2019 Minerals Yearbook

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The Mineral Industry of Australia

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In 2019, Australia continued to be among the world's leading producers of such mineral commodities as bauxite, coal, cobalt, copper, gem and industrial diamond, gold, gypsum, ilmenite, iron ore, lead, lithium, manganese, nickel, phosphate rock, rare earth elements, rutile, salt, silver, tin, uranium, zinc, and zircon. Australia's lithium production accounted for 52% of world production; iron ore (gross weight), 38%; iron ore (Fe content), 37%; zircon, 33%; industrial garnet and rutile, 31% each; bauxite, 29%; industrial diamond, 24%; manganese, 16%; alumina, 15%; ilmenite and lead, 11% each; gold and zinc, 10% each; rare earths, 9%; nickel, 6%; copper, 5%; and cobalt, 4%.[1] Australia was ranked third in global uranium production (accounting for approximately 12% of world production) and fourth in global coal production (8%). Australia was the second-ranked exporter of liquefied natural gas (LNG), behind Qatar, accounting for 22% of global exports (BP p.l.c., 2020, p. 46; World Nuclear Association, 2020; Bray, 2021a, b; Flanagan, 2021; Gambogi, 2021a, b; Jaskula, 2021; Klochko, 2021; McRae, 2021; Olson, 2021a, b; Sangine, 2021; Schnebele, 2021; Sheaffer, 2021; Shedd, 2021; Tolcin, 2021; Tuck, 2021).

Minerals in the National Economy

In 2019, Australia's nominal gross domestic product (GDP) was 1.97 trillion Australian dollars (AUD) ($1.32 trillion[2]). Australia's real GDP increased by 1.9% in 2019 compared with that of 2018. The mineral industry (including exploration and mining support services) accounted for 10.1% of Australia's GDP compared with 9.8% in 2018. The gross value added of the mineral sector increased by 5.5% to AUD 199 billion ($139 billion). Iron ore mining accounted for 32% the gross value added of the mining sector as a whole, followed by natural gas and petroleum extraction, 31%; coal mining, 25%; other mining (which includes nonferrous metals, industrial minerals, and uranium), 9%; and exploration and mining services, 4%. The gross value added of natural gas and petroleum extraction increased by 16%, followed by other mining and coal mining, which increased by 4% and 2%, respectively. The gross value added of exploration and mining support services decreased by 7%, whereas that of iron ore mining remained the same as in 2018 (Australian Bureau of Statistics, 2020c).

Investment in the mineral industry totaled AUD 33.9 billion ($23.6 billion) in 2019, which was down by 2% compared with that of 2018. This decrease was owing to a 34% decrease in investment in the natural gas and petroleum sector, which totaled AUD 10.2 billion ($7.1 billion), and a 14% decrease in investment in exploration and mining support services, which totaled AUD 1.4 billion ($1.0 billion). Investment in nonmetallic mining and quarrying increased by 92% to AUD 1.2 million ($812,000), followed by coal mining, which increased by 27% to AUD 7.3 million ($5.1 million), and metal mining, which increased by 23% to AUD 13.7 million ($9.5 million) (Australian Bureau of Statistics, 2020c, i; Department of Industry, Innovation and Science, 2020a).

The mineral industry employed 179,005 people at the end of June 2019 compared with 168,591 in 2018 and a peak of 194,205 in 2012. This was the first year in which total employment in the mineral industry increased since 2012. Mineral extraction accounted for about 1.4% of Australia's total employment at the end of June 2019. Metallic ore mining accounted for 41% of employment in the mineral industry, followed by exploration and other mining services, 22%; coal mining, 21%; natural gas and petroleum extraction, 10%; and nonmetallic mineral mining and quarrying, 7%. Employment in every mineral industry category increased compared with that in 2018. Employment in exploration and other mining support services increased by 7%, followed by coal mining, 3%; natural gas and petroleum extraction, 2%; and nonmetallic ore mining, 1% (Australian Bureau of Statistics, 2021).

In 2019, the net inflow of foreign direct investment (FDI) toward Australia was valued at AUD 52.0 billion ($36.1 billion), which was a 43% decrease compared with that of 2018. The decrease was mostly owing to the divestment of $22.8 billion from the financial and insurance industry. The manufacturing sector was the leading recipient category of FDI, accounting for 43% of the total net inflow of FDI in 2019. The mineral industry was the second-ranked recipient category of FDI and accounted for 9% of the total net inflow of FDI in 2019. The net inflow of FDI towards the mineral industry was 73% lower than in 2018. The largest source of FDI was the United Kingdom, which invested $20.1 billion in 2019, followed by Japan, $8.3 billion; and Canada, $4.5 billion. The country with the largest divestment was France, which divested $10.3 billion. The stock of FDI at the end of 2019 was $708 billion, of which the mineral industry accounted for the largest share at 35% followed by the manufacturing industry at 13%. The United States accounted for 20% of the FDI stocks at the end of the year. Other countries with large shares of FDI stocks included the United Kingdom, 12%; Japan, 11%; and the Netherlands, 5% (Department of Foreign Affairs and Trade, 2020b, p. 68–69, 74).

Government Policies and Programs

Land ownership in Australia is divided into the following two categories: freehold land, which includes land that is held by traditional owner groups, such as Aboriginal and Torres Strait Islander land groups, and nonfreehold land or public land, commonly known as Crown land. Mineral resources, irrespective of whether they are located on freehold or Crown land, are owned by the relevant State government or the Government of Australia. The right to extract these mineral resources is under the

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[1] World rankings and percentages do not include U.S. production for bauxite, lithium, and rutile.

[2] Where necessary, values have been converted from Australian dollars (AUD) to U.S. dollars (US$) at the rate of AUD1.154=US$1.00 for 2014, AUD1.340=US$1.00 for 2018, and AUD1.439=US$1.00 for 2019.

jurisdiction of the respective State governments (Australian Trade and Investment Commission, 2021).

In Australia's three-tiered Government system—local, State or Territories, and Federal—each State or Territory establishes its own mineral sector legal framework and has the authority to grant mining rights. Mineral resources are considered owned by either the Federal or State governments. States, however, do not engage in commercial exploration or development of minerals; this is carried out solely by the private sector. The Federal Government does invest in the collection and release of geoscientific data through three Government agencies: the Commonwealth Scientific and Industrial Research Organisation; the Department of Industry, Science, Energy and Resources; and Geoscience Australia. The Federal Government sets national policies regarding the mineral industry, including the regulation of offshore mining operations, FDI guidelines, and taxation policy. The administration of offshore mineral resources is overseen by the National Offshore Petroleum Titles Administrator. States and Territories manage and allocate mineral and petroleum property rights onshore and in coastal waters. They also regulate mining operations and oversee the adherence to environmental, occupational health, and safety laws; collect royalties; and oversee other mineral-related laws and regulations that are not covered by Australia's Constitution (Geoscience Australia, 2020, p. 18–20).

In March, the Government launched a critical minerals strategy with the goal of making Australia a global leader in the exploration, production, and processing of minerals deemed critical to other countries' economies. The strategy includes promoting policies to increase investment in Australia's mineral industry relating to critical minerals, provide incentives for innovation in the mineral industry, and connect existing infrastructure development with critical minerals projects. As part of this strategy, Geoscience Australia released a report on critical minerals, in which it defines critical minerals as "minerals that are both important to society and vulnerable to supply disruptions." The report identifies deposits in Australia that contain minerals considered critical by the European Union, the United Kingdom, and the United States. These include antimony, hafnium, indium, lithium, molybdenum, platinum-group elements, rare earth elements, rhenium, scandium, and tungsten (Department of Industry, Innovation and Science, 2019, p. 4, 10–11; Geoscience Australia 2019, p. 2, 5, 10–12).

Production

Mineral commodities for which output increased by 10% or more in 2019 included tantalum (tantalite concentrate, Ta content), by 109%; nickel matte, 55%; metallurgical coal and subbituminous coal, 22% each; magnesite, 21%; cobalt (mine, Co content), lead (mine, Pb content), and natural gas (marketable), 18% each; zinc (mine, Zn content), 17%; cobalt (refinery, Co content) and silicomanganese, 16% each; copper (refined, primary) and tin (mine, Sn content), 13% each; LNG and smelted copper (primary), 11% each; and bauxite and fuller's earth (including attapulgite), 10% each. Mineral commodities for which output decreased by 10% or more included barite, by 70%; refined lead (primary), 42%; ferromanganese and refined petroleum products (other), 23% each; lithium (spodumene), 18%; silicomanganese, 16%; and salt, smelted zinc (primary), and zirconium (mineral concentrate), 11% each. Data on mineral production are in table 1.

Structure of the Mineral Industry

The Government of Australia and State and Territory governments did not engage in the exploration for, nor the development of mineral resources. All exploration and mining operations were undertaken by private entities. The mineral industry had the largest share of foreign ownership among all Australia's industries. At the end of June 2019, 38.8% of mining businesses had some foreign ownership: 8.0% were less than 10% foreign owned, 7.4% were between 10% and 50% foreign owned, and 23.4% were greater than 50% foreign owned. Table 2 is a list of major mineral industry facilities (Department of Foreign Affairs and Trade, 2020b, p. 19; Geoscience Australia, 2020, p. 18).

Mineral Trade

Australia's total exports in 2019 were valued at AUD 493 billion ($342 billion), which was an increase of 12% compared with the value of total exports in fiscal year 2018. Australia's nonfuel mineral exports were valued at AUD 169.8 billion ($118.0 billion) in 2019, which was a 26% increase compared with the value in 2018 (which was, in turn, an increase of 9% compared with that in 2017). The value of Australia's mineral fuel exports increased by 15% to AUD 127.0 billion ($88.3 billion) in 2019. The leading mineral export was iron ore, which was valued at AUD 96.2 billion ($66.8 billion), followed by LNG, AUD 48.7 billion ($33.8 billion); metallurgical coal, AUD 41.3 billion ($28.7 billion); gold, AUD 23.4 billion ($16.2 billion); and thermal coal, AUD 22.7 billion ($15.7 billion). The largest percent increase, by value, was in the export of nickel ore and concentrates, which increased by 72%, followed by LPG, 59%; other gemstones (including cut and polished sapphires), 35%; opals, 30%; gold and refined copper, 22% each; bauxite, 21%; steel, 18%; crude petroleum, 17%; and LNG and tin, 12% each. The largest percent decrease, by value, was in the export of refined silver, which decreased by 35%, followed by alumina (including aluminum hydroxide), 18%; refined petroleum and refined zinc, 15% each; thermal coal, 12%; and rough sapphires, 11% (table 3; Department of Foreign Affairs and Trade, 2020a, p. 5; Department of Industry, Innovation and Science, 2020a, p. 17).

China (excluding Hong Kong), Japan, the Republic of Korea, and the United States were Australia's leading export markets. Exports to China in 2019 increased by 23% to AUD 169 billion ($117 billion), accounting for 37% of Australia's total exports. In 2019, Australia's major mineral commodity exports to China were iron ore (including pellets), 687 million metric tons (Mt); thermal coal, 50.0 Mt; metallurgical coal, 34.3 Mt; LNG, 29 Mt; zinc concentrates, 1.19 Mt; copper ore and concentrates, 1.03 Mt; lead concentrate, 257,000 metric tons (t); refined zinc, 124,000 t; gold bullion (refined and unrefined), 49,000 kilogram (kg) (a substantial decrease of 53% from that of 2018); and crude petroleum (including other refinery feedstock), 10 million barrels (Mbbl) (BP p.l.c., 2020, p. 42; Department of Foreign Affairs and Trade, 2020a, p. 24; Department of Industry, Innovation and Science, 2020a, p. 24, 25, 27–29, 31, 36).

Exports to Japan in 2019 increased in value by 3% to AUD 60.4 billion ($42.0 billion), accounting for 12% of Australia's total exports. In 2019, Australia's major mineral commodity exports to Japan included thermal coal, 75.0 Mt; metallurgical coal (45% high quality and 55% other), 35.1 Mt; LNG, 30 Mt; aluminum, 453,000 t; copper ore and concentrates, 416,000 t; zinc concentrates, 157,000 t; lead concentrate, 39,000 t; and crude petroleum (including other refinery feedstock), 2.6 Mbbl (BP p.l.c., 2020, p. 42; Department of Foreign Affairs and Trade, 2020a, p. 24; Department of Industry, Innovation, and Science, 2020a, 23–25, 28, 29, 31, 36).

The Republic of Korea was a substantial importer of zinc concentrate, aluminum, lead concentrate, and LNG from Australia, accounting for, by volume, 25%, 23%, 20%, and 10% of Australia's total exports, respectively. India accounted for 25% Australia's metallurgical coal exports. Malaysia and Taiwan were substantial importers of refined copper from Australia, accounting for 28% and 13% of Australia's exports, respectively. Taiwan accounted for 6% of Australia's LNG exports. The United Kingdom accounted for 50% of Australia's gold bullion (refined and unrefined) exports, followed by Hong Kong, 18% (Department of Industry, Innovation, and Science, 2020a, p. 23–25, 27–29, 31, 36).

Australia's total imports in 2019 were valued at AUD 425 billion ($296 billion), which was an increase of 2% compared with that in 2018. The value of Australia's mineral imports decreased by 4% to AUD 51.6 billion ($35.8 billion). Australia's leading mineral import category was petroleum refinery products, which were valued at AUD 26.1 billion ($18.2 billion), followed by crude petroleum (including other refinery feedstock), AUD 12.5 billion ($8.7 billion) and gold bullion (refined and unrefined), AUD 6.8 billion ($4.7 billion). Australia's leading supplier of crude petroleum (including other refinery feedstock) was Malaysia, which accounted for 25% of Australia's imports, followed by the United Arab Emirates, 14%; Indonesia and New Zealand, 4% each; and Papua New Guinea and Singapore, 3% each. Morocco accounted for 22% of Australia's imports of phosphate rock, followed by Nauru, 13%, and China, 4% (Department of Industry, Innovation, and Science, 2020a, p. 19, 31–32).

