



2020–2021 Minerals Yearbook

THAILAND [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF THAILAND

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

In 2020, Thailand was among the world's leading producers of rare earths (was the fifth-ranked producer, accounting for 1.5% of world production), gypsum (sixth-ranked producer, accounting for 6.8% of world production), and feldspar (sixth-ranked producer, accounting for 4.9% of world production). Thailand's mineral industries produced metallic minerals, such as antimony (refined), iron ore, manganese, steel (raw steel and steel products), tin, and tungsten; industrial minerals, including barite, cement, clay, fluorspar, lime, perlite, salt, sand and gravel (construction and industrial), and stone (crushed and dimension); and mineral fuels, including coal, natural gas, crude petroleum, and refinery products (table 1; Barry, 2022; Cordier, 2022; Crangle, 2022).

Minerals in the National Economy

In 2020, Thailand's real gross domestic product (GDP) decreased by 6.2% compared with a 2.2% increase in 2019, which was likely attributed to the effects of the coronavirus disease 2019 (COVID-19) pandemic. The nominal GDP in 2020 was \$502 billion¹ (BHT 15.7 trillion). The revenue of the mining and quarrying sector, which accounted for 2.1% of the GDP in 2020, decreased by 8.9% compared with an increase of 1.7% in 2019. The net flow of foreign direct investment (FDI) into Thailand was negative \$4.95 billion in 2020 compared with a \$5.52 billion gain in 2019. The net flow of FDI to the mining and quarrying sector was negative \$360 million in 2020 compared with negative \$68.6 million in 2019. In 2020, the mineral industry employed 74,500 people, which accounted for 0.20% of the total labor force and was an increase of 23% compared with that in 2019 (Bank of Thailand, 2023a, b, d; Office of the National Economic and Social Development Council, 2023, table 4.1).

Government Policies and Programs

Thailand made major changes in its mining legislation with the enactment of the Minerals Act, B.E. 2560 (2017) in August 2017. This Minerals Act consolidated the Minerals Act, B.E. 2510 (1967) (last amended in 2002) and the Mineral Royalty Rates Act, B.E. 2509 (1966) (last amended in 1979). The Department of Primary Industries and Mines (DPIM) within the Ministry of Industry is responsible for supervising and promoting the mineral industry and setting safety and pollution control requirements. The Minerals Act decentralizes the authority to issue 1-year basic exploration licenses to local officials, whereas the Director-General of the DPIM continues to issue 2-year exclusive prospecting licenses and special prospecting licenses for more than 5 years. The exploration

¹Where necessary, values have been converted from Thai bahts (THB) to U.S. dollars (US\$) at the annual average exchange rates of BHT31.98=US\$1.00 for 2021, BHT31.30=US\$1.00 for 2020, and BHT31.05=US\$1.00 for 2019.

for, production of, and sale of petroleum and natural gas are regulated by the Petroleum Act, B.E. 2514 (1971) (as amended in 2017). Petroleum and natural gas activities fall under the ultimate authority of the Department of Mineral Fuels within the Ministry of Energy (Prior and Summacarava, 2017, p. 1; Food and Agriculture Organization of the United Nations, 2018; Praiwan, 2019b; Baker McKenzie, 2020, p. 192).

Production

In 2020, the production of iron ore (Fe content) increased by 569%; pyrophyllite, by 385%; tin (mine, Sn content), by 332%; tungsten (mine, W content), by 160% (estimated); quartz, by 125%; rare earths (rare-earth-oxide equivalent), by 89% (estimated); and dolomite, by 32%. Production of ball clay decreased by 92%; marl (for cement), by 91%; granite (dimension stone), by 87%; perlite, by 77%; travertine (dimension stone), by 72%; manganese (mine, Mn content), by 71% (estimated); jet fuel, by 58%; marble (dimension stone), by 50%; fluorspar (acid grade), by 50% (estimated); fluorspar (metallurgical grade), by 45%; crushed marble, by 43%; shale, by 35%; barite, by 33%; kerosene, by 19%; talc, by 18%; petroleum (condensate), by 17%; fuel oil, by 14%; feldspar and beneficiated kaolin, by 12% each; anhydrite, by 11%; and natural gas, by 10%. No mine production of antimony, gold, or silver had been reported since 2017 following the closure of the Chatree gold mine in December 2016 because of legal actions regarding environmental health issues. Data on mineral production are in table 1 (Kingsgate Consolidated Ltd., 2020, p. 4; Petchkaew, 2022).

Structure of the Mineral Industry

According to Department of Primary Industries and Mines, Thailand had 510 active mines in 2020, of which 498 were industrial mineral mines; 11 were metal mines, including 6 for iron, 2 for manganese, 2 for tin and tin-tungsten, and 1 for wolframite; and 1 coal mine. Detailed information on some of these facilities was not available. Most of the nonfuel mineral mining and mineral-processing companies in Thailand were privately owned and operated. Government-owned Electricity Generating Authority of Thailand (EGAT) operated the Mae Moh coal mine. PTT Exploration and Production Public Co. Ltd. (PTTEP), which was a subsidiary of the Government-owned Petroleum Authority of Thailand (PTT), its joint ventures, and some foreign and Thailand-based international oil companies owned most of the country's petroleum and natural gas exploration projects and production businesses. Table 2 is a list of major mineral industry facilities in Thailand (Nation Thailand, The, 2019; Department of Primary Industries and Mines, 2021, p. 82).

Mineral Trade

The value of Thailand's total goods exports decreased by 6.5% to \$227 billion in 2020. Exports of petrochemical products accounted for 5.2% (valued at \$11.7 billion) of Thailand's total goods export value in 2020; petroleum products, 2.4% (\$5.6 billion); other metals except aluminum, copper, and iron and steel, 1.9% (\$4.3 billion); iron and steel, 1.0% (\$2.2 billion); copper, 1.0% (\$2.2 billion); aluminum, 0.7% (\$1.7 billion); and crude petroleum, 0.2% (\$370 million). Thailand's main export partners in 2020 were China (including Hong Kong), which received 18% of Thailand's total exports, by value; the United States, 15%; Japan, 10%; Vietnam, 5%; and Australia, 4% (Bank of Thailand, 2022b, 2023c).

In 2020, the value of Thailand's total goods imports decreased by 14% to \$186 billion. In 2020, imports of crude petroleum accounted for 8.7% (valued at \$16.1 billion) of Thailand's total goods import value; petroleum products, 2.2% (\$4.0 billion); natural gas, 2.0% (\$3.8 billion); other mineral commodities excluding mineral fuels, 1.5% (\$2.8 billion); and coal, coke, and peat, 0.7% (\$1.3 billion). Thailand was a net importer of hydrocarbons and had an import reliance of 88% for crude petroleum consumption and 31% for natural gas consumption in 2020. Thailand's main import partners in 2020 were China (including Hong Kong), which supplied 25% of Thailand's total imports, by value; Japan, 13%; the United States, 7%; Malaysia, 5%, and Taiwan, 4% (Bank of Thailand, 2022a, 2023c; Beckstead and others, 2022).

