaysia depended on prices of manganese in the world markets. Since 2005, with an increase in manganese prices in the world, Malaysia's manganese output gradually increased during the past several years. Without much domestic demand for manganese, the country exported nearly all its output to China. Pertama Ferroalloys Sdn Bhd [formerly known as ANL Manganese (Malaysia) Sdn Bhd] [a joint venture between Asia Mineral Ltd. (ANL), 51%, and customers from Japan Steel Group, Korea Steel Group, and a local Malaysian company, 49%] planned to build a manganese ferroalloy plant in the Samalaju Industry Park in Bintulu in the State of Sarawak. The ferroalloy plant was designed to produce 350,000 t/yr of manganese ferroalloy by the fourth quarter of 2014. ANL signed an agreement with Sarawak Energy for the provision of 270 MW of electricity generation capacity for 20 years. Raw materials would be sourced from Brazil, South Africa, and local mines. OM Minerals (Sarawak) Sdn Bhd (a joint venture between OM Holdings Ltd., 80%, and Cahya Meta Sarawak Bhd, 20%) planned to build a 600,000-t/yr ferroalloy plant in the Samalaju Industrial Park in Sarawak. The Board of OM Holdings approved a definitive feasibility study in 2011; construction would start in 2012, and the plant was scheduled to be put into operation in the first quarter of 2014 (Minerals and Geoscience Department, 2011, p. 36; Australia's Paydirt, 2012).

Tin.—Malaysia's tin mine production produced about 3,000 t during the past several years. Resources were depleted and ore grades were lower after more than 100 years of active mining operations. The country imported tin concentrates from other countries in Asia and Africa to meet its demand. Solder production was the leading tin consuming sector in Malaysia, followed by tinplate and pewter. Tin consumption in Malaysia decreased to less than 3,000 t/yr during the past 3 years. The decrease in tin consumption was mainly the result of a decrease in demand from the solder and the pewter sectors; consumption by other consumers remained at the same level during that period. Malaysia Smelting Corp. Bhd. (MSC) was Malaysia's sole integrated tin producer; it produced 40,267 t of refined tin at its Butterworth smelter in 2011, which was about 4.0% more than it produced in 2010. The increase in tin production was a result of MSC's ability to source raw material from overseas markets. In 2011, Malaysia imported 30,027 t of tin concentrates compared with 30,589 t in 2010. Malaysia's refined tin exports increased to 42,302 t in 2011 from 33,697 t in 2010 and went mainly to Japan, the Republic of Korea, Singapore, and Taiwan. The MSC's tin mining company, Rahman Hydraulic Tin Sdn Bhd (RHT), agreed to increase the royalty paid on sales of tin in concentrates to the State of Perak to 5% from 2.5% upon the renewal of its mining leases in March 2012; the new leases would be valid through September 28, 2030. In 2011, RHT produced 2,010 t of tin in concentrates, which was 13.6% more than in 2010, and discovered more tin resources in the Perak area that could prolong the mine life beyond 15 years (Malaysian Tin Bulletin, 2012; Malaysia Smelting Corp. Bhd., 2012, p. 25–26).

Industrial Minerals

Cement.—Malaysia's cement sector was dominated by three companies: Cement Industries of Malaysia Bhd, Lafarge Malaysia Cement Bhd, and YTL Cement Bhd; together, these companies accounted for about 78% of the country's total cement output capacity. Cement demand in Malaysia had fluctuated between 16 and 17 Mt/yr during the past 5 years. West Malaysia had one of the most developed infrastructures in the country, but east Malaysia remained relatively undeveloped. Under the 10th Malaysia Plan and Economic Transformation program, the Government planned to build the east coast highway from Jabur to Kuala Terenggaru and to improve rural infrastructure. Together with ongoing construction of commercial properties, the demand for cement was expected to increase during the next several years (International Cement Review, 2012).