Commodity Review

Metals

Bauxite and Alumina.—Western Australia remained Australia's leading bauxite-producing State, accounting for nearly 50% of the country's bauxite production in 2019, followed by Queensland, 39%, and the Northern Territory, 12%. Tasmania also produced a very minor amount of bauxite. In 2019, 11 bauxite mines operated in the country—5 on Cape York in Queensland, 3 in the Darling Range in Western Australia, 2 near Nhulubuy in the Northern Territory, and 1 at Campbell Town in Tasmania. In 2019, Rio Tinto Ltd. operated the Weipa-Ely project, which included the Amrun, the Andoom, and the East Weipa Mines, and produced 35.4 Mt of bauxite. The Amrun Mine reached its full capacity of 22.8 Mt in late 2019. Alcoa of Australia Ltd. (Alcoa Corp. of the United States, 60%, and Alumina Ltd., 40%) operated the Darling Range Mines project, which included the Huntly and the Willowdale Mines and produced 34.7 Mt of bauxite in 2019 (table 2; Alcoa Corp., 2020, p. 6; Department of Industry, Innovation and Science, 2020a, p. 23; Rio Tinto Ltd., 2020, p. 47, 270).

Cobalt and Nickel.—Western Australia remained Australia's sole nickel-producing State in 2019. Panoramic Resources Ltd. dispatched its first shipment of nickel-copper-cobalt concentrate from its Savannah Mine. The Savannah Mine restarted production in December 2018 after being on care-and-maintenance status since 2016. In 2019, the Savannah Mine produced 67,145 t of concentrate at an average grade 7.2% nickel, 4.5% copper, and 0.37% cobalt. BHP Group Ltd. began production at its Yakabindie Mine in December, and its Venus Mine reached full production in September. Ore produced at the Yakabindie Mine was fed into the Mount Keith concentrator, whereas ore produced at the Venus Mine was fed to the Leinster concentrator. As of June 30, the Yakabindie Mine had 150 Mt of reserves grading 0.57% nickel, and the Venus Mine had 2.1 Mt grading 2.7% nickel. The mine lives of the Yakabine and the Venus Mines were 15 and 7 years, respectively. BHP's Kwinana nickel refinery produced 66,000 t of refined nickel, 17,000 t of nickel matte, and 827 t of cobalt byproducts (Panoramic Resources Ltd., 2019, p. 3; 2020a, p. i, 8; 2020b, p. 3, 13; BHP Group Ltd., 2020a, p. 84, 302; 2020b, p. 22; Department of Industry, Innovation and Science, 2020a, p. 30).

Copper.—In 2019, South Australia remained Australia's leading State in the production of copper ore and concentrate (Cu content), accounting for 34% of the total production in the country, followed by Queensland, 25%; and New South Wales and Western Australia, 22% each. Tasmania also produced a very minor amount of copper. Oz Minerals Ltd. commissioned its Carrapateena Mine in South Australia in December. The mine had the capacity to produce 65,000 metric tons per year (t/yr) of copper concentrate (Cu content). The mine had a total proven and probable mineral reserves of 91 Mt at a grade of 1.6% Cu, and it had a projected mine life of 20 years (Department of Industry, Innovation and Science, 2020a, p. 25; Oz Minerals Ltd., 2020, p. 11, 107).

Gold.—Western Australia remained Australia's leading gold-producing State, accounting for 67% of the country's gold production in 2019, followed by New South Wales, 13%; Victoria, 7%; the Northern Territory and Queensland, 5% each; and South Australia, 3%. Tasmania also produced a minor amount of gold. Mining commenced at the Gruyere Mine in the eastern goldfields of Western Australia in June. The mine was a joint venture between Gold Roads Resources Ltd. (50%) and Gold Fields Ltd. of South Africa (50%) and produced nearly 3,100 kg of gold in 2019. The mine had a capacity of 9,000 kilograms per year (kg/yr) of gold (table 2; Department of Industry, Innovation and Science, 2020a, p. 27; Gold Roads Resources Ltd., 2020, p. 19–20).

Resolute Mining Ltd. received approval from the Queensland government for 12 new mining leases related to the expansion of the Ravenswood Mine. The expansion had an estimated capital cost of $93 million and was expected to extend the mine life to 15 years. In October, Newcrest Mining Ltd. announced the approval of the first stage of expansion of its Cadia Valley Mining complex, which would increase the mine's processing capacity to 33 million metric tons per year (Mt/yr) of ore from 30 Mt/yr. Newcrest was performing a feasibility study for the second stage of expansion which would increase the mine's processing capacity to 35 Mt/yr by the June quarter of 2022. The total capital cost of the Cadia Valley Mine expansion was expected to be $476 million (Resolute Mining Ltd., 2019, p. 7; Department of Industry, Innovation and Science, 2020b, p. 134; Newcrest Mining Ltd., 2020a, p. 6; 2020b, p. 25).

Iron Ore.—Western Australia remained Australia's leading iron-ore-producing State, accounting for more than 99% of the country's total iron ore production in 2019. South Australia and Tasmania accounted for less than 1% each. The Pilbara Region in northwestern Western Australia was the country's leading iron-ore-producing region; it included, for example, Rio Tinto's Hamersley operations that had a combined capacity of 140 Mt/yr. In April, Mount Gibson Iron Ltd. dispatched its first shipment of iron ore from the Koolan Island Mine in Western Australia, which restarted production in the March quarter. Koolan Island had been shut down since 2014 after it was flooded when the mine's main seawall failed. Koolan Island had a nameplate production capacity of 4 Mt/yr of iron ore grading 65% iron. The company mined nearly 2 Mt of iron ore at Koolan Island in 2019 (table 2; Fowler, 2019; Mount Gibson Iron Ltd. 2019, p. 5; 2020, p. 7; Department of Industry, Innovation and Science, 2020a, p. 28).

Lead, Silver, and Zinc.—Queensland remained Australia's leading lead-, silver-, and zinc-producing State. Queensland produced 59% of the country's lead ore and concentrate (Pb content), followed by New South Wales, 19%; the Northern Territory, 11%; Tasmania, 10%; and Western Australia, 1%. Queensland produced 63% of the country's silver, followed by New South Wales, 12%; Western Australia, 8%; Tasmania, 7%; the Northern Territory, 6%; and South Australia, about 4%. Queensland produced 56% of the country's zinc ore and concentrate (Zn content), followed by the Northern Territory, 20%; New South Wales, 9%; Tasmania, 8%; and Western Australia, 7%. In 2019, Glencore plc of Switzerland produced 213,300 t of lead, and 597,600 t of zinc in 2019, which was a 21% and 12% increase, respectively, compared with that of 2018. Glencore attributed these increases to the rampup of the Lady Loretta Mine, which was restarted in 2018. MMG Ltd. continued to ramp up of its Dugald River Mine in Queensland following its startup in November 2017. MMG reported producing 170,057 t of zinc and 23,154 t of lead in concentrate in 2019, which was an increase of 15% and 39%, respectively, compared with production levels in 2018. The company also reported selling 37 t of silver from the Dugald River Mine in 2019, which was an increase of 33% from the amount sold in 2018 (table 2; LeotAUD, 2019; Department of Industry, Innovation and Science, 2020a, p. 29, 33, 36; Glencore plc, 2020, p. 70; MMG Ltd., 2020, p. 20, 29; 2021).

Australia's 42% decrease in primary refined lead production was owing to the shutdown of the Port Pirie smelter on May 28. The smelter's owner, Nyrstar Corp. of Belgium, stated that the shutdown was due to an outage of the smelter's blast furnace caused by an eruption of steam. This incident affected the smelter's top submerged lance furnace, which began production in January 2018. The company reported that the furnace was restarted on July 19 and became fully operational on July 31; however, the company reported on August 12 that the furnace had been shut down again. The company restarted an older furnace at the smelter to compensate for this shutdown. In November, the company shut down the older furnace and restarted the top submerged lance furnace (Moret, 2018; Corvo and Culliver, 2019; Home, 2019; Kinch, 2019; Thomson Reuters, 2019).

Industrial Minerals

Diamond.—Western Australia was the sole diamond-producing State in Australia. The Argyle Mine, operated by Argyle Diamonds Ltd. (Rio Tinto Ltd., 100%), was the sole operating diamond mine in the country. The mine produced 13 million carats of diamond in 2019, which was an 8% decrease compared with the amount produced in 2018. Rio Tinto reported the Argyle Mine had a remaining 5.1 Mt of reserves at a grade of 1.9 carats per metric ton diamond compared with 11 Mt of reserves at a grade of 2.2 carats per metric ton diamond in 2018, and that the mine was expected to be closed in 2020. In September, the Federal Court of Australia ordered the liquidation of Merlin Diamonds Ltd. following an investigation by the Australian Securities and Investment Commission of possible illegal activity. Merlin Diamond was the owner and operator of the Merlin diamond mine in the Northern Territory. In December, Gibb River Diamonds Ltd. acquired the Ellendale diamond mine in Western Australia. The Ellendale Mine, where operations had ceased in 2015, remained closed (table 2; Gibb River Diamonds Ltd., 2019, p. 1, 9; Toscano, 2019; Department of Industry, Innovation and Science, 2020a; Rio Tinto Ltd., 2020, p. 51, 274).

Lithium and Tantalum.—Western Australia was the sole lithium-producing and tantalum-producing State in Australia. Although several lithium projects commenced production or ramped up production in 2019, overall lithium production in Australia decreased owing to decreasing global lithium prices in the second half of the year. Lithium miners responded to this price decrease by reducing their production (Department of Industry, Innovation and Science, 2020b, p. 121, 122).

Three mines began lithium production in 2018 and ramped up in 2019—Alita Resources Ltd.'s (formerly Alliance Mineral Assets Ltd.) Bald Hill Mine, Altura Mining Ltd.'s Pilgangoora Mine, and Pilbara Minerals Ltd.'s Pilgangoora lithium-tantalum project. Altura reported that the Pilgangoora Mine had reached commercial production in March. In 2019, the mine produced 164,694 t of spodumene concentrate at a grade of 6% lithium oxide. The mine had a nameplate capacity of 220,000 t/yr of spodumene concentrate. Pilbara Minerals announced that it had reached commercial production at the Pilgangoora lithium-tantalum project in April. In 2019, the mine produced 152,011 t of spodumene concentrate at a grade of 6% lithium oxide and 73 t of tantalum pentoxide in concentrate. The project had a nameplate capacity of 330,000 t/yr of spodumene concentrate with potential to expand to 850,000 t/yr. Pilbara Minerals deliberately decreased production in the second half of the year owing to low lithium prices. As a result, the company's spodumene concentrate production in the second half of 2019 decreased by 69% and tantalum concentrate, by 40%, compared with the first half of the year. Alita Resources ramped up production at the Bald Hill Mine in 2019, producing 77,007 t of spodumene concentrate at a grade of 6% lithium oxide, and 33 t of tantalum pentoxide in concentrate in the first half of the year. Owing to decreased lithium prices, however, the company went into administration in August when it was found the mine could not be operated at a profit (Alita Resources Ltd., 2019, p. 3; Altura Mining Ltd., 2019, p. 3, 6; 2020, p. 3; Argus Media Ltd., 2019; Ker, 2019; Pilbara Minerals Ltd., 2019, p. 14; 2020a, p. 15, 34; 2020b, p. 5).

Mineral Fuels and Related Materials

Coal.—Queensland remained Australia's leading State in the production of coal (all types), accounting for 55% of the coal produced in the country, followed by New South Wales, 44%; and Western Australia, 1%. Tasmania also produced a minor amount of coal. In January, Mach Energy Australia Pty Ltd. began production at the Mount Pleasant Mine in New South Wales. The mine had a capacity of 10.5 Mt/yr of thermal coal. Stanmore Coal Ltd. closed its Isaac Plains Mine in February owing to depletion of resources and transitioned all mining activities to its Isaac Plains East Mines, which began operating in December 2018 and had a capacity of 2 Mt/yr of metallurgical coal. Bounty Mines Ltd. continued the rampup of the Cook Mine in Queensland, producing 472,000 t of coal (thermal and metallurgical) in 2019. However, on October 17, a roof fell in the mine. Bounty Mines went into administration on December 18 and placed Cook Mine on care-and-maintenance status stating the reason was the costs and delays incurred by the roof collapse and low metallurgical coal prices. The Byerwen Mine in Queensland, a joint venture between QCoal Pty Ltd. (80%) and JFE Steel Corp. of Japan (20%), opened in September. The mine had a capacity of 3 Mt/yr of metallurgical coal (Bounty Mines Ltd., 2019a–d; Gleeson, 2019; Lu and Bartholomew, 2019; McArtney, 2019; Stanmore Coal Ltd., 2019, p. 26; Department of Industry, Innovation and Science, 2020a, p. 24; Mach Energy Australia Pty Ltd., 2021).

In June, Adani Group of India received approval from the Queensland government to begin construction of the Carmichael Mine located 300 kilometers (km) west of Mackay, Queensland. The Carmichael Mine was expected to produce 10 Mt/yr of thermal coal with an option to ramp up production to 27 Mt/yr. Adani planned to construct 200 km of railway linking the mine to the Port of Abbot Point, where the coal was expected to be exported to India. Production at the mine was expected to begin in 2021 (Australian Broadcasting Corp., 2019; Robertson, 2019; Adani Enterprises Ltd., 2020, p. 77; Department of Industry, Innovation and Science, 2020b, p. 134).

Natural Gas.—Australia's exports of LNG continued to increase in 2019, up by 11% to 77 Mt compared with LNG exports in 2018. The Prelude Floating LNG platform dispatched its first shipment of LNG in June. The Ichthys LNG facility continued to ramp up, producing 7 Mt of LNG in 2019 (Royal Dutch Shell plc, 2019; Department of Industry, Innovation and Science, 2020a, p. 16; Total S.A., 2020, p. 34).

