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The Mineral Industry of Indonesia

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Note: In this chapter, information for 2020 is followed by information for 2021.

In 2020, Indonesia was the world's first-ranked producer of mined nickel, accounting for 31% of total production and 22% of the world's reserves. The country was also the world's 2d-ranked producer of mined tin, accounting for an estimated 20% of total mine production and 19% of the world's reserves; the 2d-ranked producer of coal, accounting for 9% of total production and 3% of the world's reserves; the 3d-ranked producer of zeolites (natural), accounting for an estimated 8% of total production (its reserves were not available); and the 12th-ranked producer of mined gold, accounting for 3% of total production and 5% of the world's reserves. Other notable mineral commodities produced in the country included bauxite, cement, copper, iodine, nitrogen, pumice, sand and gravel (industrial), and mined zirconium. The Government continued to encourage mining companies to build smelters in Indonesia and to yield value-added mineral products rather than export metallic ores and concentrates (BP p.l.c., 2021, p. 46, 48; McRae, 2021, 2022; Merrill, 2021, 2022; Sheaffer, 2021, 2022; Crangle, 2022; U.S. Geological Survey, 2022).

Minerals in the National Economy

In 2020, Indonesia's real gross domestic product (GDP) decreased by 2.1%. The output value of the manufacturing of coal and refined petroleum products and that of the mining, quarrying, and oil and gas extraction sector decreased by 6.8% and 2.0%, respectively, both owing to the decreases in exports and domestic consumption driven by the coronavirus disease 2019 (COVID-19) pandemic. The nominal GDP was $1.06 trillion. The construction sector accounted for 11% of the GDP; the mining, quarrying, and oil and gas extraction sector, 6.4%; and the manufacturing-related mineral commodity sector, 3.3%. Employment in the mining, quarrying, and oil and gas extraction sector decreased by 5% to 1,352,200 in 2020 and accounted for 1.1% of the total employment in the country (Badan Pusat Statistik, 2020, p. 105; 2021, p. 102, 104, 660, 661, 663; Bank of Indonesia, 2021, p. 34; World Bank, The, 2023).

Government Policies and Programs

On January 12, 2014, Indonesia's ban on exports of unprocessed minerals went into effect. The ban, law No. 4/2009 on Mineral and Coal Mining, includes provisions that mined minerals should be processed and refined domestically, and that the export of unprocessed minerals is prohibited. Mining companies, however, were exempted from the ban until January 11, 2017, under the condition that they were able to meet the minimum domestic refining requirements (which differ by commodity), pay export duties, and commit to building smelters in the country (PricewaterhouseCoopers Inc., 2019, p. 8–10).

On January 11, 2017, the Government issued Government Regulation No. 1/2017, which extended this exemption for 5 years to prevent mining companies from reducing their mining activities. In 2020, the Ministry of Energy and Mineral Resources (MEMR) again extended the export ban to June 10, 2023, from January 11, 2022, under the Regulation of the MEMR No. 17/2020. However, a nickel-ore export ban, which came into effect on January 1, 2020, remained unchanged (PricewaterhouseCoopers Inc., 2019, p. 8–10; Asmarini, 2020b).

In May 2020, law No. 4/2009 was revised to boost the downstream mineral industry and to create jobs. The changes were to (1) "obligate" (from "allow") miners to explore new reserves every year; (2) extend reserve exploration areas to Indonesian seas (the previous law limited offshore activity to 12 kilometers off the coast); (3) guarantee 20-year special mining permits to six major coal companies (which accounted for 70% of the country's coal production), including PT Adaro Indonesia; (4) centralize the issuance of mining permits; (5) guarantee 30-year permits with unlimited renewals for miners integrated with downstream facilities or cap at 20 years with two extensions otherwise; and (6) allow miners to export raw materials for 3 years, provided that their downstream facilities have been constructed or were under construction (Harsono, 2020a; Bill Sullivan, Senior Foreign Counsel, Christian Teo and Partners Law Office, written commun., July 6, 2020).

The MEMR Regulation No. 11/2020 issued the mineral benchmark price (HPM) used as a reference in the domestic sales of coal and metallic ores. The HPM was calculated monthly based on average metal prices from Beijing, Jakarta, and the London Metal Exchange. The regulation was especially intended to prevent smelting companies from purchasing nickel ore at low prices, and instead enable small-scale miners to sell ore at a maximum of 3% below the floor price (Harsono, 2020b; Thomson Reuters, 2020a).

Production

Data on mineral production are in table 1. In 2020, notable changes in production included that of silicomanganese, which increased by 177%; metallurgical coal, 114%; smelted copper, 71%; marble, 50% (estimated); raw steel, 50%; refined copper, 49%; mined copper, 44%; bauxite, 25% (estimated); nickel pig iron, 22% (estimated); ferrochromium, 21%; rolled steel, 20%; and iodine, 12%. The increase in copper output was attributed to the increased production from the Grasberg minerals district and the Batu Hijau Mine, and the increase in ferronickel and nickel pig iron outputs resulted from the Government's strategy to encourage miners to process nickel ore domestically to yield nickel products. Extraction of manganese resumed in 2020 as operations restarted at the Putra Indonesia Jaya Mine, which Gulf Manganese Corp. Ltd. of Australia

acquired in 2019 (Mir, 2019; Freeport-McMoRan Inc., 2021, p. 45; PT Medco Energi Internasional Tbk, 2021, p. 42).

Notable production decreases included that of direct-reduced iron, which decreased by 74%; limestone (crushed), 66% (estimated); mined gold, 40%; feldspar, 40% (estimated); kaolin, 37% (estimated); mined tin, 32%; mined silver, 31%; mined lead, 27% (estimated); titanium (ilmenite and leucoxene), 25% (estimated); smelted tin, 23%; mined zinc, 20% (estimated); bituminous coal, 14%; cement (hydraulic), 13% (estimated); natural gas, 12%; mined zirconium, 12% (estimated); gravel, 11% (estimated); and nickel (laterite ore), 10%. The decrease in gold extraction resulted from decreased output at some major mines, including the Grasberg minerals district, the Martabe Mine, and the Toka Tindung Mine. The decreases in mined and smelted tin output were attributed to pandemic-related disruptions to PT Timah Tbk's operations.