Commodity Review

Metals

Gold and Silver.—In November 2020, while in arbitration concerning the Government's closure of the Chatree Mine, Akara Resources Public Co. Ltd. (a 100%-owned subsidiary of Kingsgate Consolidated Ltd. of Australia) was granted a special license for gold exploration in Chon Daen and Wang Pong Districts, Phetchabun Province. The license would be valid to October 2025 for an area of approximately 640 square kilometers (table 2; Kebui, 2020; Kingsgate Consolidated Ltd., 2020, p. 10; Akara Resources Public Co. Ltd., 2021).

Iron and Steel.—In 2020, production of raw steel increased by 5% to 4.47 million metric tons (Mt) and that of steel products decreased by 8% to 7.15 Mt. Consumption of raw steel and steel products decreased by 12.3% to 7.22 Mt and by 11.6% to 16.5 Mt, respectively. In 2020, the steel industry was significantly affected by delays in construction projects and operation suspensions at automobile factories owing to the COVID-19 pandemic. Up to 60% of steel output went to the construction sector, and the remaining 40% went to car and home appliance manufacturers. The steel industry of Thailand faced competition from imports of inexpensive steel products from China, the Republic of Korea, and Vietnam. The country also faced competition from China's alloy-mixed and carbon-added steel products, which did not fall under Thailand's product specifications, and as a result, Thailand was unable to apply antidumping duties for these imports. China's steel exports to Thailand totaled 4.37 Mt in 2020 (table 1; Apisitniran, 2020; Nation Thailand, The, 2020;

Iron and Steel Institute of Thailand, 2021, p. 10, 11; Zen Innovations AG, 2023).

In 2014, the Government imposed an antidumping tariff on cold-reduced coiled and uncoiled carbon steel from China, Taiwan, and Vietnam. The tariff was set to expire in February 2020 but was extended by the Government of Thailand for another 5 years. In February 2020, another antidumping tariff ranging from 6.97% to 51.61% was decided to be imposed on iron and steel pipes and tubes from Vietnam (Arunmas, 2019; Vietnam News, 2020).

In August 2020, Tata Steel Manufacturing (Thailand) Public Co. Ltd., which was a subsidiary of Tata Steel Ltd. of India, formerly known as NTS Steel Group Plc., completed restructuring by merging its subsidiaries Siam Construction Steel Co. Ltd. in Murang, Rayong Province, and Siam Iron and Steel Co. Ltd. in Ban More, Saraburi Province, into one operating company. After the merger, the facilities all operated under the name Tata Steel (table 2; Tata Steel Manufacturing (Thailand) Public Co. Ltd., 2020, p. 9; 2021).

Lead and Zinc.—In March 2020, Metal Tiger Plc. of the United Kingdom terminated the acquisition and joint-venture agreement with Boh Yai Mining Co. Ltd. for the Boh Yai lead-zinc-silver mine. Metal Tiger was not able to reach agreement on the terms regarding upfront payment, fund allocation, and risk-reward ratio with its joint-venture partners. As of 2017, the Boh Yai Mine's indicated and inferred resources were estimated to be 3.3 Mt grading 4.5% zinc, 3.7% lead, and 72.6 grams per metric ton silver. Metal Tiger retained 12 exploration license applications, which had been fully processed at the DPIM and were expected to be granted. The senior management and subsidiary board would consider whether or not to pursue further exploration when the licenses are obtained (Metal Tiger Plc., 2018, p. 24; 2020, p. 4; 2021, p. 13).

Lithium.—Pan Asia Metals Ltd. of Singapore had lithium projects in Thailand, including the Bang I Tum and Reung Kiet lithium prospects. Pan Asia was the first foreign company to obtain an exploration license in Thailand since the Mineral Act was amended in 2017. In September 2020, Pan Asia announced a plan to start drilling at its Reung Kiet lithium prospect by yearend to secure sufficient ore reserves to feed a proposed plant with a capacity of 5,000 to 10,000 metric tons per year (t/yr) of lithium carbonate equivalent for more than 10 years (Barich, 2020; Pan Asia Metals Ltd., 2020, p. 13).

Rare Earths.—Production of rare earths (rare-earth-oxide equivalent) increased by 89% to 3,600 metric tons (t) in 2020. Shenghe Resources Holding Co. Ltd. of China was in negotiations to purchase Xinyuan Rare Earth (Thailand) Co. Ltd. from Jiangxi Chenguang Investment Co. Ltd. of China. Xinyuan's separation facility in Ban Kai, Rayong Province, was under construction and would have a capacity of 2,000 t/yr of rare-earth metal and alloy products and 3,000 t/yr of rare-earth oxides (tables 1, 2; Asian Metals, 2018).

Tin.—In 2020, Thailand produced an estimated 315 t of mined tin (Sn content) by numerous small mines in Nakhon Si Thammarat, Phangnga, Phuket, and Rayong Provinces. Thailand Smelting & Refining Co. Ltd. (Thaisarco), which was a wholly owned subsidiary of Amalgamated Metal Corp. Plc. of the United Kingdom, was one of the largest primary tin smelters outside of China. Thaisarco's smelter in Phuket, Phuket Province,

produced 11,265 t of tin in 2020, which was a 3% increase from the amount produced in 2021; the increase was owing to the commissioning of a new furnace in 2019. Thailand imported 16,100 t of tin ore and concentrates in 2020 to feed the smelter because domestic tin mine output met only approximately 3% of the raw material demand (tables 1, 2; Amalgamated Metal Corp. Plc., 2021, p. 18; Zen Innovations AG, 2023).

Tungsten.—Production of mined tungsten (W content) was estimated to be 65 t in 2020. Pan Asia started drilling at the Khao Soon tungsten project, which was estimated to have between 15 and 29 Mt of resources grading 0.2% to 0.4% WO₃. As of November 2020, drilling samples contained 0.24% to 0.50% WO₃ from the surface to a 51.5-meter depth. The company planned to produce ammonium tungstate intermediate using mined materials from the Khao Soon Mine, and the facilities were planned to be similar to those at the Nui Phao tungsten mine and associated chemicals plants in neighboring Vietnam. The average WO₃ grade of drilled samples from the Khao Soon Mine was higher than the average grade of 0.18% WO₃ of the proven and probable resources at the Nui Phao Mine (table 1; Masan Group, 2015, p. 144; Pan Asia Metals Ltd., 2020, p. 10, 11).