Reserves and Resources

Under Australia's National Classification System for Identified Mineral Resources, "economic demonstrated resources" (EDR) is a collective term for mineral resources that the Australia Government has determined to be economical.

The EDR of the following minerals increased in 2019 compared with those of 2018: molybdenum, increased by 45%; tin and vanadium, 30% each; platinum-group elements, 19%; manganese ore and potash, 17% each; and graphite, 10%. The EDR for diamond decreased by 73%, followed by antimony, 30%; uranium, 13%; and magnesite, 10%. Accessible economic demonstrated resources[3] for select minerals at the end of 2019 are shown in table 5 (Geoscience Australia, 2021, p. 13).

In 2019, expenditure on exploration totaled AUD 4.05 billion ($2.82 billion) compared with AUD 3.33 billion ($2.49 billion) in 2018. Exploration for nonpetroleum minerals accounted for nearly 66% of total exploration expenditures in 2019, followed by offshore petroleum and natural gas, 20%; and onshore petroleum and natural gas, 15%. Exploration expenditures for onshore petroleum and natural gas increased by 51%, followed by nonpetroleum minerals, 22%; and offshore petroleum and natural gas, 5%. Gold deposits accounted for the largest share of exploration expenditures among minerals other than petroleum and natural gas in 2019, accounting for 40% of the total, followed by copper deposits, 16%; iron ore deposits, 13%; coal (undifferentiated) and nickel-cobalt deposits, 9% each; silver-lead-zinc deposits, 3%; mineral sands [composed of titanium ore minerals (ilmenite, leucoxene, and rutile), and zircon], 1%; uranium, 0.4%; and diamond, 0.3%. Other minerals, which included construction sand and gravel, crushed stone, garnet, staurolite, tin, and tungsten (scheelite and wolframite), accounted for the remaining 8% of exploration expenditures. Exploration expenditures on copper increased by 59% in 2019 compared with those in 2018; coal, 32%; gold, 20%; iron ore, 16%; other minerals, 15%; nickel-cobalt, 10%; and mineral sands, 1%. Exploration expenditures decreased only for silver-lead-zinc deposits in 2019, by 18%, and diamond and uranium, by 17% each (Australian Bureau of Statistics, 2020a, d–g, j).

For the exploration of nonpetroleum minerals, identified deposits accounted for 60% of exploration expenditures, and new deposits accounted for the remaining 40%. In 2019, 10,391 km was drilled for exploration of minerals other than petroleum and natural gas, which was a 6% increase compared with the depths drilled in 2018 (Australian Bureau of Statistics, 2020e, f).

The total expenditures on petroleum and natural gas exploration were valued at AUD 1.4 billion ($970 million) in 2019, which was a 20% increase from those in 2018. This was the first annual increase since 2014, when expenditures on petroleum and natural gas exploration reached $4.11 billion. Offshore exploration accounted for 57% of total expenditures on petroleum exploration. Drilling accounted for 57% of total onshore exploration expenditures and 53% of offshore exploration expenditures (Australian Bureau of Statistics, 2020a–h).

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[3]Accessible economic demonstrated resources (AEDR) are defined by Geoscience Australia as economic demonstrated resources that exclude resources subject to legal or land-use restrictions.

Outlook

Overall investment in mining is expected to increase slowly during the next several years following a 7-year decline. This expectation is based on the planned development of some large mining projects in coming years, such as the Carmichael coal mine in Queensland, and five committed gold projects, which include the expansions of the Cadia Valley Mine and the Ravenswood Mine. The Carmichael coal mine and these five gold projects together represent $2.3 billion of investment. Investment in gold mining is driven by high global gold prices that are expected to continue to increase. Other committed projects included the Eliawana iron mine (Fortescue Metals Group Ltd.), the South Flank iron mine (BHP), and the Koodaideri iron mine (Rio Tinto) (Department of Industry, Innovation and Science, 2020b, p.125–127, 134).

Although overall investment in coal exploration increased in 2019, investment in future greenfield coal projects is likely to decrease as a result of low thermal coal and metallurgical coal prices, community opposition to coal mining, and increased regulation. Base metal exploration is expected to increase, largely as a result of exploration for copper as investors anticipate a global shortage. Iron ore exploration depends heavily on China's production of steel, which was not expected to grow in 2020. After a 6-year decline in investment in the development of mineral projects, investment is expected to increase slowly because of the development large LNG projects in Western Australia. The decrease in lithium prices has caused the delay of some lithium exploration and expansion projects, and future production levels may depend on global market prices (Department of Industry, Innovation and Science, 2020b, p. 24, 25, 129, 130, 133).

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TABLE 1

AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons, gross weight, unless otherwise specified)

Commodity		2015	2016	2017	2018	2019
METALS						
Aluminum:						
Bauxite	thousand metric tons	80,909	83,517	89,421	95,948	105,544
Alumina	do.	20,097	20,681	20,486	20,062	20,239
Metal, primary	do.	1,646	1,635	1,487	1,574	1,570
Antimony, mine, Sb content		3,712	3,598	3,115	2,173	2,032
Cadmium, refinery, primary[e]		380	400	400	400	400
Cobalt, Co content:						
Mine, laterite ore, Ni concentrate, and Zn concentrate[3]		5,721	5,140	5,034	4,878	5,742
Refinery, metal powder and oxide-hydroxide		5,150	3,350 [e]	3,000	3,200	3,700
Copper:						
Mine:						
Concentrates, Cu content	thousand metric tons	956	918	823 [r]	888 [r]	909
Solvent extraction[4]	do.	40	30	26	23	25
Smelter, primary	do.	433	445	360	361 [r]	401
Refinery, primary:						
Electrowon	do.	40	30	26	23	25
Other	do.	435 [r]	445	360	354 [r]	401
Ferroalloys:						
Ferromanganese[5]		150,000	116,900	125,100	148,300	114,000
Silicomanganese[5]		130,700	83,700	120,200	112,900	95,000
Gold:						
Mine, Au content	kilograms	275,160	290,800	294,171	313,028	325,148
Refinery, primary and secondary	do.	302,271	344,253	327,609	342,706	323,708
Iron ore, mine:						
Gross weight	thousand metric tons	809,882	858,026	885,357	907,819	918,731
Fe content	do.	500,994	531,075	548,297	562,137	568,965
Iron and steel:						
Pig iron	do.	3,594	3,642	3,758	3,882	3,664
Raw steel	do.	4,935	5,160	5,335	6,035	5,493
Lead:						
Mine, Pb content		653,488	441,338	459,487	431,552	509,198
Refinery:						
Primary		182,258	182,830	168,300	155,482	89,888
Secondary, excluding remelt[e]		45,000	41,000	43,000	33,000	35,000
Manganese, mine, ore:						
Gross weight	thousand metric tons	7,400	5,164	6,473	8,193	7,545
Mn content	do.	3,247	2,325	2,821	3,475	3,177
Nickel:						
Mine, Ni content	do.	225	203	185	160 [r]	159
Smelter, matte[6]	do.	44	38	37	11	17
Refinery:						
Metal[7]		132,074	117,920	108,500	114,517 [r]	106,470
Unspecified[8]		20,904	2,600	--	--	--
Platinum-group metals, mine, elemental content:[e, 9]						
Palladium	kilograms	420	590	600	420	380
Platinum	do.	120	170	170	120	110
Total	do.	540	760	770	540	490
Rare earths, mineral concentrate, rare-earth-oxide equivalent[e]		12,000	15,000	19,000	21,000	20,000
Silicon, metal[e]		48,000	48,000	50,000	40,000	40,000
Silver						
Mine, Ag content		1,430	1,418	1,120	1,254	1,325
Refinery		1,064	1,209	1,019	865	928
Tantalum, mine, tantalite concentrate, Ta content	kilograms	68,200	11,000 [r]	20,000 [r]	32,000 [r]	67,000
Tin, mine, Sn content		7,158	6,635	7,402	6,871	7,738

See footnotes at end of table.

TABLE 1—Continued
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons, gross weight, unless otherwise specified)

Commodity		2015	2016	2017	2018	2019
METALS						
Titanium, mineral concentrates:						
Ilmenite and leucoxene	thousand metric tons	1,156	1,400	1,500	1,400 r	1,400 e
Rutile	do.	320	300	300	200	200
Tungsten, mine, concentrate, W content		348	108	20 e	20 e	20 e
Zinc:						
Mine, Zn content	thousand metric tons	1,610	885	852	1,136 r	1,325
Smelter, primary	do.	489	464	462	490	436
Zirconium, mineral concentrates	do.	601	600	505	530	470
INDUSTRIAL MINERALS						
Abrasives, garnet, natural		283,108	574,660	363,573	360,133	352,978
Barite		6,017	7,139	8,958	6,534	1,982
Cement, hydraulic[e]	thousand metric tons	9,500	9,600	9,700	10,200	10,600
Clay:						
Bentonite[e]		76,000	92,000	117,000 r	87,000 r	90,000
Fuller's earth, attapulgite		16,216	12,200 e	12,000 e	10,000 r, e	10,000 e
Kaolin[e]		209,000	205,000	200,000	200,000	220,000
Diamond, natural:[e]						
Gem	thousand carats	271	279	343	281	260
Industrial	do.	13,300	13,700	16,800	13,800	12,700
Total	do.	13,600	14,000	17,100	14,100	13,000
Diatomite[e]		14,000	12,000	12,000	11,000 r	11,000
Feldspar, includes nepheline syenite[e]		45,000	10,000	10,000	10,000	10,000
Graphite, crystalline flake		500	--	--	--	--
Gypsum, mine	thousand metric tons	2,542	2,889	1,397	1,400 e	1,400 e
Lime[e]		1,990,000	2,000,000	2,000,000	2,000,000	1,980,000
Lithium, spodumene, concentrates		439,514 r	522,181 r	1,706,618	1,965,944 r	1,616,764
Magnesite[e, 10]		570,000	340,000	210,000	265,000	320,000
Nitrogen, ammonia, N content[e]		1,300,000	1,300,000	1,300,000	1,300,000	1,300,000
Perlite[e]		1,000	800	500	500	500
Phosphate rock:[e]						
Gross weight		3,300,000	3,000,000	3,000,000	2,800,000	2,700,000
P_2O_5 content		860,000	750,000	750,000	680,000	670,000
Salt	thousand metric tons	11,390	10,410	11,675	12,894	11,474
Stone, sand and gravel, construction:						
Sand and gravel	do.	29,500	29,300	29,000 e	29,000 e	29,000 e
Stone, crushed[e]	do.	24,700	24,900	25,000	25,000	25,000
Talc and related materials, chlorite, pyrophyllite, steatite, talc[e]		80,000	111,000	110,000	100,000	100,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:[e]						
Anthracite	thousand metric tons	179	800	790	820 r	790
Bituminous	do.	259,000	256,000	253,000	262,000	265,000
Lignite	do.	71,900	71,600	70,600	73,300	68,800
Metallurgical	do.	215,000	213,000	210,000	218,000	265,000
Subbituminous	do.	25,400	25,100	24,700	44,900 r	54,900
Coke, metallurgical[e]	do.	2,920	2,500	2,500	2,500	2,660
Liquefied natural gas[e]	do.	32,400	45,000	56,900	69,500	77,000
Natural gas, marketable	million cubic meters	76,791	97,328	113,805	130,987	154,485
Petroleum:						
Crude, including condensate	thousand 42-gallon barrels	117,468 r	107,539 r	103,706	107,539	131,539
Refinery products:						
Liquefied petroleum gas	do.	17,883	19,970	18,209	19,971	33,173
Other[11]	do.	174,652	172,245	168,039	175,394	134,421
Uranium, mine, U content		5,655	6,234	5,712 r	6,561 r	6,552

See footnotes at end of table.

TABLE 1—Continued

AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

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

[1]Table includes data available through March 12, 2021. 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, Australia produced dimension stone, dolomite, jade, kyanite, opal, sapphire, silica, sulfuric acid, and secondary tin metal, but available information was inadequate to make reliable estimates of output.

[3]Cobalt content of lateritic nickel ore and nickel concentrate reported by the government of Western Australia.

[4]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.

[5]Reported by the International Manganese Institute.

[6]Figures exclude toll-refined material.

[7]Products with a nickel content of 99% or more. Includes electrolytic nickel, pellets, briquets, and powder.

[8]Products with a nickel content of less than 99%. Includes ferronickel, nickel oxides and oxide sinter and excludes intermediate nickel-cobalt sulfide matte, regulus, and speiss for further refining.

[9]Platinum-group metal (PGM) recovered from nickel ore that is processed domestically. PGM in exported nickel ore are extracted in the importing countries, such as Japan, and are thought to be included in the production figures for those countries.

[10]Estimates are based on reported data for the calendar year by the Dept. of State Development, South Australia, and for the fiscal year by the Queensland Department of Natural Resources and Mines.

[11]Includes automotive gasoline, aviation gasoline, diesel fuel, and fuel oil.