Structure of the Mineral Industry

The Directorate General of Mineral and Coal under the MEMR manages the country's mineral resources by formulating and implementing policy on mining activities. Statistics Indonesia collects and publishes data on mineral production and trade monthly and annually. The Oil & Gas Law of 2001 grants the Government the exclusive rights to oil and gas extraction and requires all private companies wishing to explore for and extract oil and gas resources to enter into production-sharing contracts with the Government (Global Business Guide Indonesia, 2015).

State-owned PT Aneka Tambang Tbk (PT Antam) produced bauxite, ferronickel, gold, nickel, and silver. Other major state-owned companies engaged in the production of mineral commodities included PT Bumi Resources (coal), PT Indonesia Asahan Aluminium (PT Inalum) (aluminum), PT Krakatau Steel Tbk (steel), PT Pertamina (natural gas and refined petroleum), PT Tambang Batubara Bukit Asam Tbk (PT Bukit Asam) (coal), and PT Timah Tbk (tin). State-owned holding company Mining Industry Indonesia (MIND ID), which was launched in 2019, oversaw five mining companies: PT Antam, PT Bukit Asam, PT Freeport Indonesia Co. (PT–FI), PT Inalum, and PT Timah. International companies were also active in Indonesia's metal mining and processing industries. Partially foreign-owned company PT–FI mined copper, gold, and silver, and partially foreign-owned PT Vale Indonesia Tbk (PT Vale) produced nickel ore and nickel matte. Table 2 is a list of major mineral industry facilities.

In 2020, PT Weda Bay Nickel commissioned a smelter in Central Halmahera, North Maluku, which had the capacity to produce 300,000 metric tons per year (t/yr) of ferronickel. The MEMR reported that, as of 2020, Indonesia had 19 operational smelters, of which 13 were for nickel (including PT Weda Bay Nickel), 2 were for bauxite, 2 were for copper, 1 was for iron ore, and 1 was for manganese. The MEMR expected the number of smelters to reach 53 by 2024, of which 30 would be for the production of nickel; 11, for bauxite; 4, for copper; 4, for iron; 2, for lead and zinc; and 2, for manganese (Andi, 2021; Mulyana, 2021).

Mineral Trade

Indonesia's total exports and imports of goods in 2020 were valued at about $163 billion and $142 billion, respectively. The country's exports of "mineral products" as defined under chapters 25 through 27 of the Harmonized System (HS) were valued at $29 billion (or 18% of total exports), and exports of base metals and articles of base metal (defined under HS chapters 72 through 83) were valued at $17 billion (10%). The leading mineral commodity export under HS chapters 25 through 27 was coal, which accounted for 9% of total exports. Imports of mineral products as defined under HS chapters 25 through 27 were valued at $17 billion (or 12% of total imports); those of base metals and articles of base metal were valued at $14 billion (10%). The leading commodity import under HS chapters 25 through 27 was crude petroleum , which accounted for 6% of total imports (Badan Pusat Statistik, 2021, p. 575; U.S. International Trade Commission, 2023; Zen Innovations AG, 2023).

Commodity Review

Metals

Bauxite and Alumina.—As of 2020, PT Bintan Alumina Indonesia (PT BAI) of China was constructing a refinery at the Galang Batang Special Economic Zone on Bintan Island in Riau Islands. PT BAI planned to process 2 million metric tons per year (Mt/yr) of bauxite mined from Riau Islands and Kalimantan and produce 1 Mt/yr of alumina (AlCircle, 2020; Press Metal, 2020).

Copper and Gold.—PT–FI managed one of the world's largest copper and gold deposits at the Grasberg minerals district in Papua; as of 2020, ore reserves at the Grasberg district were estimated to be 1.73 billion metric tons (Gt) containing 15.1 million metric tons (Mt) copper and 818 metric tons (t) of gold. PT–FI's copper and gold production in 2020 was about 367,000 t and 26,400 kilograms (kg) compared with 275,000 t and 26,800 kg in 2019, respectively. The increase in copper output was mainly due to higher copper ore grades (1.32% in 2020 compared with 0.84% in 2019); the slight decrease in gold output was attributed to lower operation rates during the transition from open pit to underground operations. In 2020, 50% of PT–FI's output of copper concentrates was sold to the Gresik smelter, which was owned by PT Smelting Co. in East Java. PT–FI held a 25% ownership share of PT Smelting (Freeport-McMoRan Inc., 2021, p. 43, 45, 118–119).

The Batu Hijau Mine, which was owned by PT Amman Mineral Nusa Tenggara was Indonesia's second-ranked copper producer in 2020. The mine produced 133,300 t of copper and 4,110 kg of gold in 2020, which was more than double the 59,100 t of copper and 1,730 kg of gold produced at the mine in 2019. The increase in copper and gold output was the result of ongoing pit development, which started in April 2020. As of 2020, the Batu Hijau had ore reserves totaling 3 Mt of copper and 286 t of gold (PT Medco Energi Internasional Tbk, 2021, p. 42, 58).