Mineral Fuels

Coal.—In 2020, Thailand's lignite coal production totaled 13.3 Mt. The country's lignite production had steadily decreased since 2017, when production was 16.3 Mt. EGAT operated the Mae Moh lignite mine, which was the only coal resource in the country, and had supplied the output to the Mae Moh powerplant since 1978. The powerplant had a capacity of 2.4 gigawatts, and it supplied 50% of its electricity to northern Thailand, 30% to central Thailand, and 20% to the northeastern part of the country. EGAT had mined a total of 517 Mt of lignite since 1978, and the remaining coal reserves at Mae Moh were 213 Mt as of December 2020. Some of the 10 units in operation would be retired during the next 5 years. Privately owned Thai coal companies Banpu Public Co. Ltd. and Lanna Resources Public Co. Ltd. had imported bituminous coal from mines in Indonesia that were owned either by their subsidiaries or by joint ventures owing to depletion of their domestic coal reserves (tables 1, 2; Praiswan, 2019a; Banpu Public Co. Ltd., 2021, p. 5, 10; Electricity Generating Authority of Thailand, 2021, p. 19; Lanna Resources Public Co. Ltd., 2021).

Natural Gas.—In 2020, production of natural gas was 33.8 million cubic meters, which was a decrease of 10% from the 37.4 million cubic meters produced in 2019. Production from the Malaysia-Thailand Joint Development Area (JDA) gasfield decreased by 23.4%; the Tantanwan gasfield, by 21.4%; the Pailin gasfield, by 17.5%; and the Erawan gasfield, by 10.1%. These decreases were partially compensated for by the increases at some other gasfields, including the Jasmin gasfield, where production increased by 16.5%, and the Sinphuhorm gasfield, by 10.7%. The Bongkot and Erawan gasfields were expected to be depleted in the coming years. Imports of natural gas also decreased by 6.1% owing to low demand. The proven reserves of natural gas in Thailand were 112 billion cubic meters at yearend 2020. PTTEP budgeted \$300 million in 2020 to explore 18 offshore gas blocks in Burma and Malaysia. In 2019, 20% of PTTEP's sales volume came from Burma (the MOGE3, M11, and MD7 Blocks) and Malaysia (the K, SK309,

and SK311 Blocks) (tables 1, 2; Praiswan, 2020b; Department of Mineral Fuels, 2021; Ministry of Energy, 2022).

Petroleum.—In 2020, Thailand's production of crude petroleum and condensate decreased by 7% to 42.8 million barrels (Mbbbl) and by 17% to 31.1 Mbbbl, respectively, owing to the effects of the COVID-19 pandemic on the regional and global oil markets. Thailand's proven reserves of condensate and crude petroleum were 102.7 Mbbbl and 92.4 Mbbbl, respectively, at yearend 2020. The production of refinery products except diesel decreased in 2020 compared with that in 2019. PTTEP's refineries, including IRPC Public Co. Ltd., PTT Global Chemical Public Co. Ltd., and Thai Oil Public Co. Ltd., reduced their overall output by 15% to 25% in 2020, as domestic consumption by airplanes and vehicles plummeted (table 1; Bangkok Post, 2020; Offshore, 2020; Praiswan, 2020a; Department of Mineral Fuels, 2021).

MINERAL INDUSTRY HIGHLIGHTS IN 2021

Minerals in the National Economy

In 2021, the growth rate of Thailand's real GDP was 1.5% and the nominal GDP was \$507 billion (BHT 16.2 trillion). The mining and quarrying sector's revenue decreased by 5.4% in 2021, and accounted for 2.2% of the GDP. The net flow of FDI into Thailand was \$14.6 billion in 2021; however, the net flow of FDI to the mining and quarrying sector was negative \$197 million. In 2021, the mineral industry employed 53,200 people, which was equivalent to 0.14% of the total labor force in the country (Bank of Thailand, 2023a, b, d; Office of the National Economic and Social Development Council, 2023, tables 3, 4.1).

The value of Thailand's total goods exports increased by 19% to \$270 billion in 2021. Of this amount, exports of petrochemical products were valued at \$15.5 billion; petroleum products, \$9.1 billion; other metal and steel, \$5.3 billion; iron and steel, \$3.8 billion; copper, \$3.6 billion; aluminum, \$2.6 billion; and crude petroleum, \$428 million. The value of total goods imports increased by 23% to \$230 billion in 2021. Of this amount, imports of crude petroleum were valued at \$24.1 billion; petroleum products, \$6.4 billion; natural gas, \$5.5 billion; other mineral commodities excluding mineral fuels, \$4.1 billion; and coal, coke, and peat, \$1.8 billion (Bank of Thailand, 2022a, b).

Production

In 2021, production of shale increased by 384%; ball clay, by 229%; crushed marble, by 199%; iron ore (Fe content), by 173%; rare earths (rare-earth-oxide equivalent), by 128% (estimated); granite (dimension stone), by 96%; ceramic clay, by 84%; beneficiated kaolin, by 43%; marl (for cement), by 40%; nonbeneficiated kaolin, by 39%; gypsum (anhydrite), by 27%; raw steel, by 23%; feldspar, by 22%; limestone (for cement), by 17%; calcite, by 15%; fuel oil, by 13%; tin (mine, Sn content), by 11%; and gypsum (other), by 10%. Production of quartz decreased by 84%; barite, by 78%; marble (dimension stone) and jet fuel, by 30% each; travertine (dimension stone), by 28%; pyrophyllite and crude petroleum, by 17% each; and talc, by 11%. No mine production of antimony, fluorspar (acid grade), gold, and silver was reported in 2021 (table 1).

Commodity Review

Metals

Gold and Silver.—In 2021, the tribunal case regarding the closure of the Chatree Mine was still pending; however, the Government agreed to allow the mine to reopen in January 2022. The Government approved Akara Resources' 5-year metallurgical processing license, which would commence on January 19, 2022. Four 10-year mining leases, which were required to operate the Chatree Mining Complex, were also approved. The Chatree Mine had estimated mineral resources of 106 t of gold and 902 t of silver and mineral reserves of 28 t of gold and 249 t of silver reported in September 2020 (table 2; Kingsgate Consolidated Ltd., 2021, p. 2; 2022, p. 4; Petchkaew, 2022).

Iron and Steel.—In 2021, production of raw steel increased by 23% to 5.47 Mt. Production of steel products increased by 7% to 7.66 Mt, including flat steel, by 14%; wire rod, by 11%; long steel, by 3%; and hot-rolled steel, by 0.6%. This recovery was likely attributed to the loosening of the restrictive measures put in place during the COVID-19 pandemic and the resumption in the construction of Government projects that had been delayed during the pandemic. In 2021, consumption of raw steel and steel products increased by 12% to 8.1 Mt and by 14% to 18.8 Mt, respectively, compared with those in 2020. Accordingly, imports of steel increased by 18% to 17.68 Mt, including finished products, 12.49 Mt; semifinished products, 3.22 Mt; and raw steel, 1.97 Mt. Thailand's major import partners for finished steel products were China (46%), Japan (25%), the Republic of Korea (17%), and Taiwan (5.6%). Exports of steel products also increased, by 55% to 2.47 Mt in 2021 (table 1; Iron and Steel Institute of Thailand, 2022, p. 10–16).