TABLE 2
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Aluminum:			
Bauxite	Amrun Mine at the Weipa/Ely project (Rio Tinto Ltd., 100%)	South of Weipa, QLD	22,800
Do.	Andoom and East Weipa mines at the Weipa/Ely project (Rio Tinto Ltd., 100%)	Weipa, QLD	12,700
Do.	Bald Hill Mine (Australian Bauxite Ltd., 100%)[3]	Campbell Town, TAS	40
Do.	Bauxite Hills Mine (Metro Mining Ltd., 100%)	95 km north of Weipa, QLD	3,500
Do.	Boddington-Worsley open pit bauxite mine {Worsley Alumina Pty. Ltd., manager [South32 Ltd., 86%; Japan Alumina Associates (Australia) Pty. Ltd., 10%; Sojitz Alumina Pty. Ltd., 4%]}	14 km south of Boddington, WA	19,000
Do.	Gove open pit bauxite mine [Pacific Aluminum (Rio Tinto Ltd., 100%)]	15 km southeast of Nhulunbuy, NT	13,000
Do.	Gulkula Mine (Gulkula Mining Co., 100%)	20 km south of Nhulunbuy, NT	NA
Do.	Hey Point Mine (Green Coast Resources Pty. Ltd., 100%)	Near Weipa, QLD	1,500
Do.	Huntly Mine at Darling Range Mines project [Alcoa of Australia Ltd. (Alcoa Corp., 60%, and Alumina Ltd., 40%)]	80 km south of Perth, WA	26,000
Do.	Willowdale Mine at Darling Range Mines project [Alcoa of Australia Ltd. (Alcoa Corp., 60%, and Alumina Ltd., 40%)]	130 km south of Perth, WA	10,000
Alumina, refinery	Kwinana alumina refinery [Alcoa of Australia Ltd. (Alcoa Corp., 60%, and Alumina Ltd., 40%)]	Kwinana, WA	2,200
Do.	Pinjarra alumina refinery [Alcoa of Australia Ltd. (Alcoa Corp., 60%, and Alumina Ltd., 40%)]	Pinjarra, WA	4,200
Do.	Queensland Alumina alumina refinery [Queensland Alumina Ltd., operator (Rio Tinto Ltd., 80%, and United Company RUSAL, 20%)]	Gladstone Region, QLD	3,950
Do.	Wagerup alumina refinery [Alcoa of Australia Ltd. (Alcoa Corp., 60%, and Alumina Ltd., 40%)]	Wagerup, WA	2,850
Do.	Worsley alumina refinery {Worsley Alumina Pty. Ltd., manager [South32 Ltd., 86%; Japan Alumina Associates (Australia) Pty. Ltd., 10%; Sojitz Alumina Pty. Ltd., 4%]}	Worsley, 20 km northwest of Collie, WA	4,600
Do.	Yarwun alumina refinery (Rio Tinto Ltd., 100%)	Gladstone Region, QLD	3,200
Metal, smelter	Bell Bay aluminum smelter [Pacific Aluminum (Rio Tinto Ltd., 100%)]	Bell Bay, TAS	195
Do.	Boyne Island aluminum smelter [Boyne Smelters Ltd., operator (Rio Tinto Alcan, 59.39%; YKK Aluminum, 9.5%; UACJ Australia, 9.43%; Southern Cross Aluminum, 7.57%; Ryowa Development, 5.27%; Ryowa Development II, 6.34%; Sumitomo Chemical Co. Ltd., 2.5%]	Boyne Island, QLD	584
Do.	Portland aluminum smelter [Alcoa of Australia, 55%, manager; China International Trust Investment Co. (China state-owned company), 22.5%; Marubeni Australia Pty. Ltd., 22.5%]	Portland, VIC	358
Do.	Tomago aluminum smelter {Tomago Aluminium Co. Pty. Ltd., operator [Pacific Aluminum, 51.55% (Rio Tinto Ltd., 100%); Gove Aluminium Finance Ltd., 36.05%; Hydro Aluminium, 12.40%]}	Tomago, NSW	590
Antimony	Costerfield underground antimony-gold mine [AGD Mining, operator (Mandalay Resources Ltd., 100%)]	50 km east and southeast of Bendigo, VIC	4
Do.	Hillgrove Mine[4] (Bracken Resources Pty. Ltd., 100%)	25 km east of Armidale, NSW	10
Cement	Adelaide Brighton Cement Pty. Ltd., 100%	Angaston, SA	250
Do.	do.	Birkenhead, SA	1,200
Do.	do.	Geelong, VIC	800
Do.	do.	Munster, SA	590
Do.	Blue Circle Southern Cement Ltd. (Boral Ltd., 100%)	Berrima, NSW	1,200
Do.	do.	Maldon, NSW	700
Do.	do.	Waurn Ponds, VIC	250
Do.	Cement Australia Pty. Ltd. (Hanson Ltd. and Holcim Australia Pty Ltd.)	Brisbane, QLD	1,200
Do.	do.	Gladstone, QLD	1,700
Do.	do.	Railton, TAS	1,000
Do.	Cockburn Cement Ltd., 100%	Munster, 30 km south of Perth, WA	700
Clay:			
Bentonite	Arumpo open pit bentonite mine (Arumpo Bentonite Pty. Ltd., 100%)	95 km northeast of Mildura, NSW	30
Do.	Cedars open pit bentonite mine (PCP Douglass Pty. Ltd., 100%)	10 km southwest of Yarraman, QLD	20

See footnotes at end of table.

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Clay:—Continued			
Bentonite—Continued	Cressfield open pit bentonite mine (Sibelco Group through Sibelco Australia Ltd., 100%)	15 km north of Scone, NSW	12
Do.	Mantuan Downs (Pacific Enviromin Ltd., 100%)	West of Springsure, QLD	100
Do.	Miles open pit bentonite mine (Unimin Australia Ltd., 100%)	350 km west of Brisbane, QLD	100
Kaolin	Axedale Clays open pit kaolin mine (E Clay Pty Ltd., 100%)	18 km east of Bendigo, VIC	50
Do.	Pittong open pit kaolin mine (Imerys Minerals Australia Pty Ltd., 100%)	35 km southwest of Ballarat, VIC	110
Do.	Skardon River open pit kaolin mine (Queensland Kaolin Pty. Ltd., 96.6%, and private, 3.4%)	85 km north of Weipa, QLD	150
Coal	Airly coal mine [Centennial Coal Co. Ltd. (Banpu Public Co. Ltd., 100%)]	42 km northwest of Lithgow, NSW	1,900
Do.	Angus Place longwall coal mine[4] (Centennial Coal Co. Ltd., 50%, and SK Kores Australia Pty Ltd., 50%)	16 km northwest of Lithgow, NSW	4,000
Do.	Appin longwall coal mine [Illawarra Coal Holdings Pty Ltd., operator (South32 Ltd., 100%)]	40 km northwest of Wollongong, NSW	8,800
Do.	Ashton open pit and underground coal mine (Yancoal Australia Ltd., 90%, and Itochu Corp., 10%)	14 km northwest of Singleton, NSW	4,000
Do.	Austar underground coal mine [Yancoal Australia Ltd., 100% (Centennial Coal Co. Ltd., 100%)]	65 km west of Newcastle, NSW	2,000
Do.	Baal Bone coal mine [Oakbridge Pty. Ltd., 74.1% (Glencore plc, 100%); Sumitomo Corp., 5%; Toyota Tsusho Mining (Australia) Pty Ltd., 4.75%; private, 14.44%]	24 km northwest of Lithgow, NSW	2,500
Do.	Baralaba North coal mine (Baralaba Coal Co., 100%)	8 km south of Baralaba, QLD	4,100
Do.	Bengalla open pit coal mine (New Hope Corp. Ltd., 40%; Wesfarmers Ltd., 40%; Mitsui & Co. Ltd., 10%; Taiwan Power Co., 10%)	5 km west of Muswellbrook, NSW	8,600
Do.	Blackwater open pit coal mine (includes South Blackwater) [BHP Billiton Mitsubishi Alliance, manager (BHP Group Ltd., 50%, and Mitsubishi Corp., 50%)]	195 km west of Rockhampton, QLD	14,000
Do.	Broadmeadow open pit and underground coal mine [BHP Billiton Mitsubishi Alliance, manager (BHP Group Ltd., 50%, and Mitsubishi Corp., 50%)]	30 km north of Moranbah, QLD	3,000
Do.	Bulga open pit coal mine [Oakbridge Pty Ltd., manager (Glencore plc, 68.25%; Nippon Steel Australia Pty. Ltd., 12.5%; Toyota Tsusho Mining (Australia) Pty Ltd., 4.38%; private, 13.3%)]	16 km southwest of Singleton, NSW	10,000
Do.	Burton open pit coal mine (Peabody Energy Corp., 95%, and Thiess Pty. Ltd., 5%)	150 km southwest of Mackay, QLD	5,800
Do.	Byerwen Mine (Qcoal Pty. Ltd., 80%, and JFE Steel Corp., 20%)	20 km west if Glendale, QLD	3,000
Do.	Callide coal mine (Anglo Coal Pty Ltd., 100%)	120 km southwest of the Port of Gladstone, QLD	10,700
Do.	Caval Ridge open pit coal mine [BHP Billiton Mitsubishi Alliance, manager (BHP Group Ltd., 50%, and Mitsubishi Corp., 50%)]	160 km west of Mackay, QLD	5,500
Do.	Carborough Downs underground coal mine (Vale SA, 80%; Nippon Steel & Sumitomo Metal Corp. 5%; POSCO, 5%; Tata Steel Ltd., 5%; JFE Shoji, 2.5%; JFE Steel, 2.5%)	Bowen basin, QLD	2,500
Do.	Clarence underground coal mine [Centennial Coal Co. (Banpu Public Co. Ltd., 100%), 85%, and SK Energy Australia Pty Ltd., 15%]	10 km east of Lithgow, NSW	2,600
Do.	Clermont coal mine [GS Coal Pty Ltd. (Glencore plc and Sumitomo Corp.)]	12 km north of Clermont, QLD	12,000
Do.	Commodore open pit coal mine {Roche Mining Pty. Ltd., operator [Intergen (Australia) Pty Ltd., 100%]}	80 km southwest of Toowoomba, QLD	3,600
Do.	Cook underground mine (Bounty Mining Ltd., 100%)[5]	27 km south of Blackwater, QLD	2,000
Do.	Coppabella open pit coal mine (Macarthur Coal Ltd., 73.3%, and others, 26.7%)	140 km southwest of Mackay, QLD	4,000
Do.	Cumnock No. 1 Colliery mine (Cumnock No. 1 Colliery Pty Ltd., 100%)	28 km northwest of Singleton, NSW	3,000
Do.	Curragh open pit coal mine (Wesfarmers Ltd., 100%)	70 km east of Emerald, QLD	9,000
Do.	Dartbrook coal mine[4] (Anglo Coal Holdings Australia Ltd., 77.3%)	70 km north of Singleton, NSW	3,750

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Coal—Continued			
Do.	Daunia open pit coal mine [BHP Billiton Mitsubishi Alliance, manager (BHP Group Ltd., 50%, and Mitsubishi Corp., 50%)]	30 km east of Moranbah, QLD	4,500
Do.	Drake Mine (Qcoal Pty Ltd., 100%)	17 km south of Collinsville, QLD	6,000
Do.	Dawson coal complex (includes Moura, Taroom, and Theodore) [Anglo American plc, 51%, and Mitsui & Co. (Australia) Ltd., 49%]	230 km west of Bundaberg, QLD	7,000
Do.	Dendrobium underground coal mine [Dendrobium Coal Pty Ltd., operator (South32 Ltd., 100%)]	15 km southwest of Wollongong, NSW	5,200
Do.	Donaldson open pit coal mine (Donaldson Coal Pty Ltd., 100%)	5 km southeast of Maitland, NSW	2,500
Do.	Drayton open pit coal mine [Anglo Coal Holdings Australia Ltd., 88.2%, manager; Mitsui Coal Development Australia Pty. Ltd., 3.8%; Mitsui Mining (Australia) Pty. Ltd., 3%; others, 5%]	35 km northwest of Singleton, NSW	5,000
Do.	Duralie open pit coal mine (Gloucester Coal Ltd., 100%)	110 km of Newcastle, NSW	2,000
Do.	Elouera underground coal mine (Gujarat NRE Resources NL, 100%)	15 km southwest of Wollongong, NSW	2,000
Do.	Ensham-Yongala open pit coal mine [Idemitsu Kosan Co. Ltd., 85%; J-Power (Australia) Pty. Ltd., 10%; LG International (Australia) Pty Ltd., 5%]	40 km northeast of Emerald, QLD	9,000
Do.	Ewington II open pit coal mine (Griffin Coal Mining Co. Pty. Ltd., 100%)	8 km east of Collie, WA	1,000
Do.	Foxleigh open pit coal mine [Foxleigh Mining Pty. Ltd., 100% (Realm Resources Ltd., 70%; POSCO, 20%; Nippon Steel & Sumitomo Metal Australia Pty. Ltd., 10%)]	Bowen basin, QLD	3,600
Do.	German Creek and German Creek East open pit and underground coal mines [Anglo American plc, 70%, and Mitsui & Co. (Australia) Ltd., 30%]	275 km west-northwest of Rockhampton, QLD	6,000
Do.	Glennies Creek longwall coal mine (CVRD Inco Ltd., 85%; Nippon Steel Australia Pty Ltd., 5%; POSCO Australia Pty Ltd., 5%; private, 5%)	12 km north of Singleton, NSW	2,800
Do.	Goonyella-Riverside open pit coal mines [BHP Billiton Mitsubishi Alliance, manager (BHP Group Ltd., 50%, and Mitsubishi Corp., 50%)]	140 km southwest of Mackay, QLD	16,000
Do.	Gregory Crinum open pit and underground coal mine (Sojitz Corp., 100%)	60 km north of Emerald, QLD	5,500
Do.	Hail Creek open pit coal mine (Rio Tinto Ltd., 82%; Nippon Steel Australia Pty Ltd., 8%; Marubeni Coal Pty. Ltd., 6.67%; Sumisho Coal Development Pty Ltd., 3.33%)	100 km west of Mackay, QLD	8,000
Do.	Hunter Valley Operations (includes Carrington Chestnut, Howick, Hunter Valley No. 1, Lemington, Riverview open pit coal mines) (Rio Tinto Ltd., 80%)	10 km west and 25 km north of Singleton, NSW	15,000
Do.	Integra underground mine [HV Coking Coal Pty Ltd. (Glencore plc, 100%)]	10 km northwest of Singleton, NSW	1,000
Do.	Isaac Plains open pit coal mine (Stanmore Coal Ltd.)[5]	7 km southeast of Moranbah, QLD	1,600
Do.	Isaac Plains East open pit coal mine (Stanmore Coal Ltd., 100%)	do.	2,000
Do.	Jax Mine (Qcoal Pty Ltd., 100%)	15 km south of Collinsville, QLD	1,800
Do.	Jellinbah East open pit coal mine (Queensland Coal Mine Management Pty. Ltd., 70%; Marubeni Coal Pty. Ltd., 15%; Sojitz Australia Ltd., 15%)	90 km east of Emerald, QLD	4,000
Do.	Kestrel underground coal mine (Rio Tinto Ltd., 80%, and Mitsubishi Corp., 20%)	40 km north-northeast of Emerald, QLD	5,500
Do.	Liddell open pit coal mine [Liddell Coal Operations Pty. Ltd. (Glencore plc, 67.5%, and Mitsui Matushima Australia Pty. Ltd., 32.5%)]	25 km northwest of Singleton, NSW	4,000
Do.	Loy Yang open pit coal mine (Loy Yang Power Ltd., 100%)	165 km east of Melbourne, VIC	30,000
Do.	Mondalong underground coal mine (Centennial Coal Co. Ltd., 100%)	35 km southwest of Newcastle, NSW	4,500
Do.	Moorvale open pit coal mine (Macarthur Coal Ltd., 73.3%; CITIC Resources Australia Pty Ltd., 14%; Sojitz Australia Ltd., 7%; Nippon Steel Australia Pty Ltd., 2%)	10 km south of Coppabella, QLD	3,400
Do.	Moranbah North longwall coal mine (Anglo American plc., 88%; Nippon Steel Australia Pty. Ltd., 5%; others, 7%)	150 km southwest of Mackay, QLD	5,800
Do.	Mount Arthur open pit coal mine (BHP Group Ltd., 100%)	5 km southwest of Muswellbrook, NSW	15,000