The Martabe Mine (owned by PT Agincourt Resources) and the Toka Tindung Mine (owned by PT Archi Indonesia Tbk) were Indonesia's second- and third-ranked gold producers, respectively, in 2020. Gold output from the Martabe Mine decreased to 9,500 kg in 2020 from 12,200 kg in 2019 owing

to lower ore grades. The Martabe Mine had 91 Mt of reserves containing 134 t of gold, and an expected mine life of 14 years. A total of 6,400 kg of gold was produced from the Toka Tindung Mine in 2020, which was down from 8,100 kg in 2019; the decrease resulted from a lower gold head grade of 2.12 grams per metric ton (g/t) compared with a grade of 2.75 g/t gold in 2019. As of 2020, the Toka Tindung Mine had ore reserves of 98.3 Mt containing 121 t of gold (PT Agincourt Resources, 2021, p. 69, 74, 82; PT Archi Indonesia Tbk, 2021, p. 6, 17).

Iron and Steel.—In 2020, PT Dexin Steel Indonesia completed the construction of the first of two blast furnaces at Morowali Industrial Park in Central Sulawesi Province; construction of the twin blast furnaces had begun in 2018. The first completed furnace had a production capacity of 1.75 Mt/yr of raw steel. When construction of the second blast furnace is completed, total production capacity was expected to reach 3.5 Mt/yr. The company was a joint venture of Delong Steel Group of China, Shanghai Decent Investment Co. Ltd. (a subsidiary of Tsingshan Holding Group of China), and Indonesia Morowali Industrial Park. Hanwa Co. Ltd. of Japan held 10% share in PT Dexin (Hanwa Co. Ltd., 2020; Mysteel Global, 2020).

Nickel.—The Government of Indonesia banned exports of nickel ore in January 2020 to encourage nickel miners to sell mined nickel to domestic processing facilities. With the increasing demand for nickel used for lithium-ion batteries in electric vehicles (EV), the Government's strategy was for Indonesia to dominate the global supply chain of EV batteries and to become a hub for EV manufacturing. In May, the Government announced the 2020–24 National Strategic Projects, including nickel projects at three industrial zones: Konawe of Southeast Sulawesi, Morowali of Central Sulawesi, and Weda Bay of North Maluku. The Konawe industrial zone was expected to employ up to 11,000 workers; Morowali, 40,000 workers; and Weda Bay, 30,000 workers (Andriyanto, 2020; Cabinet Secretariat, 2020).

In 2020, battery manufacturer LG Energy Solution (the battery unit of LG Chem Ltd.) of the Republic of Korea planned to invest $9.8 billion in a new EV battery plant in North Maluku. China's Contemporary Amperex Technology (CATL) signed an agreement with PT Antam to invest $5 billion in an EV battery plant in Indonesia; the plant would process 60% of the nickel mined from PT Antam into batteries. Both plants were expected to start operations in 2024 (Asmarini, 2020a; Thomson Reuters, 2020b).

In October, Vale S.A. (Brazil) divested a 20% stake in PT Vale to PT Inalum. After the transaction, ownership of PT Vale was Vale, 44.3%; PT Inalum, 20%; Sumitomo Metal Mining Co. Ltd. of Japan, 15%; and others, 20.7%. The divestment of Vale's shares followed the 2014 Contract of Work amendment between PT Vale and the Government. The amendment included the divestment by Vale as a condition to extend its license to operate after 2025 (Suryahadi, 2020; Vale S.A., 2020).

Tin.—In 2020, PT Timah was the world's second-ranked tin refiner after Yunnan Tin Co. Ltd. of China and Indonesia's first-ranked tin miner. The company extracted about 39,760 t of tin (Sn content) from three islands (Bangka, Belitung, and Kundur Islands) and produced 45,700 t of refined tin in 2020, which was down from the 82,500 t extracted and 76,390 t refined in 2019. The decreases resulted from disruptions caused by the COVID-19 pandemic. PT Timah held tin reserves of 282,000 t in 2020 compared with 328,000 t in 2019; the decrease was due to an adjustment in the parameters for estimating tin reserves (PT Timah Tbk, 2021, p. 189, 193–195; International Tin Association Ltd., 2022).

Mineral Fuels

Coal.—As of 2020, Indonesia's coal reserves were 25.8 Gt, which was an increase compared with the reserve estimate of 25.1 Gt in 2019. East Kalimantan accounted for 42% of the country's coal reserves; South Sumatra, 33%; and South Kalimantan, 12%. In 2020, coal production decreased by 9% to 564 Mt. Coal exports decreased by 11% to 405 Mt, of which China and India accounted for 32% and 24%, respectively. The deceases in coal production and exports resulted from a drop in demand from China and India during the COVID-19 pandemic (Ministry of Energy and Mineral Resources, 2020, p. 62; 2021, p. 62–64; Thomson Reuters, 2020c).

MINERAL INDUSTRY HIGHLIGHTS IN 2021

Minerals in the National Economy

In 2021, Indonesia's real GDP increased by 3.7%. The output value of the mining, quarrying, and oil and gas extraction sector and that of the manufacturing of coal and refined petroleum products increased by 4.0% and 0.6% in real terms, respectively. These increases resulted from the growing domestic and global demand and the rising global commodity prices during the economic recovery as the pandemic wound down. The country's nominal GDP was $1.19 trillion, of which the construction sector accounted for 10.4%; the mining, quarrying, and oil and gas extraction sector, 9.0% (including coal, 3.6%); the manufacturing of coal and petroleum products, 1.9%; and the manufacturing of base metals, 0.8%. Employment in the mining, quarrying, and oil and gas extraction sector was 1,443,400 in 2021, which accounted for 1.1% of the total employment in the country (Badan Pusat Statistik, 2022, p. 103, 105, 683–684, 686; Bank of Indonesia, 2022, p. 29; World Bank, The, 2023).

Indonesia's total exports and imports of goods in 2021 were valued at about $232 billion and $196 billion, respectively. The country's exports of mineral products as defined under HS chapters 25 through 27 were valued at $52 billion (or 22% of total exports); those of base metals and articles of base metal were valued at $30 billion (13%). The leading mineral commodity export under HS chapters 25 through 27 was coal, which accounted for 11% of total exports. Imports of mineral products as defined under HS chapters 25 through 27) were valued at $32 billion (or 16% of total imports); those of base metals and articles of base metal, $21 billion (11%). The leading import mineral commodity under HS chapters 25 through 27 was crude petroleum, which accounted for 7% of total imports, in terms of value (Badan Pusat Statistik, 2022, p. 595; Zen Innovations AG, 2023).