Lithium.—In 2021, Pan Asia initiated a new project—the Kata Thong lithium project—by the submission of five special prospecting license applications in Phang Nga Province in southern Thailand. The project would explore one geothermal lithium block and four lepidolite lithium and tin blocks. The exploration blocks are located approximately 35 kilometers north of the Reung Kiet lithium project. Drilling results showed that Reung Kiet had drilling samples grading up to 1.24% of lithium oxide (Li₂O) and Bang I Tum samples grading up to 0.98% of Li₂O (Ephrems, 2021; Pan Asia Metals Ltd., 2022, p. 5, 9, 10).

Rare Earths.—Production of rare earths (rare-earth-oxide equivalent) was estimated to have increased by 128% to 8,200 t in 2021. The significant increase in Thailand's rare earth production was largely attributed to China's increased imports from Thailand. China increased its production quota for processed rare earth products by approximately 20% in 2021 (table 1; China Nonferrous Metals News, 2021; Tabeta, 2021; United Nations, 2022).

Mineral Fuels

Natural Gas.—In 2021, Thailand produced 33.1 billion cubic meters of natural gas, which was a decrease of 2% from the amount produced in 2020. Gasfields with 10% or more production increases included Jasmine, 36.8%; Pailin, 22.0%; JDA, 20.4%; Bongkot, 13.1%; and others, 23.0%. In contrast,

production from the Yoong Thong gasfield decreased by 62.2%; Erawan, by 27.0%; and Lanta, by 18.9% (tables 1, 2; Ministry of Energy, 2022).

The Erawan (G1/61 Block) project, which was owned by PTTEP (60%) and Chevron Thailand Exploration and Production Ltd. (40%, as operator), was the leading producing gasfield in Thailand in terms of output, and it accounted for 27% of domestic production. Production from the Erawan gasfield decreased to approximately 9.0 billion cubic meters in 2021 from 12.2 billion cubic meters in 2020. In December, PTTEP and Mubadala Petroleum LLC signed an agreement regarding the transition of operations. Mubadala would be a new concessionaire partner (40%), replacing Chevron, in fiscal year 2023 (which runs from October 2022 through September 2023); however, the transition was 2 years behind schedule (table 2; PTT Exploration and Production Public Co. Ltd., 2022, p. 9, 33, 114; Ministry of Energy, 2022).

In 2021, imports of natural gas were 15.7 billion cubic meters, which was an increase of 5.8% from the amount imported in 2020. To offset the shortage of domestic production, Thailand had been diversifying its imports by importing seaborne liquefied natural gas and by acquiring participating interest in overseas gas assets, mostly in Burma under long-term gas sales agreements on a take-or-pay basis. The imports from the Yadana gasfield in Burma (PTTEP owned a 25.5% interest) increased by 6.1% to 4.5 billion cubic meters and those from the Zawtika gasfield in Burma (PTTEP, 80%) increased by 4.3% to 2.5 billion cubic meters. The imports from the Yetagun gasfield in Burma (PTTEP, 19.32%) decreased by 69% to 165 million cubic meters; the change was attributed to the production decrease since 2013 and to the temporarily complete gas production halt declared by Malaysia's National Petroleum Ltd. (which owned a 40.91% interest in the field) in April owing to depletion in Blocks M12, M13, and M14 (Thomson Reuters, 2021; PTT Exploration and Production Public Co. Ltd., 2022, p. 27, 28; Ministry of Energy, 2022).

Outlook

Thailand's GDP is expected to grow by 2.8% in 2022 owing to the continued recovery from the COVID-19 pandemic. The contribution of the mining and quarrying sector to Thailand's economy is expected to remain insignificant in the near future. Gold production at the Chatree Mine is expected to resume in 2022 following approval of Ankara Resources' mining lease and processing license. The country may start to produce lithium if Pan Asia's lithium exploration projects are successful. The natural decline of mineral fuels will likely be able to be compensated for if PTTEP's exploration for overseas assets is successful. Construction of the mining and mineral-processing facilities at the Khao Soon tungsten project is expected to bolster Thailand's mineral industry in the coming years. Owing to natural declines in the Mae Moh coal mine and in major gasfields and oilfields, the country may continue to face the challenge of high import reliance on mineral fuels in the future (International Monetary Fund, 2022).

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TABLE 1
THAILAND: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2017	2018	2019	2020	2021
METALS					
Antimony, refinery ^c	3,000	2,700	1,800	1,900	2,000
Iron ore, mine:					
Gross weight	135	--	17,660 ^r	113,239	324,914
Fe content	84	--	11,000	73,600	201,000
Iron and steel, steel:					
Raw steel	6,762	6,403	4,246 ^r	4,467	5,473
Products	9,318	9,032	7,799 ^r	7,150	7,660
Lead, refinery, secondary	88,000	85,000	82,000	80,000	79,000
Manganese, mine:					
Gross weight	8,020	4,000	4,800	1,400	--
Mn content ^e	3,900	1,900	2,300	670	--
Rare earths, mine, concentrate ^{e, 3}					
Gross weight	2,200	1,700	3,200	6,000	14,000
Rare-earth-oxide equivalent	1,300	1,000	1,900	3,600	8,200
Tin:					
Mine, concentrate, Sn content	541	75	73	315	351
Smelter, primary	10,588	10,721	10,956 ^r	11,265	12,100
Tungsten, mine, concentrate:					
Gross weight	83 ^r	127	42 ^r	110	113
W content ^e	49 ^r	69	25 ^r	65	67
Zinc:					
Mine, ore:					
Gross weight	7,877	--	--	--	--
Zn content	1,460	--	--	--	--
Smelter, primary	30,018	--	--	--	--
Alloys, Zn content	9,010	--	--	--	--
INDUSTRIAL MINERALS					
Barite	147,954 ^r	67,490 ^r	33,644 ^r	22,394	4,988
Cement, hydraulic	39,067 ^r	39,221 ^r	40,261 ^r	38,616	39,200 ^e
Clay:					
Ball clay	157,093	579,565	332,786	25,777	84,895
Cement clay	4,254,783 ^r	5,837,807	7,455,441	7,205,870	6,977,605
Ceramic clay	357,982	485,853	378,086	403,677	744,295
Kaolin:					
Beneficiated	103,079 ^r	96,666	80,776	71,051	101,711
Nonbeneficiated	392,100 ^r	403,225	551,674	594,850	828,488
Diatomite ^{e, 4}	440 ^r	650 ^r	310 ^r	310	310
Feldspar	1,385,925	1,117,803	1,251,143	1,105,344	1,346,997
Fluorspar:					
Acid grade ^e	25,000	36,000	28,000	14,000	--
Metallurgical grade	5,500	16,700	17,747	9,807	9,766
Gypsum, mine:					
Anhydrite	1,393	1,517	1,420	1,267	1,614
Other	9,254	9,680	8,368	8,012	8,789
Lime ^e	820,000	810,000	730,000 ^r	740,000	790,000
Perlite	5,800	5,600	15,000	3,500	3,500 ^e
Phosphate rock:					
Gross weight	8,000	--	--	--	--
P ₂ O ₅ content	2,400	--	--	--	--
Salt	1,497,233	1,487,364	1,580,390	1,439,877	1,563,970
Sand and gravel, industrial, unspecified	1,776,118 ^r	1,557,218	1,248,032	1,252,909	1,322,614