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Coal—Continued				
Do.		Mount Owen open pit coal mine (Glencore plc, 100%)	20 km northwest of Singleton, NSW	7,700
Do.		Mount Thorley open pit coal mine [Yancoal Australia Ltd. (Yanzhou Coal Mining Co., 62.26%; Cinda International Holdings Ltd., 15.89%; other, 21.85%), 80%, and POSCO, 20%]	14 km southwest of Singleton, NSW	12,000
Do.		Mount Pleasant Mine (Mach Energy Australia Pty Ltd., 100%)	3 km south of Muswellbrook, NSW	10,500
Do.		Muja open pit coal mine (The Griffin Coal Mining Co. Pty. Ltd., 100%)	18 km southeast of Collie, WA	2,000
Do.		Muswellbrook No. 2 open pit coal mine (Muswellbrook Coal Co., 100%)	4 km northeast of Muswellbrook, NSW	1,700
Do.		Myuna underground coal mine (Centennial Coal Co. Ltd., 100%)	35 km south of Newcastle, NSW	2,000
Do.		New Acland open pit coal mine (New Hope Corp. Ltd., 100%)	35 km northwest of Toowoomba, QLD	3,750
Do.		Newlands-Collinsville-Abbot Point open pit coal mine (Glencore plc, 55%; Itochu Corp., 35%; Sumitomo Corp., 10%)	130 km west of Mackay, QLD	15,000
Do.		Newstan Colliery longwall coal mine[4] (Centennial Coal Co. Ltd., 100%)	30 km southwest of Newcastle, NSW	4,000
Do.		North Goonyella underground coal mine (Peabody Energy Corp., 100%)	40 km north of Moranbah, QLD	3,000
Do.		Norwich Park open pit coal mine[4] [BHP Billiton Mitsubishi Alliance, manager (BHP Group Ltd., 50%, and Mitsubishi Corp., 50%)	85 km north-northeast of Emerald, QLD	5,000
Do.		Oaky Creek longwall and Alliance open pit coal mines (Glencore plc, 55%; Sumitomo Coal Australia Pty. Ltd., 25%; Itochu Corp., 20%)	300 km west-northwest of Rockhampton, QLD	9,500
Do.		Peak Downs open pit coal mine [BHP Billiton Mitsubishi Alliance, manager (BHP Group Ltd., 50%, and Mitsubishi Development Pty. Ltd., 50%)]	145 km north of Emerald, QLD	9,000
Do.		Poitrel open pit coal mine (BHP Group Ltd., 80%, and Mitsui & Co. (Australia) Ltd., 20%)	Bowen basin, QLD	3,100
Do.		Premier open pit coal mine (Wesfarmers Premier Coal Ltd., 100%)	10 km southeast of Collie, WA	4,000
Do.		Ravensworth-Narama open pit coal mine (includes Ravensworth East) (Glencore plc, 90%, and Itochu Corp., 10%)	20 km northwest of Singleton, NSW	3,500
Do.		Rixs Creek open pit coal mine (Bloomfield Colliers Pty. Ltd., 100%)	5 km northwest of Singleton, NSW	2,000
Do.		Rolleston open pit coal mine (Glencore plc, 75%; Itochu Corp., 12.5%; Sumitomo Corp., 12.5%)	90 km south-southeast of Emerald, QLD	8,000
Do.		Saraji open pit coal mine [BHP Billiton Mitsubishi Alliance, manager (BHP Group Ltd., 50%, and Mitsubishi Corp., 50%)]	125 km north of Emerald, QLD	6,500
Do.		Sonoma Mine (Qcoal Pty Ltd., 85.5%; JFE Steel Corp., 9.5%; China Steel Corp., 5%)	6 km south of Collinsville, QLD	4,000
Do.		South Walker Creek open pit and underground coal mine [BHP Group Ltd., 80%, and Mitsui & Co. (Australia) Ltd., 20%]	90 km southwest of Mackay, QLD	5,300
Do.		Springvale underground coal mine [Centennial Coal Co. Ltd. (Banpu Public Co. Ltd., 100%), 50%, and SK Kores Australia Pty Ltd., 50%]	16 km northwest of Lithgow, NSW	4,500
Do.		Tahmoor longwall coal mine (includes Tahmoor North and Bargo) [Austral Coal Ltd., operator (Glencore plc, 100%)]	70 km southwest of Sydney, NSW	2,500
Do.		Tarong-Meandu open pit coal mine (Rio Tinto Ltd., 100%)	85 km north of Toowoomba, QLD	7,000
Do.		Ulan underground coal mine (Glencore plc, 90%, and Mitsubishi Corp., 10%)	45 km northwest of Mudgee, NSW	5,000
Do.		United Collieries underground coal mine (Glencore plc, 95%, and private, 5%)	15 km west of Singleton, NSW	3,000
Do.		Wambo open pit and underground coal mine (Peabody Energy Corp., 100%)	30 km from Singleton, NSW	6,000
Do.		Warkworth coal mine [Yancoal Australia Ltd. (Yanzhou Coal Mining Co., 62.26%; Cinda International Holdings Ltd., 15.89%; other, 21.85%), 80%, and POSCO, 20%]	15 km southwest of Singleton, NSW	1,300
Do.		West Cliff longwall coal mine (South32 Ltd., 100%)	43 km northwest of Wollongong, NSW	2,300
Do.		West Wallsend longwall coal mine (Glencore plc, 70%; Marubeni Coal Pty Ltd., 17%; private, 13%)	25 km southwest of Newcastle, NSW	2,500
Do.		Yallourn open pit lignite mine (CLP Power Asia Ltd., 100%)	140 km southeast of Melbourne, VIC	18,000
Cobalt:				
Mine production, Co content	metric tons	Murrin Murrin open pit nickel-cobalt mine (Minara Resources Ltd., 60%, and Glencore plc, 40%)	60 km east of Leonora, WA	2,000
Do.	do.	Radio Hill underground nickel-cobalt mine (Fox Resources Ltd., 100%)	35 km south of Karratha, WA	200
Do.	do.	Ravensthorpe open pit mine[4] (First Quantum Minerals Ltd., 100%)	155 km west of Esperance, WA	1,400
Do.	do.	Savannah underground mine (Panoramic Resources Ltd., 100%)	120 km north of Halls Creek, WA	250
Cobalt-nickel-sulfide	do.	Kwinana nickel refinery (BHP Group Ltd., 100%)	Kwinana, WA	1,200

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Copper:				
Mine production, Cu content		Boddington open pit and underground gold mine (Newmont Mining Corp., 100%)	130 km southeast of Perth, WA	35
Do.		Cadia Valley mining complex (includes Cadia East, Cadia Hill, and Ridgeway) (Newcrest Mining Ltd., 100%)	25 km south-southwest of Orange, NSW	90
Do.		Capricorn Copper Mine (Capricorn Copper Pty Ltd., 100%)	125 km northwest of Mount Isa, QLD	30
Do.		Carrapateena Mine (Oz Minerals Ltd., 100%)	160 km north of Port Augusta, SA	65
Do.		Cobar underground copper mine (Glencore plc, 100%)	12 km northwest of Cobar, NSW	30
Do.		DeGrussa underground gold-copper mine (Sandfire Resources NL, 100%)	150 km north of Meekatharra, WA	300
Do.		Eloise underground copper mine (FMR Investments Pty Ltd., 100%)	60 km southeast of Cloncurry, QLD	70
Do.		Ernest Henry open pit and underground copper-gold mine (Glencore plc, 100%)	35 km northeast of Cloncurry, QLD	115
Do.		Golden Grove underground zinc-copper mine [EMR Golden Grove Pty Ltd. (EMR Capital Pty Ltd., 100%)]	225 km east of Geraldton, WA	20
Do.		Lady Annie copper (solvent extraction-electrowinning) mine (CST Mining Group Ltd., 100%)	100 km north-northwest of Mount Isa, QLD	19
Do.		Leichhardt copper mine (Cape Lambert Resources Ltd., 100%)	110 km northwest of Cloncurry, QLD[4]	10
Do.		Mount Gordon open pit copper (solvent extraction-electrowinning) mine (Aditya Birla Minerals Ltd., 100%)	120 km north of Mount Isa, QLD	50
Do.		Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, and Hilton Mines) (Glencore plc, 100%)	Mount Isa, QLD	190
Do.		Mount Lyell underground copper-gold mine [Copper Mines of Tasmania Pty Ltd. (Vedanta Ltd., 100%)]	2 km northeast of Queenstown, TAS	35
Do.		Nifty open pit copper (solvent extraction-electrowinning) mine (Aditya Birla Minerals Ltd., 100%)	200 km southeast of Marble Bar, WA	25
Do.		Northparkes open pit and underground copper-gold mine (China Molybdenum Co. Ltd., 80%; Sumitomo Metal Mining Oceania Pty. Ltd., 13.3%; SC Mineral Resources Pty. Ltd., 6.7%)	30 km northwest of Parkes, NSW	90
Do.		Olympic Dam underground copper-silver-gold-uranium mine [BHP Billiton Olympic Dam Corp. Pty. Ltd., operator (BHP Group Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	235
Do.		Osborne underground copper-gold mine (Ivanhoe Australia Ltd., 100%)	120 km northeast of Boulia, QLD	22
Do.		Peak underground gold-zinc-lead-copper-silver mine (includes New Cobar, New Occidental, and Perseverance) (Aurelia Metals Ltd., 100%)	8 km south of Cobar, NSW	3
Do.		Prominent Hill open pit and underground copper-gold mine (OZ Minerals Ltd., 100%)	650 km northwest of Adelaide, SA	140
Do.		Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	35 km north of Queenstown, TAS	2
Do.		Savannah underground mine (Panoramic Resources Ltd., 100%)	120 km north of Halls Creek, WA	3
Do.		Telfer copper-gold mine (Newcrest Mining Ltd., 100%)	400 km east-southeast of Port Hedland, WA	NA
Do.		Tritton underground mine (Straits Resources Ltd., 100%)	Nyngan, NSW	30
Smelter		Mount Isa copper smelter (Glencore plc, 100%)	Mount Isa, QLD	300
Do.		Olympic Dam copper smelter [Olympic Dam Operations Pty. Ltd., operator (BHP Group Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	100
Refinery		Olympic Dam copper refinery [Olympic Dam Operations Pty. Ltd., operator (BHP Group Ltd., 100%)]	do.	235
Do.		Port Pirie smelter (Nyrstar Corp., 100%)	Port Pirie, SA	NA
Do.		Townsville copper refinery (Glencore plc, 100%)	Townsville, QLD	300
Diamond	thousand carats	Argyle diamond mine [Argyle Diamonds Ltd., operator (Rio Tinto Ltd., 100%)]	120 km southwest of Kununurra, WA	20,000
Do.	do.	Ellendale Mine[4] (Gibb River Diamonds Ltd., 100%)	130 km east-southeast of Derby, WA	700
Do.	do.	Merlin diamond mine[4] (Merlin Diamonds Ltd., 100%)	100 km south of Borroloola, NT	100
Diatomite		Barraba open pit diatomite mine (Australia Diatomite Mining Pty. Ltd., 100%)	85 km north-northwest of Tamworth, NSW	25
Do.		Conjuboy Mine (Greenvale Silicon Pty Ltd., 100%)	45 km northwest of Greenvale, QLD	NA
Do.		Mount Sylvia Mine (Mount Sylvia Diatomite Pty Ltd., 100%)	35 km southeast of Toowoomba, QLD	NA