Production

In 2021, notable changes in production included that of titanium (ilmenite and leucoxene), which increased by 37 times (estimated); mined cobalt, 145% (estimated); direct-reduced iron, 61% (estimated); mined copper, 45%; nickel (laterite ore), 34%; mined tin, 33% (estimated); smelted tin, 19% (estimated); raw steel, 11%; and ferrochromium, 10%. Notable production decreases included that of silicomanganese, which decreased by 66%; iron ore (Fe content), 41%; mined zinc, 30% (estimated); and zirconium, 14% (estimated). Extraction of manganese ore ceased in 2021 after Gulf Manganese Corp. Ltd. put production at the Putra Indonesia Jaya Mine on hold in late 2020 (table 1).

Structure of the Mineral Industry

The Government launched an EV battery holding company, Indonesia Battery Corp. (IBC), in March 2021. IBC consisted of four state-owned companies—MIND ID, PT Antam, PT Pertamina, and PT Perusahaan Listrik Negara (PLN). IBC planned to partner with LG Energy Solution and CATL and expected to be involved in the development of a $17 billion upstream-to-downstream EV battery project in Indonesia. MIND ID and PT Antam would be in charge of mining and processing of raw minerals; PT Pertamina and PLN would be in charge of manufacturing batteries and constructing public EV charging stations (Association of Indonesia Automotive Industries, The, 2021).

Commodity Review

Metals

Cobalt and Nickel.—PT Halmahera Persada Lygend started operations of its first and second production lines for mixed hydroxide precipitate (MHP) in June and December 2021, respectively. The plant in Obi Island had a total production capacity of 250,000 t/yr of MHP (contained 39% nickel and 4.8% cobalt), employing high-pressure acid leaching technology to refine low-grade nickel cobalt ore containing less than 1.6% nickel. The company planned to begin producing nickel sulfate and cobalt sulfate for EV battery use in the second quarter of 2022 (Moore, 2021; Yahya, 2021).

Tsingshan Holding Group started production of nickel matte derived from converting nickel pig iron at the plant in Morowali, Central Sulawesi, in December. The company would supply 100,000 t/yr of nickel matte to Chinese companies Huayou Cobalt Co. Ltd. and CNGR Advanced Materials; both were suppliers of EV battery materials (Chen and Yarham, 2021).

In December, PT Gunbuster Nickel Indonesia, a subsidiary of Jiangsu Delong Nickel Industry of China, completed the construction of its smelter in North Morowali, Central Sulawesi. The new smelter had a nickel pig iron production capacity of 1.8 Mt/yr and a nickel ore processing capacity of 13 Mt/yr (Thomson Reuters, 2021).

Copper.—In April, PT–FI acquired a 14.5% of the outstanding common stock of PT Smelting Co. from Mitsubishi Corp. of Japan (9.5%) and JX Nippon Mining & Metals Corp. of Japan (5%). As a result of the acquisition, PT–FI's ownership share in PT Smelting increased to to 39.5%. Mitsubishi Materials Corp. of Japan owned the remaining 60.5% and served as the operator of PT Smelting (JX Nippon Mining & Metals Corp., 2021; Freeport-McMoRan Inc., 2022, p. 77).

Lead.—In November, PT Kapuas Prima Coal Tbk completed the construction of a lead smelter, which was the country's first lead smelter, in Pangkalanbun, Central Kalimantan. The company planned to start operations in December. The designed production capacity was 20,000 t/yr of lead bullion (Hariyanto, 2021).

Mineral Fuels

Coal.—In October, the Indonesian Parliament approved the Harmonized Tax Law that includes a new carbon tax. The Government would impose a carbon tax of 30 rupiahs per kilogram (about $0.0021 per kilogram) of carbon dioxide equivalent. The tax would be initially imposed on the coal-fired power sector starting in April 2022 (Ungku and Christina, 2021).

Outlook

In the medium term, the Government's ban on exports of bauxite and other metallic ores (except nickel ore, which has been in effect since January 2020) will come into effect in June 2023. The ban is intended to stimulate mining companies to build smelters in Indonesia, process metallic ores domestically, and produce and export value-added mineral products. When new smelters under construction start operations, the country's exports of metallic ore concentrates are expected to decrease, whereas production and exports of processed metals are expected to increase, especially for nickel. The Government may continue aiming to make Indonesia one of the major EV battery producers in the world by utilizing the country's abundant nickel resources. The changes of law No. 4/2009, which aims to create jobs and mandates miners to explore for mineral reserves annually, may have a positive effect on the development of the mineral industry in terms of its contribution to the country's economy and the availability of mineral reserves. Meanwhile, the new carbon tax will likely cause adverse conditions for the coal mining industry and the carbon-intensive industries, including cement manufacturing, petroleum refining, and ferrous metals production.