Rare Earths.—Globally, the production and resources of rare earths were dominated by China. Lynas Corp. Ltd. of Australia planned to develop the rare-earth deposit at Mount Weld in Western Australia and to ship rare-earth concentrates to Malaysia for further processing. Lynas secured approval from the Malaysian Government to build an advanced materials plant in the Gebeng III Industrial Area, which is located near the Port of Kuantan in the State of Pahang. The construction of the plant was scheduled to be completed in late 2011 and to be put into operation in 2012. The plant would have an initial output

capacity of 11,000 t/yr of rare-earth-oxide-equivalent products. Local residents objected to the construction of the rare-earth plant in their area because they worried about the safety of storing low-level radioactive waste that could cause lasting environmental damage. They feared that Lynas's plant would be a repeat of the Mitsubishi Chemical rare-earth plant in the area, which was shut down in 1992. The Government invited experts from the International Atomic Energy Agency (IAEA) to review the rare-earth project. The IAEA issued 11 recommendations, including the recommendation to install an airborne monitoring system at the site and in Kuantan Town and to have a permanent disposal facility with specifications required by the Atomic Energy Licensing Board and Department of Environment within 5 years. The Malaysian Government allowed Lynas to store the waste onsite temporarily until a permanent disposal facility is identified and required the company to have \$50 million deposited with the Government. The government of the State of Western Australia in Australia announced that Australia would not accept the waste generated by the Lynas rare-earth plant in Malaysia. The Malaysian Parliamentary Committee approved a temporary operating license to Lynas. A local environmental group applied to the High Court of Malaysia for an injunction to block Lynas's license. As of the end of 2011, Lynas was awaiting for the court decision on whether or not to allow its rare-earth separation plant to be operated (Star, The, 2012).

Mineral Fuels

Coal.—Malaysia's coal resources are located in the States of Perak, Perlis, Sabah, Sarawak, and Selangor. Coal was produced from the areas of Bintulu, Merit-Pila, Silantek, and Tutoh in the State of Sarawak. The country has coal resources of about 1.9 billion metric tons (Gt), of which 281 Mt was measured, 378 Mt was indicated, and 1.3 Gt was inferred. About 1.5 Gt of the country's coal resource is located in Sarawak, and more than 300 Mt is located in Sabah. Owing to the lack of infrastructure, most of the coal in the interior areas of the country had not been exploited. Coal resources located in Sabah were in the Maliau Basin Conservation area, which the Government had designated as a protected area. Mining and exploration for coal were conducted only in Sarawak. Power-generating plants consumed about 70% of the total supply of coal (domestic production and imports), and the remaining supply was consumed by the cement and iron and steel sectors. Despite Malaysia's position as a natural gas exporter, Tenaga Nasional Berhad planned to decrease the use of natural gas at its powerplants to 49% from 72% and to shift to the use of coal because of a shortage in the supply of natural gas in the domestic market. Coal demand for powerplants would likely increase; as a result, coal consumption was expected to increase to 21 Mt in 2011. The supply of domestic coal would likely not be sufficient to meet the demand, and the country was expected to increase coal imports to fill the gap. In 2010 (the latest year for which data were available), Malaysia imported 19.9 Mt of coal, which was about 10.4 Mt more than in 2009. Coal imports from Indonesia accounted for 71.4% of the total imports followed by Australia, 13.5%; South Africa, 12.2%; and others, 2.9% in 2010. Coal consumption was expected to increase to 36 Mt in 2020

because the demand for electricity was expected to increase; in expectation of this increase in demand, the Government planned to build another coal-fired powerplant (Minerals and Geoscience Department, 2011, p. 104–105).

Natural Gas and Petroleum.—Malaysia remained a net exporter of natural gas and crude oil. The increase in natural gas production was caused by the growth of external demand for LNG from China and Japan. On January 1, 2012, Petronas reported that the country had oil and natural gas reserves totaling 21.3 billion barrels of oil equivalent, which was 2.2% more than on January 1, 2011. The Malaysian Government offered incentives for companies to explore deeper and less-profitable fields in a bid to increase reserves as energy demand increases (Petroleum Nasional Berhad, 2012, p. 44).