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Feldspar		Broken Hill open pit feldspar mine (includes Bakers, Lady Beryl, and Spar Ridge) (Unimin Australia Ltd., 100%)	42 km southwest of Broken Hill, NSW	15
Ferroalloys:				
Ferromanganese		Bell Bay Smelter [Tasmanian Electro Metallurgical Co. Pty. Ltd. (South32 Ltd., 100%)]	Bell Bay, TAS	150
Silicomanganese		do.	do.	120
Garnet		Port Gregory open pit industrial garnet mine (GMA Garnet Pty. Ltd., 100%)	100 km north of Geraldton, WA	400
Gemstone, opal		Many small producers	Andamooka and Coober Pedy areas, SA; Lightning Ridge area, NSW	NA
Gold:				
Mine production, Au content	kilograms	Agnew/Lawlers open pit and underground gold mine (Gold Fields Ltd., 100%)	23 km west of Leinster, WA	8,600
Do.	do.	Boddington open pit and underground gold mine (Newmont Mining Corp., 100%)	130 km southeast of Perth, WA	24,000
Do.	do.	Bronzewing underground gold mine (includes Mount McClure, Cockburn, Corboys, Mount Joel, Success, and Venus) (Audax Resources Ltd., 100%)	65 km northeast of Leinster, WA	9,000
Do.	do.	Burnside open pit mines (includes Brocks Creek, Fountain Head, North Point, Princess Louise, Rising Tide, Union Reefs, Zapopan) (Crocodile Gold Corp., 100%)	Pine Creek, NT	6,500
Do.	do.	Cadia Valley mining complex (includes Cadia East, Cadia Hill, and Ridgeway) (Newcrest Mining Ltd., 100%)	25 km south-southwest of Orange, NSW	25,000
Do.	do.	Doolgunna open pit and underground gold-copper mine (includes DeGrussa) (Sandfire Resources NL, 100%)	140 km north of Meekatharra, WA	270
Do.	do.	Ernest Henry open pit copper-gold mine (Glencore plc, 100%)	35 km northeast of Cloncurry, QLD	3,000
Do.	do.	Garden Well gold mine (Regis Resources Ltd., 100%)	350 km northeast of Kalgoorlie, WA	5,200
Do.	do.	Granny Smith open pit gold mine (includes Wallaby) (Gold Fields Ltd., 100%)	20 km south of Laverton, WA	16,000
Do.	do.	Gruyere Mine (Gold Fields Ltd., 50%, and Gold Roads Resources Ltd., 50%)	150 km east-northeast of Laverton, WA	9,000
Do.	do.	Gwalia underground gold mine (St Barbara Ltd., 100%)	3 km south of Leonora, WA	2,600
Do.	do.	Henty underground gold-silver mine (Unity Mining Ltd., 100%)	30 km north of Queenstown, TAS	3,700
Do.	do.	Hillgrove Mine (Straits Resources Ltd., 100%)	25 km east of Armidale, NSW	650
Do.	do.	Jundee-Nimary open pit and underground gold mine (Newmont Mining Corp., 100%)	45 km northeast of Wiluna, WA	12,000
Do.	do.	Kalgoorlie open pit and underground gold mine [Kalgoorlie Consolidated Gold Mine Pty Ltd., operator (Barrick Gold Corp., 50%, and Newmont Mining Corp., 50%)]	Southeast corner of the Kalgoorlie Boulder Township, WA	20,000
Do.	do.	Kanowna Belle underground gold mine (Barrick Gold Corp., 100%)	18 km northeast of Kalgoorlie, WA	7,000
Do.	do.	Moolart Well gold mine (Regis Resources Ltd., 100%)	100 km north of Laverton, WA	3,000
Do.	do.	Mount Lyell underground copper-gold mine [Copper Mines of Tasmania Pty Ltd. (Vedanta Ltd., 100%)]	2 km northeast of Queenstown, TAS	1,000
Do.	do.	Mount Magnet open pit and underground gold mine (includes Hill 50 and Star) (Ramelins Resources Ltd., 100%)	2 km from Mount Magnet, WA	8,500
Do.	do.	Mount Morgan Mine (Dacian Gold Ltd., 100%)	25 km west of Laverton, WA	4,500
Do.	do.	Norseman underground gold mine (Norseman Gold Plc, 100%)	Norseman, WA	3,700
Do.	do.	Northparkes open pit and underground copper-gold mine (China Molybdenum Co. Ltd., 80%, and Sumitomo Metal Mining Oceania Pty. Ltd., 20%)	30 km north of Parkes, NSW	1,550
Do.	do.	Osborne underground copper-gold mine (Ivanhoe Australia Ltd., 100%)	120 km northeast of Boulia, QLD	1,000
Do.	do.	Olympic Dam underground copper-silver-gold-uranium mine [Olympic Dam Operations Pty. Ltd., operator (BHP Group Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	1,500
Do.	do.	Paddington open pit and underground gold operation [Norton Gold Fields Ltd. (Zijin Mining Group Co. Ltd., 100%)]	35 km north of Kalgoorlie, WA	5,000
Do.	do.	Pajingo underground gold mine (includes Vera-Nancy) (Evolution Mining Ltd., 100%)	60 km south-southeast of Charters Towers, QLD	6,400
Do.	do.	Plutonic open pit and underground gold mine (Barrick Gold Corp., 100%)	180 km northeast of Meekatharra, WA	8,000
Do.	do.	Prominent Hill open pit copper-gold mine (OZ Minerals Ltd., 100%)	650 km northwest of Adelaide, SA	2,200
Do.	do.	Ravenswood open pit mine (includes Nolans, Sarsfield, and Mount Wright) (Resolute Mining Ltd., 100%)	100 km south of Townsville, QLD	3,000

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Gold—Continued				
Mine production, Au content—Continued	kilograms	Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	35 km north of Queenstown, TAS	1,000
Do.	do.	Saint Ives open pit and underground gold mine (Gold Fields Ltd., 100%)	75 km south-southeast of Kalgoorlie, WA	15,000
Do.	do.	Selwyn underground copper-gold mine (Barrick Gold Corp., 100%)	160 km southeast of Mount Isa, QLD	700
Do.	do.	Stawell underground gold mine (Perseverance Corp. Ltd., 100%)	250 km west of Melbourne, VIC	3,000
Do.	do.	Sunrise Dam open pit gold mine (includes Cleo) (AngloGold Ashanti Ltd., 100%)	55 km south of Laverton, WA	15,000
Do.	do.	Tanami open pit gold mine (Newmont Gold Corp., 100%)	650 km northwest of Alice Springs, NT	13,000
Do.	do.	Telfer copper-gold mine (Newcrest Mining Ltd., 100%)	400 km east southeast of Port Hedland, WA	15,000
Do.	do.	Trident gold mine (Alacer Gold Corp., 100%)	Higginsville, WA	5,000
Do.	do.	Tropicana gold mine (AngloGold Ashanti Australia Pty Ltd., 70%, and Independence Group NL, 30%)	330 km northeast of Kalgoorlie, WA	16,400
Do.	do.	Wiluna open pit and underground gold mine (Apex Minerals NL, 100%)	7 km south of Wiluna, WA	3,300
Smelter	do.	Gidji Roaster gold smelter (Kalgoorlie Consolidated Gold Mines Pty. Ltd., 100%)	Kalgoorlie, WA	24,300
Refinery	do.	Perth Mint Refinery [Gold Corp. (Government of Western Australia, 100%)]	Newburn, WA	400,000
Gypsum		Lake MacDonnell open pit gypsum mine (Gypsum Resources Australia Pty. Ltd., 100%)	Point Thevenard, SA	1,400
Do.		Dredging of gypsum from surface of Lake MacLeod (Rio Tinto Ltd., 68.4%)	Lake MacLeod, WA	900
Iron and steel:				
Iron ore		Area C Mine (BHP Group Ltd., 85%; ITOCHU Minerals & Energy of Australia Pty Ltd., 8%; Mitsui Iron Ore Corp. Pty. Ltd., 7%)	180 km east of Port Hedland, Pilbara region, WA	42,000
Do.		Channar Mine {Channar Joint Mining Venture [Hamersley Iron Pty Ltd., 60% (Rio Tinto Ltd., 100%), and China Iron and Steel Industry & Trade Group Corp. (SINOSTEEL) (a China state-owned company), 40%]}	70 km south of Tom Price, WA	11,000
Do.		Cloudbreak iron ore mine (includes Chichester Range, Christmas Creek, Flinders, Mount Lewin, Mount Nicholas, and White Knight) (Fortescue Metals Group Ltd., 100%)	Chichester Ranges, East Pilbara, WA	55,000
Do.		Eastern Range open pit iron ore mine {Bao-HI Ranges Joint Venture, 100% [Hamersley Iron Pty Ltd., 54% (Rio Tinto Ltd., 100%), and Shanghai Baosteel Group Corp., 46%]}	10 km east of Paraburdoo, WA	10,000
Do.		Extension Hill/Iron Hill open pit iron ore mine (Mount Gibson Iron Ltd., 100%)	85 km of Perenjori, WA	3,200
Do.		Hamersley operations (includes Brockman 2, Brockman 4, Marandoo, Mount Tom Price, Nammuldi, Paraburdoo, Silvergrass, Western Turner Syncline, and Yandicoogina open pit iron ore mines) [Hamersley Iron Pty Ltd. (Rio Tinto Ltd., 100%)]	30 km to 85 km northeast, northwest, and south of Tom Price, WA	140,000
Do.		Hope Downs 1 Mine [Hope Downs Iron Ore Pty Ltd. (Hancock Prospecting Pty Ltd., 100%), 50%, and Rio Tinto Ltd., 50%]	75 km northwest of Newman, Pilbara region, WA	30,000
Do.		Hope Downs 4 Mine [Hope Downs Iron Ore Pty Ltd. (Hancock Prospecting Pty Ltd., 100%), 50%, and Rio Tinto Ltd., 50%]	Pilbara region, WA	15,000
Do.		Jimblebar open pit iron ore mine (includes ore from Wheelarra JV) [BHP Iron Ore (Jimblebar) Pty Ltd. (BHP Group Ltd., 85%; ITOCHU Minerals and Energy of Australia, 8%; Mitsui Iron Ore Exploration and Mining Pty Ltd., 7%]	40 km east of Newman, WA	20,000
Do.		Karara open pit iron ore mine (Anshan Iron and Steel Group Corp., 50%, and Gindalbie Metals Ltd., 50%)	110 km south of Yalgoo, WA	8,000
Do.		Koolan Island open pit iron ore mine (Mount Gibson Iron Ltd., 100%)	140 km north of Derby, WA	4,000
Do.		Koolyanobbing Central open pit iron ore mine (Portman Ltd., 100%)	50 km north-northeast of Southern Cross, WA	6,000

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Iron and steel:—Continued			
Iron ore—Continued	Mount Gould open pit iron ore mine (Unimin Australia Ltd., 100%)	160 km west of Meekatharra, WA	6,000
Do.	Mount Newman open pit iron ore mine (BHP Group Ltd., 85%; Mitsui-ITOCHU Iron Iron Pty Ltd., 10%; ITOCHU Minerals and Energy of Australia, 5%)	Within 13 km of Newman, Pilbara region, WA	42,000
Do.	Pannawonica (includes Mesa A and J) open pit iron ore mine [Robe River Iron Associates, manager (Rio Tinto Ltd., 53%; Mitsui & Co. Ltd., 33%; Nippon Steel & Sumitomo Metal Corp., 14%)]	130 km south-southwest of Dampier, Pilbara region, WA	35,000
Do.	Roy Hill Mine (Hancock Prospecting Pty Ltd., 70%; Marubeni Corp., 15%; POSCO, 12.5%; China Steel Corp., 2.5%)	340 km southeast of Port Hedland	55,000
Do.	Sino Iron iron ore mine (CITIC Pacific Mining Management Pty Ltd., 80%, and China Metallurgical Group Corp., 20%)	Cape Preston, 100 km southwest of Karratha, Pilbara region, WA	2,000
Do.	Savage River open pit iron ore mine (Grange Resources Ltd., 100%)	100 km southwest of Burnie, TAS	2,400
Do.	Tallering Peak open pit iron ore mine (Mount Gibson Iron Ltd., 100%)	120 northeast of Geraldton, WA	3,000
Do.	West Angelas open pit iron ore mine [Robe River Iron Associates, manager (Rio Tinto Ltd., 53%; Mitsui & Co. Ltd., 33%; Nippon Steel & Sumitomo Metal Corp., 14%)]	110 km west of Newman, Pilbara region, WA	29,400
Do.	Whyalla open pit iron ore mines (Arrium Steel Ltd., 100%)	270 km northwest of Adelaide, SA	2,600
Do.	Yandi open pit iron ore mine (BHP Group Ltd., 85%, manager; ITOCHU Minerals & Energy of Australia Pty Ltd., 8%; Mitsui Iron Ore Corp. Pty. Ltd., 7%)	92 km north of Newman, Pilbara region, WA	47,000
Pig iron	Hismelt pig iron plant [Hismelt Corp. Pty Ltd. (Rio Tinto Ltd., 60%; Nucor Corp., 25%; Mitsubishi Corp., 10%; Shougang Corp., 5%]	Kwinana, WA	800
Steel	Laverton Steel Mill (Arrium Steel Ltd., 100%)	Laverton, Melbourne, VIC	700
Do.	Port Kembla steelworks (Blue Scope Steel Ltd., 100%)	Port Kembla, NSW	2,600
Do.	Smorgon Steel Group Ltd.	Laverton, Melbourne, VIC	700
Do.	do.	Waratch, NSW	285
Do.	Sydney Steel Mill (Arrium Steel Ltd., 100%)	Sydney, NSW	600
Do.	Whyalla steelworks (Arrium Steel Ltd., 100%)	Whyalla, SA	1,200
Lead:			
Mine production, Pb content	Angas zinc mine (Terramin Australia Ltd., 100%)	2 km from Strathalbyn, SA	10
Do.	Broken Hill underground silver-zinc-lead mine (Shenzhen Zhongjin Lingnan Nonfemet Co. Ltd., 50.1%, and Perilya Ltd., 49.9%)	Broken Hill, NSW	90
Do.	Cannington underground silver-lead-zinc mine (South32 Ltd., 100%)	85 km southwest of McKinlay, QLD	265
Do.	Century open pit zinc-silver-lead mine [MMG Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	250 km north of Mount Isa, QLD	90
Do.	Dugald River Mine [MMG Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	65 km northwest of Cloncurry, QLD	25
Do.	Endeavor underground zinc-silver-lead mine (CBH Resources Ltd., 100%)	40 km northwest of Cobar, NSW	45
Do.	Hellyer underground zinc-lead-copper-silver mine (NQ Minerals plc, 100%)	80 km south-southwest of Burnie, TAS	25
Do.	McArthur River open pit mine [McArthur River Mining Pty Ltd., operator (Glencore plc, 100%)]	60 km southwest of Borroloola, NT	170
Do.	Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, Hilton, and Lady Loretta Mines) (Glencore plc, 100%)	Mount Isa, QLD	160
Do.	Rosebery underground zinc-lead-silver-copper-gold mine [MMG Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	35 km north of Queenstown, TAS	25
Smelter	Mount Isa smelter (Glencore plc, 100%)	Mount Isa, QLD	240
Do.	Port Pirie smelter (Nyrstar Corp., 100%)	5 km north of Queenstown, TAS	235
Lithium:			
Direct-shipping ore	Wodgina Mine (Mineral Resources Ltd., 100%)	100 km south of Port Hedland, WA	3,500
Spodumene, concentrate	Bald Hill lithium-tantalum mine (Alita Resources Ltd., 100%)[5]	50 km southeast of Kambalda, WA	150
Do.	Greenbushes open pit and underground tantalite-spodumene mine {Talison Lithium Pty. Ltd., operator [Windfield Holding Pty. Ltd., 100% (Tianqi Lithium Corp., 51%, and Albemarle Corp., 49%)]}	70 km southeast of Bunbury, WA	740
Do.	Mount Cattlin spodumene mine (Galaxy Resources Ltd., 100%)	2 km north of Ravensthorpe, WA	180