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TABLE 1
INDONESIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2017	2018	2019	2020	2021
METALS						
Aluminum:						
Bauxite, wet basis	thousand metric tons	2,900 e	13,243	16,593	20,800 e	21,000 e
Alumina		917,099	842,536	1,148,422	1,162,139	1,156,039
Metal, primary		218,816	242,043	249,532	245,000	243,000
Cobalt, mine, Co content[e]		1,200	1,200	1,100	1,100	2,700
Copper:						
Mine, Cu content:						
Concentrates		577,000 r	591,000 r	334,000 r	500,000	712,000
Solvent extraction[3]		23,160	17,071	16,777	5,377	19,045
Total		600,000 r	608,000 r	351,000 r	505,000	731,000
Smelter, primary		245,800 r	213,767 r	163,429 r	279,598	280,400
Refinery, primary:						
Electrowon		23,160	17,071	16,777	5,377	19,045
Other		224,015 r	213,853 r	163,427 r	263,208	270,497
Total		247,000 r	231,000 r	180,000 r	269,000	290,000
Ferroalloys:						
Ferrochromium		80,000	190,000	190,000	230,000	252,000
Ferronickel[e]		109,000	124,000	129,000	130,000	131,000
Nickel pig iron[e]		748,000	733,000	1,790,000	2,190,000	2,250,000
Silicomanganese		40,000	9,000 r	22,000 r	61,000	21,000
Gold, mine, Au content	kilograms	101,000	132,734	108,977 r	65,900	65,900 e
Iron ore, mine, iron sand, dry basis:						
Gross weight	thousand metric tons	1,967	1,321	3,450	3,620	2,139
Fe content	do.	1,100	661	1,730	1,800	1,070
Iron and steel:						
Direct-reduced iron	do.	22	237	120	31	50 e
Pig iron	do.	2,650	2,730	2,900	2,900 e	2,900 e
Steel:						
Raw steel	do.	5,195	6,183	8,565 r	12,871	14,300
Products, semimanufactured, rolled	do.	7,866	10,045 r	10,939 r	13,141	13,000 e
Lead:[e]						
Mine, Pb content		8,000	11,000	11,000	8,000	8,000
Refinery, secondary		46,000	54,000	54,000	53,000	54,000
Manganese, mine, concentrate:						
Gross weight		56,012	--	--	155,224	--
Mn content		24,459	--	--	54,329	--
Nickel:						
Mine, laterite ore, Ni content		355,000	606,000	853,000	771,000	1,036,000
Smelter, matte		76,807	74,806	71,025	72,237	65,388
Silver, mine, Ag content	kilograms	329,000	309,000	487,000 r	335,200	335,000 e
Tin:						
Mine, Sn content		83,000	85,000	77,468	52,467	70,000 e
Smelter, primary		80,000	81,427	76,389	58,790	70,000 e
Titanium, mineral concentrates, ilmenite and leucoxene[e]		20,000	2,000	4,000	3,000	110,000
Zinc, mine, Zn content[e]		14,000	21,000	25,000	20,000	14,000
Zirconium, mineral concentrates[e]		29,000 r	54,000 r	73,000 r	64,000	55,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	69,279	75,213	71,900 r	62,700 e	65,000 e
Clay:[e]						
Bentonite		6,000	6,000	6,000	5,500	5,500
Kaolin	thousand metric tons	750	1,400	2,700 r	1,700	1,700

See footnotes at end of table.

TABLE 1—Continued

INDONESIA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons, gross weight, unless otherwise specified)

Commodity[2]		2017	2018	2019	2020	2021
INDUSTRIAL MINERALS—Continued						
Feldspar[e]	thousand metric tons	2,600	730	470 [r]	280	280
Iodine		34	38	33 [r]	37	36
Nitrogen, ammonia, N content	thousand metric tons	4,900	5,400	6,100	5,900	6,000
Salt[e]	do.	1,000	1,200 [r]	1,200 [r]	1,200	1,200
Sand and gravel, industrial, silica[e]	do.	3,600	2,600	3,500	3,500	3,500
Stone, sand and gravel, construction:[e]						
Gravel	do.	16,000	22,000	27,000 [r]	24,000	24,000
Stone:						
Crushed, limestone	do.	6,490	10,700	41,000 [r]	14,000	14,000
Size and shape unspecified, marble	do.	267	348	321 [r]	481	480
Zeolites[e]	do.	130	130	130	130	130
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand metric tons	134,435 [r]	138,277 [r]	148,270 [r]	127,744	139,133
Lignite	do.	87,330 [r]	120,582 [r]	124,962 [r]	118,108	128,638
Metallurgical	do.	1,646	1,693	1,870 [r]	4,000	4,357
Subbituminous	do.	237,837 [r]	297,220 [r]	341,057 [r]	313,876	341,862
Total	do.	461,000	558,000 [r]	616,000 [r]	564,000	614,000
Natural gas	million cubic meters	72,700	72,800	67,600 [r]	59,500	59,300
Petroleum, crude, including condensate	thousand 42-gallon barrels	306,000 [r]	295,000 [r]	285,000 [r]	271,000	253,000

[e]Estimated. [r]Revised. do. Ditto. -- Zero.

[1]Table includes data available through December 8, 2022. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]In addition to the commodities listed, dolomite, gold (refined), gypsum, liquefied natural gas, coalbed methane, petroleum refinery products, phosphate rock, pumice, and sulfur may have been produced, but available information was inadequate to make reliable estimates of output.

[3]The copper content of solvent extraction output at the mine level is the same as electrowon refinery output because copper produced in the solvent extraction and electrowinning process is typically reported only at the refinery level.