Outlook

With the global economy recovering only slowly, Malaysia's economy is projected to grow at a slower rate during the next 3 years than in the previous several years. Private and public spending, however, will likely continue to support economic growth. The Government is aware of the country's need to reduce its dependence on external markets and to produce a more-diversified range of goods for export. To improve the investment climate and build a more-competitive economy, the Government plans to privatize state-owned companies, sell Government land, and reassess Government subsidies. The Government plans to further relax some rules regarding foreign investment in Malaysian companies and properties, initial public offerings, and the financial sector. The construction sector is expected to expand as a result of increased investment by the Government in infrastructure under the Tenth Malaysia Plan, and the demand for construction steel products will also likely increase. Several natural gas and oil projects are set to come onstream to replace maturing fields during the next several years.

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TABLE 1
MALAYSIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

| Commodity ² | 2007 | 2008 | 2009 | 2010 | 2011 | |
|---|----------------------------|-----------|-----------|----------------------|----------------------|----------------------|
| METALS | | | | | | |
| Aluminum, bauxite, gross weight | 156,785 | 295,176 | 263,432 | 124,274 | 188,141 | |
| Copper, mine, Cu content | -- | -- | 240 | -- ^r | -- | |
| Gold, mine output, Au content ³ | kilograms | 2,913 | 2,489 | 2,794 | 3,765 ^r | 4,215 |
| Iron and steel: | | | | | | |
| Iron ore, gross weight | 802,030 | 981,932 | 1,470,186 | 3,465,895 | 7,698,577 | |
| Pig iron, direct-reduced iron, and hot-briquetted iron | thousand metric tons | 1,872 | 1,957 | 2,388 | 2,390 | 2,876 |
| Steel, crude | do. | 6,895 | 6,423 | 5,354 | 5,693 | 5,941 |
| Lead metal, secondary ^c | 73,000 | 73,000 | 72,000 | 72,000 | 72,000 | |
| Manganese, gross weight | 56,500 | 536,675 | 468,963 | 899,703 | 576,835 | |
| Niobium (columbium)-tantalum metals, struverite, gross weight | 52 | 216 | 176 | 84 | 110 | |
| Rare-earth metals, monazite and xenotime, gross weight | 682 | 233 | 25 | 732 | 779 | |
| Silver, mine output, Ag content ³ | kilograms | 295 | 349 | 367 | 436 | 459 |
| Tin: | | | | | | |
| Mine output, Sn content | 2,263 | 2,605 | 2,412 | 2,668 | 3,346 | |
| Metal, smelter | 25,471 | 31,691 | 36,407 | 38,737 | 40,267 | |
| Titanium: | | | | | | |
| Ilmenite concentrate, gross weight | 59,310 | 36,779 | 15,983 | 19,036 ^r | 28,782 | |
| Rutile | 1,450 | 1,834 | 1,502 | 7,567 | 10,810 | |
| Dioxide ^c | 56,000 | 56,000 | 56,000 | 56,000 | 56,000 | |
| Zirconium, zircon concentrate, gross weight | 7,393 | 984 | 1,145 | 1,267 ^r | 1,685 | |
| INDUSTRIAL MINERALS | | | | | | |
| Barite | -- | 4,372 | 22,390 | 1,000 | -- | |
| Cement, hydraulic | thousand metric tons | 21,909 | 19,629 | 19,457 | 19,762 | 20,000 ^e |
| Clays and earth materials | do. | 28,291 | 25,065 | 22,966 | 27,543 ^r | 27,000 ^e |
| Feldspar | 358,775 | 457,377 | 410,053 | 455,497 ^r | 379,628 | |
| Kaolin | 587,508 | 506,462 | 487,632 | 530,331 | 442,500 | |
| Mica | 6,118 | 5,593 | 4,323 | 4,515 | 4,244 | |
| Nitrogen, N content of ammonia | 950,000 | 950,000 | 950,000 | 950,000 | 950,000 | |
| Sand and gravel | thousand metric tons | 22,370 | 24,472 | 17,382 | 30,678 ^r | 30,000 ^e |
| Silica sand | 719,221 | 1,466,904 | 630,394 | 932,159 | 900,000 ^e | |
| Stone: | | | | | | |
| Aggregate | thousand metric tons | 79,118 | 75,883 | 86,497 | 101,809 ^r | 100,000 ^e |
| Dolomite | 49,320 | 57,900 | 49,000 | 50,900 ^r | 50,000 ^e | |
| Limestone | thousand metric tons | 33,688 | 35,228 | 35,808 | 32,398 ^r | 32,000 ^e |
| MINERAL FUELS AND RELATED MATERIALS | | | | | | |
| Coal | 1,074,936 | 1,166,525 | 2,138,390 | 2,397,340 | 2,915,788 | |
| Gas, natural: | | | | | | |
| Gross | million cubic meters | 71,170 | 68,000 | 65,000 | 72,000 ^r | 73,000 |
| Net ⁴ | do. | 60,804 | 61,004 | 58,560 | 61,136 ^r | 61,400 |
| Liquefied natural gas | thousand metric tons | 22,900 | 23,422 | 22,452 | 24,363 | 25,000 ^e |
| Petroleum: | | | | | | |
| Crude and condensate | thousand 42-gallon barrels | 249,295 | 251,811 | 240,479 | 232,100 | 221,000 ^e |
| Refinery products ^{e,5} | do. | 220,000 | 210,000 | 200,000 | 210,000 | 215,000 |

^cEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through October 5, 2012.

²In addition to the commodities listed, a variety of crude construction materials, which include clays and stone, fertilizers, magnesium, and salt, is produced but not reported, and information is inadequate to make reliable estimates of output.

³Includes byproduct from tin mines in Peninsular Malaysia and gold mines in Peninsular Malaysia and the State of Sarawak.

⁴Includes production from Peninsular Malaysia and the States of Sabah and Sarawak.

⁵Gross less volume of reinjected and flared.

Sources: Ministry of Primary Industry, Minerals and Geoscience Department (Kuala Lumpur), Malaysian Minerals Yearbook 2010; U.S. Geological Survey Minerals Questionnaire, 2012; and Southeast Asia Iron and Steel Institute, Steel Statistical Yearbook, 2011.

TABLE 2
MALAYSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

| Commodity | | Major operating companies and major equity owners | Location of main facilities | Annual capacity |
|---------------------|------------------------------|--|-------------------------------------|------------------------------|
| Aluminum, metal | | Press Metal Sarawak Sdn Bhd (Press Metal Berhad) | Mukah, Sarawak | 120. |
| Bauxite | | Johore Mining and Stevedoring Co. Sdn. Bhd. | Teluk Rumania and Sg. Rengit, Johor | 400. |
| Cement ¹ | | 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 (subsidiary of Cahya Mata Sarawak Bhd) | Bintulu and Kuching, Sarawak | 1,750 cement; 800 clinker. |
| Do. | | Holcim (Malaysia) Sdn Bhd (Holcim Ltd.) | Pasir Gudang, Johor | 1,300 cement. |
| Do. | | Lafarge Malayan Cement Bhd. (subsidiary of Lafarge S.A.) | Rawang, Selangor | 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. | | YTL Cement Berhad (subsidiary of YTL Group) | 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 Wesport, Johor | 1,000 cement. |
| Do. | | Tasek Corp. Bhd (publicly owned company) | Ipoh, Perak | 2,300 cement; 2,300 clinker. |
| Copper, mine | | Malaco Mining Sdn Bhd | Sri Jaya, Pahang | 4. |
| Gas: | | | | |
| Natural | million cubic meters per day | ExxonMobil Exploration and Production Malaysia, Inc. | Offshore Terengganu | 45. |
| Do. | do. | Sabah Shell Petroleum Co. Ltd. | Offshore Sabah | 3. |
| Do. | do. | Sarawak Shell Bhd. | Offshore Sarawak | 80. |
| Liquefied | | Malaysia LNG Sdn. Bhd. (Petroliam Nasional Berhad, 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. (Petroliam Nasional Berhad, 60%; Shell Gas N.V., 15%; Mitsubishi Corp., 15%; Sarawak State government, 10%) | do. | 7,800. |
| Do. | | Malaysia LNG Tiga Sdn. Bhd. (Petroliam Nasional Berhad, 60%; Shell Gas N.V., 15%; Nippon Oil LNG (Netherlands) BV, 10%; Sarawak State government, 10%; Diamond Gas Netherlands BV, 5%) | do. | 6,800. |
| Gold, refined | kilograms | J Resources (J&Partners, L.P., 100%) | Penjom, Pahang | 4,000. |
| Do. | do. | Raub Australian Gold Mining Sdn. Bhd (Peninsular Gold Ltd., 100%) | Raub, Pahang | 500 |
| Do. | do. | Monument Mining Ltd. of Canada | Bukit Selinsing Koyan, Pahang | 1,500. |
| Iron and steel: | | | | |
| Direct-reduced iron | | Lion DRI Sdn Bhd (Lion Group) | 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 (Lion Group) | Labuan Island, offshore Sabah | 880. |
| Crude steel | | do. | Banting, Selangor | 1,250. |
| Do. | | do. | Klang, Selangor | 750. |
| Do. | | Ann Joo Steel Bhd (Ann Joo Group) | Prai, Penang | 900. |
| Do. | | Antara Steel Sdn. Bhd. (Lion Grop) | Pasir Gudang, Johr | 600. |
| Do. | | Kinsteel Sdn Bhd | Kuantan, Pahang | 500. |
| Do. | | Megasteel Sdn Bhd (Lion Group) | 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%) | Kermaman, 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. |