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Lithium:—Continued				
Spodumene, concentrate—Continued		Mount Marion spodumene mine [Reed Industrial Minerals Pty. Ltd. (Mineral Resources Ltd., 43.1%; Jiangxi Ganfeng Lithium Co. Ltd., 43.1%; Neometals Ltd., 13.8%)]	40 km southwest of Kalgoorlie, WA	400
Do.		Pilgangoora lihtium-tantalum project (Pilbara Minerals Ltd., 100%)	120 km south of Port Hedland, WA	330
Do.		Pilgangoora Mine (Altura Mining Ltd., 100%)	90 km south of Port Hedland, WA	220
Magnesite		Kunwarara open pit magnesite mine (includes Marlborough) [Queensland Magnesia Pty Ltd. (Sibelco Group, 100%)]	70 km northwest of Rockhampton, QLD	NA
Do.		Salt Creek open pit mine (Agricola Mining Pty Ltd., 100%)	70 km southeast of Meningie, SA	NA
Do.		Thuddungra Mine (Orind Australia Pty Ltd., 100%)	38 km northwest of Young, NSW	80
Manganese:				
Mine production, Mn cotent		Bootu Creek open pit manganese mine (OM Holdings Ltd., 100%)	110 km north of Tennant Creek, NT	200
Do.		Groote Eylandt open pit manganese mine [Groote Eylandt Mining Co., operator (South32 Ltd., 60%, and Anglo American Corp., 40%)]	Groote Eylandt, NT	3,100
Do.		Woodie Woodie open pit manganese mine (includes Bells and East Pilbara leases) [Pilbara Manganese Pty Ltd., operator (Consolidated Minerals Ltd., 100%)]	400 km southeast of Port Hedland, WA	720
Natural gas:				
Gas	million cubic meters per day	Gorgon project (Chevron Corp., 47.3%; Exxon Mobil Corp., 25%; Royal Dutch Shell plc, 25%; Osaka Gas Ltd., 1.25%; Tokyo Gas Co. Ltd., 1%; JERA Co. Inc., 0.417%)	Barrow Island, WA	64
Do.	do.	Ichthys Project (INPEX Corp., 66.245%; Total S.A., 26%; CPC Corp., 2.625%; Tokyo Gas Co. Ltd., 1.515%; Osaka Gas Co. Ltd., 1.2%; Kansai Electric Power Co. Inc., 1.2%; JERA Co. Inc., 0.735%; Toho Gas Co. Ltd., 0.42%)	South of Darwin, NT	33
Do.	do.	North West Shelf gas operations {Woodside Petroleum Pty. Ltd., manager [BHP Petroleum Pty. Ltd., BP Australia Holdings Ltd., Chevron Asiatic Ltd., Japan Australia LNG (MIMI) Pty. Ltd., Shell Development (Australia) Pty. Ltd., and Woodside Petroleum Ltd., 16.67% each]}	130 km offshore Dampier, WA	20
Do.	do.	Pluto and Xena fields {Woodside Petroleum Pty. Ltd., manager, 90% [BHP Petroleum Pty. Ltd., BP Australia Holdings Ltd., Chevron Asiatic Ltd., Japan Australia LNG (MIMI) Pty. Ltd., Shell Development (Australia) Pty. Ltd., and Woodside Petroleum Ltd., 16.67% each]; Kansai Electric Power Co., 5%; Tokyo Gas Co. Ltd., 5%}	Burrup Peninsula, WA	NA
Liquefied natural gas	million metric tons	Australia Pacific LNG (ConocoPhillips Co., 37.5%; Origin Energy, 37.5%; China Petroleum & Chemical Corp. (Sinopec), 25%)	Curtis Island, QLD	9
Do.	do.	Darwin LNG facility [ConocoPhillips Co., 56.9%; Santos Ltd., 11.5%; INPEX Corp., 11.4%; Eni S.p.A., 11%; JERA Co. Inc. and Tokyo Gas Co. Ltd., 9.2% (combined)]	Darwin, NT	4
Do.	do.	Gladstone LNG (Santos Ltd., 30%; PETRONAS, 27.5%; Total S.A., 27.5%; Korea Gas Corp., 15%)	Bowen basin, QLD	8
Do.	do.	Gorgon project (Chevron Corp., 47.3%; Exxon Mobil Corp., 25%; Royal Dutch Shell plc, 25%; Osaka Gas Ltd., 1.25%; Tokyo Gas Co. Ltd., 1%; JERA Co. Inc., 0.417%)	Barrow Island, WA	16
Do.	do.	Ichthys Project (INPEX Corp., 66.245%; Total S.A., 26%; CPC Corp., 2.625%; Tokyo Gas Co. Ltd., 1.515%; Osaka Gas Co. Ltd., 1.2%; Kansai Electric Power Co. Inc., 1.2%; JERA Co. Inc., 0.735%; Toho Gas Co. Ltd., 0.42%)	South of Darwin, NT	9
Do.	do.	North West Shelf project{Woodside Petroleum Pty. Ltd., manager [BHP Petroleum Pty. Ltd., BP Australia Holdings Ltd., Chevron Asiatic Ltd., Japan Australia LNG (MIMI) Pty. Ltd., Shell Development (Australia) Pty. Ltd., and Woodside Petroleum Ltd., 16.67% each]}	Burrup Peninsula, WA	17

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Natural gas:—Continued				
Liquefied natural gas—Continued	million metric tons	Pluto LNG {Woodside Petroleum Pty. Ltd., manager, 90% [BHP Petroleum Pty. Ltd., BP Australia Holdings Ltd., Chevron Asiatic Ltd., Japan Australia LNG (MIMI) Pty. Ltd., Shell Development (Australia) Pty. Ltd., and Woodside Petroleum Ltd., 16.67% each]; Kansai Electric Power Co., 5%; Tokyo Gas Co. Ltd., 5%}	Burrup Peninsula, WA	5
Do.	do.	Prelude Floating LNG platform (Royal Dutch Shell plc, 67.5%; INPEX Corp., 17.5%; Korea Gas Corp., 10%; CPC Corp., 5%)	Browse Basin, NT	4
Do.	do.	Queensland Curtis LNG (Royal Dutch Shell plc, 100%)	Curtis Island, QLD	9
Do.	do.	Wheatstone project [Chevron Corp., 64.14%; Kuwait Foreign Petroleum Exploration Co. (KUFPEC), 13.4%; Woodside Petroleum Ltd., 13%; PE Wheatstone Pty. Ltd., 8%; Kyushu Electric Power Co., 1.46%]	12 km west of Onslow, WA	9
Nickel:				
Mine production, Ni content		Avebury nickel mine[4] (includes Bison, North Avebury, Saxon, and West Viking) (Dundas Mining Pty Ltd., 100%)	Near Zeehan, TAS	7
Do.		Beta Hunt nickel-gold mine (includes Beta Hunt and East Alpha deposits) [Salt Lake Mining Pty Ltd. (Royal Nickel Corp., 100%)]	60 km south of Kalgoorlie, WA	3
Do.		Black Swan underground nickel mine[4] (includes Silver Swan) (Poseidon Nickel Ltd., 100%)	53 km northeast of Kalgoorlie, WA	10
Do.		Cosmos project (Odysseus nickel mine)[4] (Western Areas Ltd., 100%)	50 km north of Leinster, WA	13
Do.		Forrestania project (includes Fly Fox underground nickel mine and Spotted Quoll open pit nickel mine) (Western Areas Ltd., 100%)	100 km north of Ravensthorpe, WA	25
Do.		Lake Johnston underground nickel mine[4] (includes Maggie Hays, Maggie Hays Lake, and Emily Ann) (Poseidon Nickel Ltd., 100%)	120 km west of Norseman, WA	12
Do.		Lanfranchi underground mine[4] (includes Deacon, Schmitz, Tramway, and Winner) (Black Mountain Metals LLC, 100%)	42 km south of Kambalda, WA	10
Do.		Leinster nickel operation (includes Cliffs, Leinster, and Venus Mines and Leinster concentrator (BHP Group Ltd., 100%)	10 km north of Leinster, WA	44
Do.		Long underground mine[4] (Mincor Resources NL, 100%)	Near Kambalda East, WA	10
Do.		Miitel underground nickel mine[4] (Mincor Resources NL, 100%)	do.	5
Do.		Mount Keith nickel operation (includes Mount Keith and Yakabindie Mines, and Mount Keith concentrator) (BHP Group Ltd., 100%)	70 km south-southeast of Wiluna, WA	40
Do.		Murrin Murrin open pit nickel-cobalt mine [Minara Resources Ltd. (Glencore plc, 100%)]	60 km east of Leonora, WA	40
Do.		Radio Hill underground nickel-cobalt mine (Fox Resources Ltd., 100%)	35 km south of Karratha, WA	4
Do.		Ravensthorpe open pit mine[4] (First Quantum Minerals Ltd., 100%)	Ravensthorpe, WA	25
Do.		Savannah underground mine (Panoramic Resources Ltd., 100%)	120 km north of Halls Creek, WA	8
Smelter		Kalgoorlie nickel smelter (BHP Group Ltd., 100%)	Kalgoorlie, WA	110
Refinery		Kwinana nickel refinery (BHP Group Ltd., 100%)	Kwinana, WA	83
Do.		Murrin Murrin nickel refinery [Minara Resources Ltd. (Glencore plc, 100%)]	Murrin Murrin, WA	45
Petroleum:				
Condensate	thousand 42-gallon barrels per day	Gorgon project (Chevron Corp., 47.3%; Exxon Mobil Corp., 25%; Royal Dutch Shell plc, 25%; Osaka Gas Ltd., 1.25%; Tokyo Gas Co. Ltd., 1%; JERA Co. Inc., 0.417%)	Barrow Island, WA	6
Do.	do.	North West Shelf gas operations {Woodside Petroleum Pty. Ltd., manager [BHP Petroleum Pty. Ltd., BP Australia Holdings Ltd., Chevron Asiatic Ltd., Japan Australia LNG (MIMI) Pty. Ltd., Shell Development (Australia) Pty. Ltd., and Woodside Petroleum Ltd., 16.67% each]}	130 km offshore Dampier, WA	60
Do.	do.	Prelude Floating LNG platform (Royal Dutch Shell plc, 67.5%; INPEX Corp., 17.5%; Korea Gas Corp., 10%; CPC Corp., 5%)	Browse Basin, NT	NA
Refinery	do.	Altona Refinery (Exxon Mobil Corp., 100%)	13 km southeast of Melbourne, VIC	120
Do.	do.	Bulwer Island Refinery [BP Amoco Refinery (Bulwer Island) Pty. Ltd., 100%]	Bulwer Island, QLD	69