TABLE 2
INDONESIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Locations of main facilities	Annual capacity[e]
Aluminum:			
Bauxite	PT Aneka Tambang Tbk (PT Antam) (PT Indonesia Asahan Aluminium, 65%, and public, 35%)	Tayan Mine in West Kalimantan Province	1,700
Do.	PT Cita Mineral Investindo Tbk (PT Harita Jayaraya, 62.1%; Glencore International Investment, 30.21%; others, 7.69%)	Mines[1] in Ketapang, West Kalimantan	9,000
Alumina	PT Indonesia Chemical Alumina (PT Antam Tbk, 100%)	Tayan chemical grade alumina refinery, West Kalimantan	300
Do.	PT Well Harvest Winning (China Hongqiao Group Ltd., 56%; PT Cita Mineral Investindo Tbk, 30%; others, 14%)	Smelter grade alumina refinery in Ketapang, West Kalimantan	1,000
Metal	PT Indonesia Asahan Aluminium (PT Inalum) [Mining Industry Indonesia (Government), 100%]	Smelter in Kual Tanjun, North Sumatra	260
Cement	PT Holcim Indonesia Tbk (Holcim Group, 80.65%)	Plants at Narogong, Cilacap, and Tuban	12,500
Do.	PT Indocement Tunggal Prakarsa Tbk (HeidelbergCement Group, 61.5%)	Plants at Cirebon and Citeureup, West Java; Tarjun, South Kalimantan	25,000
Do.	PT Lafarge Cement Indonesia (Holcim Group)	Plants at Besar and Lhok, Aceh	3,000
Do.	PT Semen Baturaja (Government, 76.24%, and others, 23.76%)	Plant at Baturaja-Ogan Komering Ulu, South Sumatra	3,850
Do.	PT Semen Bosowa Maros	Plants in Banyuwangi, East Java and Maros, South Sulawesi	6,000
Do.	PT Semen Indonesia Tbk (Government, 51%, and others, 49%)	Plants at Gresik, Padang, and Tonasa	34,800
Clay, kaolin	Multiple mining establishments (12)	Mines in multiple locations	2,700
Coal:			
Metallurgical	PT Asmin Koalindo Tuhup	Mine in Murung Raya, Central Kalimantan	1,700
Unspecified	PT Adaro Indonesia (New Hope Corp., 50%; PT Asminco Bara Utama, 40%; Mission Energy, 10%)	Paringin and Tutupan Mines, South Kalimantan	36,000
Do.	PT Arutmin Indonesia (PT Bumi Resources Tbk, 80%, and Bakrie Group, 20%)	Mines in Mulia, Senakin, and Satui, South Kalimantan and Mine in Asam-Asam, East Kalimantan	26,000
Do.	PT Berau Coal (PT United Tractors, 60%; PT Armadian, 30%; Nissho Iwai, 10%)	Mines in Berau, East Kalimantan	13,000
Do.	PT Borneo Indobara (PT Golden Energy Mines Tbk, 98.1%, and others, 1.9%)	Mines in Angsana, Tanah Bumbu Regency, South Kalimantan	29,000
Do.	PT Kaltim Prima Coal Co. (PT Bumi Resources Tbk, 51%; Tata Power, 30%; China Investment Corp., 19%)	Mines in Sangatta, East Kutai Regency, East Kalimantan	62,000
Do.	PT Kideco Jaya Agung (PT Indika Energy Tbk, 91%, and Samtan Co. Ltd., 9%)	Mines in Paser, East Kalimantan	35,000
Do.	PT Tambang Batubara Bukit Asam Tbk (PT Indonesia Asahan Aluminium, 65.02%, and public, 34.98%)	Banko Barat Mine, South Sumatra	14,000
Do.	do.	Tambang Air Laya Mine, South Sumatra	8,000
Do.	do.	Muara Tiga Besar Mine, South Sumatra	7,000
Do.	White Energy Co. Ltd., 51%, and PT Bayan Resources Tbk, 49%	Tabang Mine, Kutai Kartanegara, East Kalimantan	30,000
Cobalt, Co content:			
In laterite	PT Vale Indonesia Tbk (Vale Canada Ltd., 44.3%; Mining Industry Indonesia, 20%; Sumitomo Metal Mining Co. Ltd., 15%; others 20.7%)	Sorowako Mine, South Sulawesi	3
In matte	do.	Smelter at Sorowako, South Sulawesi	1
In mixed hydroxide precipitate	PT Halmahera Persada Lygend (Harita Group, 63.1%, and Lygend Resources Technology Co. Ltd., 36.9%)	Plant in Obi Island, North Maluku Province	12

See footnotes at end of table.