See footnotes at end of table.

TABLE 1—Continued
THAILAND: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons, gross weight, unless otherwise specified)

Commodity ²	2017	2018	2019	2020	2021	
INDUSTRIAL MINERALS—Continued						
Stone, sand, and gravel, construction:						
Stone:						
Crushed:						
Calcite	1,456,747	1,467,822	1,440,030	1,430,044	1,639,588	
Dolomite, for ceramic	2,988,336	3,440,193	2,850,844	3,772,735	3,957,939	
Granite	thousand metric tons	9,036	11,281	13,864	14,760	14,509
Limestone, for cement	do.	68,024	64,303	65,274	65,199	76,097
Limestone, for other use	do.	109,481 ^r	116,913 ^r	114,767 ^r	113,301	116,059
Marble, including fragment		1,995,310	3,060,329	799,921	452,000	1,350,000
Marl, for cement		8,200	28,707	34,575	3,000	4,200
Quartz		176,083	67,802	14,000	31,500	5,000
Shale, for cement	thousand metric tons	6,506	6,716	4,953	3,223	15,598
Dimension:						
Granite		14,437	13,800	50,300	6,420	12,600
Marble		42,639	19,700	31,300	15,700	11,000
Travertine		1,969	1,628	2,494	696	500
Talc and related materials:						
Pyrophyllite		54,000	50,920	6,500	31,522	26,030
Talc		7,436	7,756	8,064	6,624	5,920
MINERAL FUELS AND RELATED MATERIALS						
Coal, lignite	thousand metric tons	16,259	14,852	14,078	13,251	14,222
Natural gas	million cubic meters	37,394	36,432	37,427	33,788	33,097
Petroleum:						
Condensate	thousand 42-gallon barrels	35,979	36,139	37,351	31,050	29,035
Crude	do.	51,556	47,158	45,959	42,832	35,631
Refinery:						
Diesel	do.	169,233	174,176	170,353	173,153	169,470
Fuel oil	do.	36,971	37,609	34,468	29,712	33,610
Gasoline	do.	79,431	82,812	82,304	81,664	77,909
Jet fuel	do.	46,760	51,163	44,712	18,889	13,192
Kerosene	do.	12,390	13,483	12,891	10,394	10,575
Liquefied petroleum gas	do.	70,538	72,762	69,653	63,838	66,053
Total	do.	415,000	432,000	414,000	378,000	371,000

^cEstimated. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through November 22, 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.

²In addition to the commodities listed, gemstones, refined gold, kaolin filler, potash, silicon, and tantalum may have been produced in Thailand, but available information was inadequate to make reliable estimates of output.

³Estimated based on trade data.

⁴Production estimated by reported exports; domestic mined amount could be higher.

TABLE 2
THAILAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2021

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Antimony, metal	metric tons	Amco Thai Mining Co. (Hibino Metal Industry)	Smelter in Ban Pin, Phrae Province	500
Do.	do.	Thai Unipet Industries Co. Ltd. (Youngsun Chemicals Co. Ltd., 100%)	Smelter in Lat Bua Luang, Ayutthaya Province	2,000
Barite		Asian Mineral Resources Co. Ltd.	Plant in Amphoe Chalermprakiat, Saraburi Province	60
Do.		Blue Dot Enterprise Ltd.	Grinding plant in Tambon Pakkang, Phrae Province	90
Do.		Kia Energy Co. Ltd.	Grinding plants in Saraburi Province	300
Do.		P&S Barite Mining Co. Ltd. (Pands Group)	Mine in Mai, Chaing Mai Province	360
Do.		do.	Mine in Loei Province	240
Do.		do.	Mine in Nakhon Si Thammarat Province	240
Do.		Sasin Mine Co. Ltd.	Mine and grinding plant in Ta Pha Mok, Long, Phrae Province	60
Do.		Sibelco Mineral (Thailand) Co. Ltd. (Sibelco Asia Pte. Ltd., 100%)	Grinding plant in Don Tum, Bang Len, Nakhon Pathom Province	24
Cement		Asia Cement Public Co. Ltd.	Saraburi Plant, Pra Buddhabat, Saraburi Province	5,000
Do.		Globe Cement Co. Ltd. (Siam City Cement Public Co. Ltd., 100%)	Plant in Chaloeam Phrakiat, Saraburi Province	850
Do.		Jalaprathan Cement Plc. (Asia Cement Public Co. Ltd., 88.84%, and other, 11.16%)	Takli Plant, Takli, Nakhon Sawan Province	1,150
Do.		do.	Cha-Am Plant, Cha-Am, Petchaburi Province	1,200
Do.		Siam Cement (Kaeng Khoi) Co. Ltd. (Siam Cement Group, 100%)	Kaeng Khoi Plant, Kaeng Khoi, Saraburi Province	7,300
Do.		Siam Cement (Lampang) Co. Ltd. (Siam Cement Group, 100%)	Lampang Plant, Chaehom, Lampang Province	2,100
Do.		Siam Cement (Ta Luang) Co. Ltd. (Siam Cement Group, 100%)	Ta Luang Plant, Ban Mo, Saraburi Province	3,100
Do.		do.	Khao Wong Plant, Praputtabath, Saraburi Province	3,840
Do.		Siam Cement (Thung Song) Co. Ltd. (Siam Cement Group, 100%)	Plant in Thung Song, Nakorn Sri Thammarat Province	6,910
Do.		Siam City Cement Public Co. Ltd. (Sunrise Ecology Co. Ltd., 34.81%; Jardine Cycle & Carriage Ltd., 25%; Ratanarak Group, 9.43%; other, 30.76%)	3 cement plants in Kaeng Koei, Saraburi Province	16,800
Do.		Thai Pride Cement Co. Ltd.	Saraburi Plant, Kaeng Khoi, Saraburi Province	960
Do.		TPI Polene Public Co. Ltd.	Plant in Tabol Tubkwang, Saraburi Province	13,000
Coal, lignite		Electricity Generating Authority of Thailand (EGAT) (Government, 100%)	Mae Moh lignite mine, Lampang Province	16,000
Copper, metal		Thai Copper Industries Public Co. Ltd.	Smelter and refinery in Rayong Industrial Park, Rayong Province ¹	165
Diatomite	metric tons	NA	Mine in Mae Nam Wang Basin, Lampang Province	600
Feldspar		Asia Mineral Processing Co. Ltd. (AMPC)	Mines in Nopphitam, Nakhon Si Thammarat Province	1,500
Do.		Sinluang Co. Ltd.	do.	600
Fluorspar		S.C. Mining Co. Ltd.	Mine in Ban Pin, Long, Phrae Province	12
Gas, natural	million cubic meters	Chevron Offshore (Thailand) Ltd., 51%; PTTEP International Ltd., 21.38%; Siam MOECO Ltd., 21.25%; Palang Sophon Ltd., 6.375%	Lanta gasfield (Block G4/43), Gulf of Thailand	10
Do.	do.	Chevron Offshore (Thailand) Ltd., 51.66%; PTTEP Offshore Investment Co., 25%; MOECO International B.V., 16.71%; Kris Energy Ltd., 4.63%	Tantawan oilfield (Blocks B8/32 and 9A), off the coast of Chumphon Province, Gulf of Thailand	620