See footnotes at end of table.

TABLE 2—Continued
MALAYSIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

| Commodity | | Major operating companies and major equity owners | Location of main facilities | Annual capacity |
|-------------------|------------------------------------|--|-----------------------------|-----------------|
| Magnesium, metal | | CVM Minerals Ltd. | Kamunting Raya, Perak | 15,000. |
| Nitrogen, ammonia | | Asean Bintulu Fertilizer Sdn. Bhd. (Petroleum Nasional Berhad, 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. (wholly owned subsidiary of Petroleum Nasional Berhad) | Gurun, Kedah | 378. |
| Do. | | Petronas Ammonia Sdn. Bhd. (wholly owned subsidiary of Petroleum Nasional Berhad) | Kerth, Terengganu | 370. |
| Petroleum, crude | thousand 42-gallon barrels per day | ExxonMobil Exploration and Production Malaysia, Inc. | Offshore Terengganu | 390. |
| Do. | do. | Sabah Shell Petroleum Co. Ltd. | Offshore Sabah | 100. |
| Do. | do. | Sarawak Shell Bhd. | Offshore Sarawak | 184. |
| Do. | do. | do. | do. | 184. |
| Do. | do. | Petronas Carigali Sdn. Bhd. | Offshore Terengganu | 22. |
| Do. | do. | Murphy Sarawak Oil Co. Ltd. | Offshore Sarawak | 15. |
| Tin: | | | | |
| Concentrate | | Delima Industries Sdn. Bhd. | Dengkil, Selangor | 1.1. |
| Do. | | Maiju Sama Sdn. Bhd. | Puchong, Selangor | 1.6. |
| Do. | | New Lahat Mines Sdn. Bhd. | Lahat, Perak | 0.3. |
| Do. | | Omsam Telecommunication Sdn. Bhd. | Bakap and Batu Gajah, Perak | 0.5. |
| Do. | | Rahman Hydraulic Tin Bhd. | Klian Intan, Perak | 1.2. |
| Do. | | S.E.K. (M) Sdn. Bhd. | Kampar, Perak | 0.4. |
| Do. | | Tasek Abadi Sdn Bhd. | Senudong and Kampar, Perak | 0.5. |
| Refined | | Malaysia Smelting Corp. Bhd. (The Straits Trading Co. Ltd., 37.44%; Malaysia Mining Corp., 37.44%; others, 25.12%) | Butterworth, Penang | 35. |
| Titanium dioxide | | Huntsman Trioxide Sdn. Bhd. (a subsidiary of Huntsman Tioxide) | Kemaman, Terengganu | 56. |

Do., do. Ditto.

¹All companies operated integrated plants.