TABLE 2—Continued
INDONESIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Locations of main facilities	Annual capacity[e]
Copper:				
Mine, Cu content		PT Amman Mineral Nusa Tenggara (PT Amman Mineral Internasional, 82.2%, and PT Pukuafu Indah, 17.8%)	Batu Hijau Mine, Sumbawa Island, West Nusa Tenggara	150
Do.		PT Batutua Tembaga Raya (Merdeka Copper Gold Group)	Wetar Mine and solvent extraction-electrowinning facility, Maluku	25
Do.		PT Freeport Indonesia Co. (PT Indonesia Asahan Aluminium, 51.24%, and Freeport-McMoRan Inc., 48.76%)	Grasberg Mine, Papua	600
Metal		PT Batutua Tembaga Raya (Merdeka Copper Gold Group)	Smelter and refinery plant in Wetar, Maluku	28
Do.		PT Smelting Co. (Mitsubishi Materials Corp., 60.5%, and PT Freeport Indonesia Co., 39.5%)	Smelter and refinery plant in Gresik, East Java	290
Feldspar		Multiple mining establishments (24)	Mines in multiple locations	2,500
Ferroalloys:				
Ferrochromium, gross weight		Nickel Mines Ltd.	Smelter in Morowali, Central Sulawesi	600
Ferronickel or nickel pig iron		PT Antam Tbk (PT Indonesia Asahan Aluminium, 65%, and public, 35%)	Smelter at Pomalaa, Southeast Sulawesi	120
Do.		PT Century Metalindo	do.	20
Do.		PT Fajar Bhakti Lintas Nusantara	Smelter in Central Halmahera	15
Do.		PT Gebe Industry Nickel	Smelter in Gresik, East Java	100
Do.		PT Gunbuster Nickel Indonesia (Jiangsu Delong Nickel Industry Co. Ltd., 100%)	Smelter in North Morowali, Central Sulawesi	1,800
Do.		PT Hengjaya Nickel Industry and PT Ranger Nickel Industry (Nickel Mines Ltd., 80%, and private interest, 20%)	Hengjaya Nickel and Ranger Nickel smelters, Morowali, Central Sulawesi	300
Do.		PT Huadi Nickel-Alloy Indonesia	Smelter in Bantaeng, South Sulawesi	50
Do.		PT Indoferro	Smelter in Cilegon, Banten	50
Do.		PT Indonesia Guan Ching Nickel and Stainless Steel	Smelter in Morowali, Central Sulawesi	40
Do.		PT Megah Surya Pertiwi (Harita Group, 60%, and Xinxing Ductile Iron Pipes Co. Ltd., 40%)	Smelter in Obi island, South Halmahera, North Maluku Province	175
Do.		PT Sulawesi Mining Investment	Smelter in Morowali, Central Sulawesi	250
Do.		PT Tsingshan Steel Indonesia	do.	430
Do.		PT Virtue Dragon Nickel Industry (Jiangsu Delong Nickel Industry Co. Ltd.)	Smelter at Morosi, Konawe, Southeast Sulawesi	745
Do.		PT Wanatiara Persada	Smelter in Obi island, South Halmahera, North Maluku Province	45
Do.		PT Weda Bay Nickel (Tsingshan Holding Group, 51.3%; Eramet Group, 38.7%; PT Antam Tbk, 10%)	Smelter in Central Halmahera, North Maluku	300
Gas:				
Coalbed methane	million cubic meters per day	Ephindo Energy Pvt. Ltd. (PT Pertamina, 52%, and Dart Energy Ltd., 24%)	Gasfields in Sangatta, East Kalimantan	14
Natural	do.	ConocoPhillips Co., 54%; Talisman Energy Inc., 36%; PT Pertamina, 10%	Gasfields in Corridor Block, South Sumatra	23
Do.	do.	ExxonMobil Oil Indonesia	Gasfields in Arun and Aceh, North Sumatra	48
Do.	do.	PT Pertamina (Government, 100%)	Gasfields in Sanga Sanga Block, East Kalimantan	20
Do.	do.	do.	Gasfields in Mahakam Block, East Kalimantan	30
Liquefied		PT Arun LNG Co. Ltd. (Government, 55%; Mobil Oil Co., 30%; Japan Indonesia LNG Co., 15%)	Plant at Blang Lancang, Aceh, North Sumatra	12,500
Do.		PT Badak LNG Co. Ltd. (Government, 55%; HUFFCO Group, 30%; Japan Indonesia LNG Co., 15%)	Plant at Bontang, East Kalimantan	22,500

See footnotes at end of table.

TABLE 2—Continued
INDONESIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Locations of main facilities	Annual capacity[e]
Gold:				
Mine, Au content	metric tons	Bluenose Gold Corp., 80%, and Zinton Investments Ltd., 20%	Buduk Mine, West Kalimantan	1
Do.	do.	Kingrose Mining Ltd., 85%, and private Indonesian investors, 15%	Way Linggo Mine, Lampung	1
Do.	do.	PT Agincourt Resources	Martabe Mine, South Tapanuli, North Sumatra	15
Do.	do.	PT Amman Mineral Nusa Tenggara (PT Amman Mineral Internasional, 82.2%, and PT Pukuafu Indah, 17.8%)	Batu Hijau Mine, Sumbawa Island, West Nusa Tenggara	5
Do.	do.	PT Antam Tbk (PT Indonesia Asahan Aluminium, 65%, and public, 35%)	Cibalung Mine, Pandeglang, Banten	2
Do.	do.	do.	Pongor Mine, West Java	2
Do.	do.	PT Archi Indonesia Tbk (PT Rajawali Corp., 100%)	Toka Tindung Mine, North Sulawesi	10
Do.	do.	PT Freeport Indonesia Co. (PT Indonesia Asahan Aluminium, 51.24%, and Freeport-McMoRan Inc., 48.76%)	Mine at Grasberg, Papua	85
Do.	do.	PT Indotan Halmahera Bangkit, 75%, and PT Antam Tbk, 25%	Gosowong (Toguraci) Mine, North Halmahera, North Maluku	7
Do.	do.	PT J Resource Asia Pasifik Tbk, 100%	Seruyung Mine, East Kalimantan	2
Do.	do.	PT J Resource Asia Pasifik Tbk, 80%	Bakan Mine, North Sulawesi	3
Do.	do.	PT J Resource Asia Pasifik Tbk, 80%, and PT Lebong Gold, 20%	North Lanut Mine, North Sulawesi	3
Do.	do.	PT Merdeka Copper Gold Tbk	Tujuh Bukit Mine, Banyuwangi, East Java	6
Do.	do.	Private owner	Manado Mine, North Sulawesi	NA
Do.	do.	Straits Resources Ltd., 100%	Mt Muro Mine, Central Kalimantan	NA
Refinery	do.	PT Antam Tbk, 100%	Logam Mulia refinery, Jakarta Raya, Jakarta	60
Gravel		Multiple quarrying establishments (4,279)	Multiple quarry locations	100,000
Iron and steel, raw steel		PT Dexin Steel Indonesia	Smelter in Morowali, Central Sulawesi	1,750
Do.		PT Ispat Indo	Smelter in Sidoarjo, Surabaya	700
Do.		PT Krakatau Steel Tbk (Government, 100%)	Smelter in Cilegon, West Java	2,400
Do.		PT Wahana Garuda Lestari	Smelter in Pulogadung, Jakarta	410
Lead-zinc, ore, gross weight		PT Kapuas Prima Coal Tbk (KPC)	Mine at Bintang Mengalih, Lamandau, Central Kalimantan	500
Lead, refined, primary		do.	Smelter in Pangkalanbun, Central Kalimantan	20
Manganese:				
Mine, Mn content		Gulf Manganese Corp. Ltd., 100%	Putra Indonesia Jaya Mine,[2] West Timor	40
Oxide		PT Primier Bumidaya Industri	Plant in Pasuruan, East Java	16
Nickel, Ni content:				
In ore		PT Antam Tbk (PT Indonesia Asahan Aluminium, 65%, and public, 35%)	Mine at Pomalaa, Southeast Sulawesi	30
Do.		do.	Gee Island Mine, North Maluku	NA
Do.		PT Hengjaya Mineralindo (Nickel Mines Ltd., 80%, and private interest, 20%)	Hengjaya Mine, Morowali, Central Sulawesi	20
Do.		PT Timah Tbk (PT Indonesia Asahan Aluminium, 65%, and public, 35%)	Timah Nickel Mine, Bombana, Southeast Sulawesi	5
Do.		PT Vale Indonesia Tbk (Vale Canada Ltd., 44.3%; Mining Industry Indonesia, 20%; Sumitomo Metal Mining Co. Ltd., 15%; others 20.7%)	Sorowako Mine, South Sulawesi	72
Do.		PT Weda Bay Nickel (Tsingshan Holding Group, 51.3%; Eramet Group, 38.7%; PT Antam Tbk, 10%)	Mine at Weda Bay, Central Halmahera, North Maluku	70
Do.		Solway Investment Group	Asera Mine, Southeast Sulawesi	30
In mixed hydroxide precipitate		PT Halmahera Persada Lygend (Harita Group, 63.1%, and Lygend Resources Technology Co. Ltd., 36.9%)	Plant in Obi Island, North Maluku Province	100