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Gas, natural— Continued	million cubic meters	Chevron Pattani Ltd., 71.25%; Siam MOECO Ltd., 23.75%; PTTEP International Ltd., 5%	Yoong Thong gasfield (Block G4/48), offshore of Surat Thani Province, Gulf of Thailand	10
Do.	do.	ExxonMobil Exploration and Production Khorat Inc., 80%, and PTT Exploration and Production Public Co. Ltd., 20%	Nam Phong gasfield (Block E5), Khon Kaen Province	85
Do.	do.	Mubadala Petroleum LLC	Jasmine oilfield (Block B5/27), Gulf of Thailand	65
Do.	do.	Petronas Carigali (JDA) Ltd., 50%, and PTTEP International Ltd., 50%	Malaysia-Thailand Joint Development Area (Blocks B17-1 and C19), Gulf of Thailand	4,800
Do.	do.	PTT Exploration and Production Public Co. Ltd., 60%, and Chevron Thailand Exploration and Production Ltd., 40%	Erawan oilfield (Block G1/61), Gulf of Thailand	9,000
Do.	do.	PTT Exploration and Production Public Co. Ltd., 80%; Chevron Thailand Exploration and Production Ltd., 16%; MOECO Thailand Co. Ltd., 4%	Arthit gasfield (Blocks B14A, B15A, B16A, and G8/50), Gulf of Thailand	2,700
Do.	do.	PTT Exploration and Production Public Co. Ltd., 44.45%; Total E&P Thailand SAS, 33.33%; BG Group Plc., 22%	Bongkot South gasfield (Block G12/48), Gulf of Thailand	4,200
Do.	do.	PTT Exploration and Production Public Co. Ltd., 45% to 60% depending on operating area; Chevron Thailand Exploration and Production Ltd. or Chevron Pattani Ltd., 35%; others, 5% to 20%	Pailin gasfield (Blocks B12, B27, and G7/50), Gulf of Thailand	4,500
Do.	do.	PTT Exploration and Production Public Co. Ltd., 66.7%, and MOECO Thailand Co. Ltd., 33.3%	Bongkot gasfield (Blocks B15, B16, and B17), Gulf of Thailand	5,700
Do.	do.	PTTEP HK Holding Ltd., 39%; PTTEP SP Ltd., 33.8%; others 27.2%	Sinphuhorm gasfield (Blocks E5-North and EU-1), Udon Thani and Khon Kaen Provinces	940
Do.	do.	PTTEP Siam Ltd., 75%, and PTT Exploration and Production Public Co. Ltd., 25%	Sirikit oilfield (Block S1), Kamphaeng Phet Province	300
Gold:				
Mine, Au content	kilograms	Akara Resources Public Co. Ltd. (Kingsgate Consolidated Ltd., 100%)	Chatree Mining Complex, Phichit Province ²	5,000
Do.		Tungkum Co. Ltd.	Mine in Wang Saphung, Loei Province ²	NA
Refinery, secondary		Umicore Precious Metals Thailand Ltd. (Umicore Group, 91.21%, and others, 8.79%)	Refinery in Dokmai, Pravat, Bangkok	NA
Gypsum, mine		General Mining and Trading Co. Ltd.	Mine in Talad, Muang, Surat Thani Province	NA
Do.		Khun Tawad Mining Co. Ltd. (Lotus Mines Co. Ltd.)	Mine in Nakornsawan Province	180
Do.		Namsin Pattana Gypsum Mining Co. Ltd. (BKG Group)	Mine in Nong Bua, Nakhon Sawan Province	NA
Do.		Vanich Gypsum Co. Ltd.	Mines in Mai Rieng and Thoeng Yai, Nakhon Si Thammarat Province and Khlong Prab, Surat Thani Province	2,000
Iron ore, gross weight		P.T.K. Mining Co. Ltd. (Siam Iron and Steel Co. Ltd.)	Phu Ang Mine, Muang Loei District, and Phu Hia Mine, Chiang Khan, Loei Province	720
Iron and steel:				
Raw steel		Bangkok Iron and Steel Works Co. Ltd.	Plant in Phrapradaeng, Samutprakarn Province	500
Do.		Chow Steel Industries Public Co. Ltd.	2 plants in Kabinburi Industrial Estate, Prachinburi Province	730

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Iron and steel:—Continued			
Raw steel—Continued	Millcon Steel Plc. (Sittichai Leeswadtrakul, 37.3%, and General Engineering Public Co. Ltd., 18%)	Plants in Bang Khun Thian, Bangkok, and Nihom Pattana, Rayong Province	350
Do.	Tata Steel Manufacturing (Thailand) Public Co. Ltd. [TS Global Holdings Pte. Ltd., 67.9%, and others, 32.1%]	NTS Plant, Hemaraj Chonburi Industrial Estate, Sriracha, Chonburi Province	550
Do.	do.	SCSC Plant, Map Ta Phut Industrial Estate, Muang, Rayong Province	550
Do.	do.	SISCO Plant, Bang Khamot, Ban Mo, Saraburi Province	300
Do.	TBS Steel Co. Ltd.	Plant in Sri Maha Pho, Prachinburi Province	350
Do.	TY Steel Co. [Tycoons Worldwide Group (Thailand) Public Co. Ltd.]	Plant in Nihom Pattana, Rayong Province	600
Do.	UMC Metals Ltd.	Plant in Muang, Chonburi Province	550
Products	Asia Metal Public Co. Ltd.	Plant in Phanat Nihom, Chonburi Province	220
Do.	Asian Wire Products Co. Ltd. (Bangkok Steel Industry Group)	Plant in Muang, Nakornrachasima Province	470
Do.	Bangkok Steel Industry Public Co. Ltd.	Plant in Phrapradaeng, Samutprakarn Province	740
Do.	Bangsaphan Barmill Public Co. Ltd.	Plant in Bang Saphan, Prachuap Khiri Khan Province	720
Do.	G-Steel Public Co. Ltd.	Plant in Bann Khai, Rayong Province	1,800
Do.	GJ-Steel Public Co. Ltd. (G-Steel Public Co. Ltd.)	Plant in Sriracha, Chonburi Province	1,500
Do.	Kobe CH Wire (Thailand) Co. Ltd. (Millcon Steel Plc., 50%, and Kobe Steel Ltd., 50%)	Plant in Ban Laeng, Mueang Rayong, Rayong Province	800
Do.	Kobelco Millcon Steel Co. (Millcon Steel Plc., 50%, and Kobe Steel Ltd., 50%)	Plant in Khok Faet, Nong Chok, Bangkok	300
Do.	LPN Plate Mill Public Co. Ltd.	Plant in Pra Samut Chedi, Samut Prakarn Province	500
Do.	Millcon Steel Plc. (Sittichai Leeswadtrakul, 38.19%; General Engineering Plc., 17.2%; others, 44.62%)	Plants in Bang Khun Thian, Bangkok and Nihom Pattana, Rayong Province	1,150
Do.	Namheng Steel Co. Ltd.	Plant in Lopburi Province	300
Do.	NS-Siam United Steel Co. Ltd. (Nippon Steel & Sumitomo Metal Corp.)	Plant in Map Ta Phut, Muang, Rayong Province	1,360
Do.	POSCO-Coated Steel (Thailand) Co. Ltd. (POSCO-TCS)	Plant in Bang Saphan, Prachuap Khiri Khan Province	450
Do.	POSCO-Thainox Public Co. Ltd.	Plant in Nihom Phatthana, Rayong Province	3,500
Do.	Prime Steel Mill Co. Ltd.	Plant in Pluak Daeng, Rayong Province	600
Do.	Ractchasima Steel Products Co. Ltd. (Bangkok Steel Industry Group)	Plant in Muang, Nakornrachasima Province	710
Do.	Sahaviriya Plate Mill Public Co. Ltd. (SPM)	Plant in Bankpakong, Chachoengsao Province	652
Do.	Sahaviriya Steel Industries Plc. (SSI)	Plant in Bangsaphan, Prachuap Khiri Khan Province	4,000
Do.	Siam Yamato Steel Co. Ltd. (SYS)	2 plants in Map Ta Phut, Mueang, Rayong Province	1,100
Do.	Sumisho Metal (Thailand) Co. Ltd. (Sumitomo Corporation Global Metals, 100%)	Plant in Samrong, Phrapradaeng, Samutprakarn Province	NA
Do.	Tata Steel Manufacturing (Thailand) Public Co. Ltd. (TS Global Holdings Pte. Ltd., 67.9%, and others, 32.1%)	NTS Plant, Hemaraj Chonburi Industrial Estate, Sriracha, Chonburi Province	800
Do.	do.	SCSC Plant, Muang, Rayong Province	500
Do.	do.	SISCO Plant, Ban Mo, Saraburi Province	400
Do.	Thai Cold Rolled Steel Sheet Public Co. Ltd. (TCRSS)	Plant in Bang Saphan, Prachuap Khiri Khan Province	1,000

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Iron and steel:—Continued				
Products—Continued		TY Steel Co. [Tycoons Worldwide Group (Thailand) Public Co. Ltd.]	Wire rod and rebar plant in Rayong Province	600
Do.		Zubb Steel Co. Ltd.	Plant in Phatthana Nikhom, Lopburi Province	1,200
Lead:				
Mine		Boh Yai Mining Co. Ltd. (Kanchanaburi Exploration and Mining Co. Ltd., 100%)	Boh Yai and Song Toh lead-zinc-silver mines, Kanchanaburi Province ³	24
Refined, secondary		Bergsoe Metals Co. Ltd.	Plant in Kaeng Khoi, Saraburi Province	65
Do.		T.K Metal Trading Ltd. Partnership	Tha Tamnak plant, Nakornpathom Province	17
Do.		Thai Nonferrous Metal Co. Ltd.	Hua Samroing plant, Chachoengsao Province	30
Lime		Chememan Public Co. Ltd.	Kaeng Khoi quicklime plant, Saraburi Province	530
Do.		do.	Phra Phutthabat plant, Saraburi Province	365
Do.		do.	Rayong hydrated lime plant, Rayong Province	88
Do.		Golden Lime Public Co. Ltd.	Plant in Lopburi Province	170
Manganese, ore, gross weight		NA	Mines in Chiang Mai, Chiang Rai, Narathiwat, Sa Kaeo Provinces	5
Perlite		NA	Quarries in Lopburi Province	15
Petroleum:				
Condensates	thousand 42-gallon barrels	APICO LLC, 35%; PTTEP SP Ltd., 35%; others 30%	Sinphuhorm gasfield (Blocks E5 and EU-1), Udon Thani and Khon Kaen Provinces	100
Do.	do.	PTT Exploration and Production Public Co. Ltd.	Blocks L53/43 and L54/43, Suphanburi, Kanchanaburi, PhraNakhon Si Ayutthaya, and Angthong Provinces	250
Do.	do.	PTT Exploration and Production Public Co. Ltd., 80%; Chevron Thailand Exploration and Production Ltd., 16%; others, 4%	Arthit gasfield (Blocks B14A, B15A, B16A, and G8/50), Gulf of Thailand	4,000
Do.	do.	PTT Exploration and Production Public Co. Ltd., 66.7%, and MOECO Thailand Co. Ltd., 33.3%	Bangkot gasfield (Blocks B15, B16, B17, and G12/48), Gulf of Thailand	4,900
Do.	do.	PTT Exploration and Production Public Co. Ltd., 45% to 60% depending on operating area; Chevron Thailand Exploration and Production Ltd. or Chevron Pattani Ltd., 35%; others, 5% to 20%	Pailin gasfield (Blocks B12, B27, and G7/50), Gulf of Thailand	6,400
Do.	do.	PTT Exploration and Production Public Co. Ltd., 44.45%; Total E&P Thailand SAS, 33.33%; BG Group Plc., 22%	Bangkot Tai gasfield (Blocks B16 and B17), Gulf of Thailand	3,500
Crude	do.	Chevron Group, 51.66%; PTTEP Offshore Investment Co. Ltd., 25%; MOECO International B.V., 16.706%; others, 6.634%	Tantawan oilfield (Blocks B8/32 and 9A), Gulf of Thailand	6,400
Do.	do.	Chevron Thailand Exploration and Production Ltd.	Erawan oilfield (Block G1/61), Gulf of Thailand	9,400
Do.	do.	Coastal Energy Co.	Songkla oilfield (Block G5/L43), Gulf of Thailand	2,100
Do.	do.	Kris Energy Ltd., 89%, and Palang Sophon International Ltd., 11%	Wasana oilfield (Block G10/48), Gulf of Thailand	1,600
Do.	do.	Medco Energi Thailand	Bualuang oilfield (Block B8/38), Gulf of Thailand	2,500
Do.	do.	Mubadala Petroleum LLC	Jasmine oilfield (Block B5/27), Gulf of Thailand	4,000
Do.	do.	Mubadala Petroleum LLC, 60%; Tap Energy Thailand Pty Ltd., 30%; Northern Gulf Petroleum Pte. Ltd., 10%	Manora oilfield (Blocks G1/48 and G3/48), Gulf of Thailand	2,000