See footnotes at end of table.

TABLE 2—Continued
INDONESIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Locations of main facilities	Annual capacity[e]
Nickel, Ni content:—Continued				
In matte		PT Antam Tbk (PT Indonesia Asahan Aluminium, 65%, and public, 35%)	Smelter at Pomalaa, Southeast Sulawesi	24
Do.		PT Vale Indonesia Tbk (Vale Canada Ltd., 44.3%; Mining Industry Indonesia, 20%; Sumitomo Metal Mining Co. Ltd., 15%; others 20.7%)	Smelter at Sorowako, South Sulawesi	80
Do.		Tsingshan Holding Group	Plant in Morowali, Central Sulawesi	NA
Nitrogen, N content		PT Asean-Aceh Fertilizer (Government, 60%, and other members of the Association of Southeast Asian Nations, 40%)	Plants at Lhokseumawe, North Sumatra	500
Do.		PT Pupuk Iskandar Muda (Government, 100%)	do.	500
Do.		PT Pupuk Kalimantan Timur (Government, 100%)	Plant at Bontang, East Kalimantan	1,850
Do.		PT Pupuk Kujang	Plant at Cikampek, West Java	330
Do.		PT Pupuk Sriwijawa (Government, 100%)	Plant at Palembang, South Sumatra	1,440
Petroleum:				
Crude	thousand 42-gallon barrels per day	Cepu Cooperation Contract (operated by ExxonMobil Cepu Ltd., 45%)	Oilfields in Cepu Block, Central Java and East Java	165
Do.	do.	PT Caltex Pacific Indonesia (Texaco Inc., 50%, and Chevron Corp., 50%)	Oilfields in Minas, Duri, and Bangko, central Sumatra	700
Do.	do.	PT Pertamina (Government, 100%)	Oilfields in Jatibarang, West Java, and Bunyu, offshore East Kalimantan	80
Do.	do.	do.	Oilfields offshore southeastern Sumatra	100
Do	do.	Total E&P Indonesie (Total S.A.)	Oilfields in Handil and Bekapai, onshore and offshore East Kalimantan	180
Refined	do.	PT Pertamina (Government, 100%)	Refineries at 6 locations	1,000
Pumice		Multiple quarrying establishments (340)	Multiple quarry locations	800
Salt		PT Puncak Keemasan Garam Dunia	Salterns in Kupang, East Nusa Tenggara	400
Silica, quartz sand		Multiple quarrying establishments (185)	Multiple quarry locations	6,000
Silver, mine, Ag content	metric tons	PT Agincourt Resources	Martabe Mine, South Tapanuli, North Sumatra	75
Do.	do.	PT Amman Mineral Nusa Tenggara (PT Amman Mineral Internasional, 82.2%, and PT Pukuafu Indah, 17.8%)	Batu Hijau Mine, Sumbawa Island, West Nusa Tenggara	50
Do.	do.	PT Antam (PT Indonesia Asahan Aluminium, 65%, and public, 35%)	Mine in Bogor, West Java	25
Do.	do.	PT Archi Indonesia Tbk (PT Rajawali Corp., 100%)	Toka Tindung Mine, North Sulawesi	15
Do.	do.	PT Freeport Indonesia Co. (PT Indonesia Asahan Aluminium, 51.24%, and Freeport-McMoRan Inc., 48.76%)	Mines at Ertsberg and Grasberg, Papua	220
Do.	do.	PT Indotan Halmahera Bangkit, 75%, and PT Antam Tbk, 25%	Gosowong (Toguraci) Mine, North Halmahera, North Maluku	8
Do.	do.	PT Merdeka Copper Gold Tbk	Tujuh Bukit Mine, Banyuwangi, East Java	20
Stone:				
Limestone		Multiple quarrying establishments (2,754)	Multiple quarry locations	40,000
Marble		Multiple quarrying establishments (29)	do.	2,000
Tin:				
Ore, Sn content		PT Timah Tbk (PT Indonesia Asahan Aluminium, 65%, and public, 35%)	Mines onshore and offshore Bangka Belitung islands and offshore Kundur islands	85
Metal		do.	Kundur smelter, Kundur, Riau Islands	70
Do.		do.	Mentok smelter, West Banka, Bangka Belitung Islands	68
Zeolites		Multiple mining establishments (5)	Mines in multiple locations	300

[e]Estimated. Do., do. Ditto. NA Not available.
[1]Metallurgical-grade bauxite.
[2]Operation suspended.