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Petroleum:—Continued				
Crude—Continued	thousand 42-gallon barrels	Mubadala Petroleum LLC, 68%; Kris Energy Ltd., 23%; Palang Sophon International Ltd., 10%	Nongyao oilfield (Block G11/48), Gulf of Thailand	2,600
Do.	do.	Pan Orient Energy (Siam) Ltd. (POS) (Pan Orient Energy Corp.)	Nasanun oilfield (Block L53/48), on shore of Gulf of Thailand	300
Do.	do.	PTTEP Siam Ltd., 75%, and PTT Exploration and Production Public Co. Ltd., 25%	Sirikit oilfield (Block S1), Kamphaeng Phet Province	11,000
Refinery	do.	Bangchak Corp. Public Co. Ltd.	Bangchak refinery, Phra Khanong, Bangkok	43,800
Do.	do.	Esso (Thailand) Public Co. Ltd. (Exxon Mobil Corp.), operating jointly with PTT Exploration and Production Public Co. Ltd. (Petroleum Public Co. Ltd.)	Esso Sriracha refinery, Sriracha, Chonburi Province	63,500
Do.	do.	IRPC Public Co. Ltd. (PTT Public Co. Ltd., 47.55%, and others, 52.45%)	Refinery in Rayong Complex, Rayong Province	78,500
Do.	do.	PTT Global Chemical Public Co. Ltd.	Refinery in Map Ta Phut Industrial Estate, Mueang, Rayong Province	102,000
Do.	do.	Star Petroleum Refining Public Co. Ltd. (Chevron South Asia Holdings Pte. Ltd., 60.6%, and others, 39.4%)	do.	62,000
Do.	do.	Thai Oil Public Co. Ltd. [PTT Public Co. Ltd., 48.0%; State Street Europe Ltd., 3.5%; South East Asia UK (Type C) Nominees Ltd., 2.9%; others, 45.6%]	Refinery in Tungsukla, Sriracha, Chonburi Province	100,000
Phosphate rock		NA	Mines in Kanchanaburi and Phetchaburi Provinces ³	NA
Potash		Asean Potash Chaiphum Plc. (ASEAN members, 29%; Ministry of Finance Thailand, 20%; others, 51%)	Mine and processing plant in Bamnet Narong, Chaiphum Province	1,100
Rare earths, oxide equivalent		Xinyuan Rare Earth (Thailand) Co. Ltd. (Shenghe Resources Holding Co. Ltd.)	Separation facility in Ban Khai, Rayong Province	3
Salt:				
Rock salt		Pimai Salt Co. Ltd.	Mines in Nakhon Ratchasima Province	1,500
Sea salt		Approximately 200 producers	Salterns in Phetchaburi, Samut Sakhon, and Samut Songkhram Provinces	160
Sand, industrial		Pands Group Mining and Milling Co. Ltd.	Quarry in Ayutthaya Province	120
Silicon, metal		G.S. Energy Co. Ltd.	Ratchaburi silicon plant, Ratchaburi Province	45
Silver, mine, Ag content	kilograms	Akara Resources Mining Ltd. (Kingsgate Consolidated Ltd., 100%)	Chatree Mining Complex, Phichit Province ²	31,000
Stone:				
Dolomite		Inthai Mining Ltd.	Quarry in Surat Thani Province	NA
Do.		Pands Group Mining and Milling Co. Ltd.	Quarry in Kanchanaburi Province	1,600
Do.		NA	Nearly 20 quarries in Kanchanaburi, Krabi, Phangnga, Phetchabun, Phrae, Songkhla, Surat Thani, and Trang Provinces	1,200
Limestone		Chememan Public Co. Ltd.	Thap Kwang Mine, Kaeng Khoi, Saraburi Province	1,000
Do.		Pands Group Mining and Milling Co. Ltd.	Quarry in Saraburi Province	1,000
Do.		Singh Group Co. Ltd.	Peerapol limestone quarry, Songkhla Province	1,000
Talc and related materials:				
Pyrophyllite		NA	Quarries in Saraburi Province	30
Talc		NA	Quarries in Uttaradit Province	8
Do.		Winstone Technology Co. Ltd.	Plant in Suanluang, Samuthsakorn Province	NA

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity ^c
Tantalum, metal powder and oxides	metric tons	Taniobis Co. Ltd. [Taniobis GmbH (JX Nippon Mining & Metals Corp.)]	Plant in Map Ta Phut, Rayong Province	250
Tin:				
Concentrate, Sn Content	do.	Numerous small companies	Mines in Nakhon Si Thammarat, Phangnga, Phuket, and Rayong Provinces	1,000
Smelter, primary		Thailand Smelting & Refining Co. Ltd. (Thaisarco) (Amalgamated Metal Corp. Plc., 100%)	Smelter in Phuket, Phuket Province	12
Smelter, secondary		O.M. Manufacturing (Thailand) Co. Ltd.	Smelter in Sriracha, Chonburi Province	NA
Tungsten, concentrate, W content	metric tons	SC Mining Co. Ltd. (Som Chai family, 100%)	Mine in Ban Pin, Phrae Province	650
Zinc:				
Ore, Zn content		Padaeng Industry Public Co. Ltd.	Mine in Mae Sot, Tak Province ⁴	30
Refined	do.		Smelter and refinery in Tak Province; roaster plant in Rayong Province ⁴	110

Do., do. Ditto. NA Not available

¹Inactive since 2015.

²All gold-mining operations were banned on January 1, 2017.

³Closed in 2016.

⁴Closed in 2017.