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Petroleum—Continued				
Refinery—Continued	thousand 42-gallon barrels per day	Geelong Refinery [Shell Refining (Australia) Pty. Ltd., 100%]	Geelong, VIC	110
Do.	do.	Kurnell Refinery (Caltex Australia Ltd., 100%)	Kurnell, NSW	114
Do.	do.	Kwinana Refinery [BP Amoco Refinery (Kwinana) Pty. Ltd., 100%]	Kwinana, WA	138
Do.	do.	Lytton Refinery (Caltex Australia Ltd., 100%)	Lytton, QLD	106
Phosphate rock		Phosphate Hill-Duchess open pit phosphate mine (Incitec Pivot Ltd., 100%)	140 km northwest of Mount Isa, QLD	2,200
Rare earths, rare-earth-oxide equivalent	metric tons	Mount Weld Mine (Lynas Corp. Ltd., 100%)	Mount Weld, WA	21,000
Salt		Dampier Salt solar evaporation salt pans (Rio Tinto Ltd., 68%; Marubeni Corp., 22%; Sojitz Corp., 10%)	Near Dampier, WA	4,000
Do.		Lake MacLeod solar salt and gypsum evaporation pans (Rio Tinto Ltd., 68%; Marubeni Corp., 22%; Sojitz Corp., 10%)	65 km north of Carnarvon, WA	900
Do.		Port Hedland solar salt fields (Rio Tinto Ltd., 68.4%)	Port Hedland, WA	3,000
Silica		Kemerton silica sands dredge [Kemerton Silica Sand Pty Ltd. (Touchu Corp., 67%, and Toyota Tsusho Corp., 33%)]	35 km northeast of Bunbury, WA	450
Silver:				
Mine production, Ag content	kilograms	Broken Hill underground silver-zinc-lead mine (Shenzhen Zhongjin Lingnan Nonfemet Co. Ltd., 50.1%, and Perilya Ltd., 49.9%)	Broken Hill, NSW	81,200
Do.	do.	Cannington underground silver-lead-zinc mine (BHP Group Ltd., 100%)	85 km southwest of McKinlay, QLD	700,000
Do.	do.	Century open pit zinc-silver-lead mine [MMG Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	250 km north of Mount Isa, QLD	3,000
Do.	do.	Dugald River Mine [MMG Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	65 km northwest of Cloncurry, QLD	38,000
Do.	do.	Endeavor underground zinc-silver-lead mine (CBH Resources Ltd., 100%)	40 km northwest of Cobar, NSW	35,000
Do.	do.	Hellyer underground zinc-lead-silver mine (NQ Minerals plc, 100%)	80 km south-southwest of Burnie, TAS	60,000
Do.	do.	Henty underground gold-silver mine (Barrick Gold Ltd., 100%)	30 km north of Queenstown, TAS	1,100
Do.	do.	Mount Isa underground copper-lead-zinc-silver mine includes Enterprise, George Fisher, Hilton, and Lady Loretta Mines) (Glencore plc, 100%)	Mount Isa, QLD	375,000
Do.	do.	Olympic Dam underground copper-silver-gold-uranium mine [Olympic Dam Operations Pty. Ltd., operator (BHP Group Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	27,000
Do.	do.	Peak underground gold-zinc-lead-copper-silver mine (includes New Cobar, New Occidental, and Perseverance) (Aurelia Metals Ltd., 100%)	8 km south of Cobar, NSW	6,000
Do.	do.	Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	35 km north of Queenstown, TAS	35,000
Smelter	do.	Port Pirie smelter (Nyrstar Corp., 100%)	Port Pirie, SA	450,000
Refinery	do.	Perth Refinery [AGR Management Services Ltd. (Australian Gold Alliance Pty Ltd., 40%; Western Australian Mint, 40%; Johnson Matthey (Australian) Ltd., 20%]	Newburn, WA	NA
Stone, dolomite		Ardrossan metallurgical dolomite quarry (SIMEC Group, 100%)	Northern York Peninsula, SA	650
Do.		Cookes Hill Mine (includes Nickol River and Warrawoona) (Haoma Mining NL, 100%)	Near Port Hedland, WA	400
Talc		Three Springs open pit talc mine (Imerys SA, 100%)	330 km north of Perth, WA	150
Tantalum, tantalite, mine production, Ta_2O_5 content		Greenbushes open pit and underground tantalite-spodumene mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA	NA
Do.		Bald Hill lithium-tantalum mine (Alliance Mineral Assets Ltd., 100%)	50 km southeast of Kambalda, WA	NA
Do.		Pilgangoora lihtium-tantalum project (Pilbara Minerals Ltd., 100%)	120 km south of Port Hedland, WA	NA
Do.		Wodgina open pit tantalite mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA	NA

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Tin:				
Mine production, Sn content	metric tons	Greenbushes open pit and underground tantalite-spodumene mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA	1,000
Do.	do.	Mount Bischoff open pit mine[4] [Metals X Ltd., 50%; YT Parksong Australia Holding Pty. Ltd. (Greentech Technology International Ltd., 82%, and Yunnan Tin Co. Ltd., 18%), 50%]	55 km southwest of Burnie, TAS	6,000
Do.	do.	Renison Bell underground tin mine [Metals X Ltd., 50%; YT Parksong Australia Holding Pty. Ltd. (Greentech Technology International Ltd., 82%, and Yunnan Tin Co. Ltd., 18%), 50%]	136 km south of Burnie, TAS	4,000
Smelter	do.	Greenbushes smelter (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA	1,000
Titanium, mineral sands (ilmenite, rutile, and zircon)		Broken Hill region mines (Cristal Australia Pty Ltd., 100%)	120 km north of Mildura, NSW	NA
Do.		Capel open pit heavy-mineral sands mine (Iluka Resources Ltd., 100%)	7 km north of Capel, WA	NA
Do.		Murray Basin heavy-mineral sands mine (Iluka Resources Ltd., 100%)	80 km southeast of Mildura, VIC	NA
Do.		North Stradbroke Island heavy-mineral sands dredge (Stradbroke Rutile Pty. Ltd., 100%)	35 km east of Brisbane, QLD	NA
Do.		Tiwest Joint Venture heavy-mineral sands dredge (Exxaro Resources Ltd., 50%, and Tronox Inc., 50%)	180 km north of Perth, WA	NA
Tungsten, mine production, W content	metric tons	Kara magnetite and scheelite mine (Tasmania Mines Ltd., 100%)	30 km south of Burnie, TAS	50
Do.	do.	Mount Carbine tungsten mine (Carbine Tungsten Ltd., 100%)[4]	75 km west of Caims, QLD	4,000
Do.	do.	Wolfram Camp molybdenum-tungsten mine (Almonty Industries Inc., 100%)[4]	85 km west of Caims, QLD	500
Uranium, mine production, U_3O_8 content	do.	Beverley in situ leach uranium operation[4] (Heathgate Resources Pty. Ltd., 100%)	300 km northeast of Port Augusta, SA	1,000
Do.	do.	Four Mile uranium mine [Quasar Resources Pty Ltd., 100% (Heathgate Resources Pty Ltd.)]	300 km northeast of Port Augusta, SA	1,200
Do.	do.	Honeymoon uranium mine[4] (Boss Resources Ltd., 100%)	75 km northwest of Broken Hill, SA	400
Do.	do.	Olympic Dam underground copper-silver-gold-uranium mine [BHP Billiton Olympic Dam Corp. Pty. Ltd., operator (BHP Group Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	4,400
Do.	do.	Ranger open pit uranium mine [Energy Resources of Australia Ltd., 100% (Rio Tinto plc, 68.4%, and public, 31.6%)]	230 km east of Darwin, NT	5,000
Vanadium, mine production, V_2O_5 content	do.	Windimurra vanadium project[4] (Atlantic Vanadium Pty Ltd., 100%)	100 km east-southeast of Mount Magnet, WA	8
Zinc:				
Mine production, Zn content		Angas zinc mine (Terramin Australia Ltd., 100%)	2 km from Strathalbyn, SA	24
Do.		Broken Hill underground silver-zinc-lead mine (Shenzhen Zhongjin Lingnan Nonfemet Co. Ltd., 50.1%, and Perilya Ltd., 49.9%)	Broken Hill, NSW	360
Do.		Cannington underground silver-lead-zinc mine (BHP Group Ltd., 100%)	85 km southwest of McKinlay, QLD	100
Do.		Century open pit zinc-silver-lead mine (New Century Resources Ltd., 100%)	250 km north of Mount Isa, QLD	500
Do.		Dugald River Mine [MMG Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	65 km northwest of Cloncurry, QLD	180
Do.		Endeavor underground zinc-silver-lead mine [CBH Resources Ltd. (Toho Zinc Co. Ltd., 100%)]	40 km northwest of Cobar, NSW	125
Do.		Golden Grove underground zinc-copper mine (EMR Capital Pty Ltd., 100%)	225 km east of Geraldton, WA	150
Do.		Hellyer underground zinc-lead-silver mine (NQ Minerals Plc., 100%)	80 km south-southwest of Burnie, TAS	130
Do.		Jaguar underground mine (Jabiru Metals Ltd., 100%)	250 km north of Kalgoorlie, WA	420
Do.		McArthur River open pit mine [McArthur River Mining Pty Ltd., operator (Glencore plc, 100%)]	60 km southwest of Borroloola, NT	280

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2019

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities[1, 2]	Annual capacity[e]
Zinc:—Continued			
Mine production, Zn content—Continued	Mount Isa underground copper-lead-zinc-silver mine (includes Enterprise, George Fisher, Hilton, and Lady Loretta Mines) (Glencore plc, 100%)	Mount Isa, QLD	330
Do.	Peak underground gold-zinc-lead-copper-silver mine (includes New Cobar, New Occidental, and Perseverance) (Aurelia Metals Ltd., 100%)	8 km south of Cobar, NSW	8
Do.	Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	35 km north of Queenstown, TAS	100
Smelter	Hobart smelter (Nyrstar NV, 100%)	Hobart, TAS	320
Do.	Port Pirie smelter (Nyrstar NV, 100%)	5 km north of Queenstown, TAS	45
Refinery	Sun Metals zinc refinery [Sun Metals Corp. Pty. Ltd., operator (Korea Zinc Co., 100%)]	Townsville, QLD	170

[e]Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.
[1]Abbreviations used for States and Territories in this table include the following: NSW—New South Wales; NT—Northern Territory; QLD—Queensland; SA—South Australia; TAS—Tasmania; VIC—Victoria; WA—Western Australia.
[2]Abbreviation(s) used for unit(s) of measure in this table include the following: km—kilometer.
[3]Produces low-grade bauxite for use by the cement and fertilizer sectors.
[4]Remained on care-and-maintenance status through the end of 2019.
[5]Placed on care-and-maintenance status in 2019.

TABLE 3
AUSTRALIA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Quantity	Value (million dollars)
METALS			
Aluminum:			
Bauxite		39,149	1,096
Alumina		17,764	5,899
Metal		1,445	2,710
Copper:			
Ores and concentrates, gross weight		1,895	4,354
Refined metal		407	2,668
Total Cu content		944	NA
Gold, bullion, refined and unrefined	metric tons	362 e	16,242
Iron and steel:			
Iron ore, gross weight[1]		835,546	66,840
Raw steel		1,148	855
Lead:			
Bullion[2]		119	268
Ores and concentrates, gross weight		414	669
Refined metal		117	231
Total Pb content		550	NA
Nickel:			
Ores and concentrates, gross weight		258	310
Refined and intermediate, gross weight		232 e	2,560 e
Total Ni content		265 e	NA
Silver, bullion, refined	metric tons	140	87
Tin, ores and concentrates:			
Gross weight	do.	14,520	131
Sn content	do.	7,550	NA
Titanium:			
Ilmenite concentrate		676 e	NA
Leucoxene concentrate		96 e	NA
Rutile concentrate		312 e	NA
Synthetic rutile		84 e	NA
Titanium dioxide pigment		195 e	NA
Zinc:			
Ores and concentrates, gross weight		2,310	1,668
Refined metal		379	991
Total Zn content		1,394	NA
Zirconium, mineral concentrates, zircon		710 e	NA
INDUSTRIAL MINERALS			
Gemstones:			
Diamond:			
Gem	carats	71,000	264
Industrial	do.	172	(3)
Unsorted	do.	13,100,000 e	163 e
Total	do.	13,200,000 e	427 e
Opal:			
Rough		NA	5
Cut and polished		NA	36
Total		NA	41
Sapphire, rough		NA	5
Other[4]		NA	21
MINERAL FUELS AND RELATED MATERIALS			
Coal:			
Metallurgical	million metric tons	184	28,687
Thermal	do.	212	15,747

See footnotes at end of table.

TABLE 3—Continued
AUSTRALIA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Quantity		Value (million dollars)
MINERAL FUELS AND RELATED MATERIALS—Continued				
Liquefied natural gas	million metric tons	77		33,810
Petroleum:				
Crude[5]	thousand 42-gallon barrels	102,867		6,973
Refinery products	do.	5,768		442
Uranium oxide (U_3O_8)	metric tons	8,160	e	521

[e]Estimated. do. Ditto. NA Not available.
[1]Includes iron ores, concentrates, lump and pellets.
[2]Lead bullion includes a substantial precious metal content, mainly silver.
[3]Less than ½ unit.
[4]Includes cut and polished sapphires.
[5]Includes other refinery feedstock.

Source: Government of Australia, Department of Industry and Science, 2020, Resources and energy quarterly, December 2020.

TABLE 4
AUSTRALIA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2019

(Thousand metric tons unless otherwise specified)

Commodity		Quantity	Value (million dollars)
METALS			
Aluminum:			
Alumina		12	13
Bauxite		6	2
Metal		55	106
Gold, bullion, refined and unrefined		NA	4,703
Iron and steel:			
Ferroalloys		54	68
Iron ore, gross weight[1]		815	63
Raw steel		1,860	1,907
Nickel, primary products[2]		NA	63
Phosphate rock		356	31
Silver, bullion, refined		NA	135
Tin, refined	metric tons	294	6
INDUSTRIAL MINERALS			
Gemstones:			
Diamond:			
Dust and powder	thousand carats	1,163	1
Gem	do.	271	421
Industrial	do.	1	(3)
Total	do.	1,430 e	422 e
MINERAL FUELS AND RELATED MATERIALS			
Petroleum:			
Crude[4]	thousand 42-gallon barrels	128,244	8,681
Refinery products	do.	236,939	18,152

[e]Estimated. do. Ditto. NA Not available.
[1]Includes limonite ore used in the production of refined nickel products.
[2]Includes matte, sinter and intermediate products; ferronickel, unwrought nickel metal and alloys and scrap. Also includes the value of limonite ore used in the production of refined nickel products.
[3]Less than ½ unit.
[4]Includes other refinery feedstock.

Source: Government of Australia, Department of Industry and Science, 2020, Resources and energy quarterly, December 2020.

TABLE 5

AUSTRALIA: RESERVES OF MAJOR MINERAL COMMODITIES IN 2019

Commodity		Reserves[1]
Antimony, Sb content	thousand metric tons	101
Bauxite	million metric tons	5,290
Coal:		
Anthracite and bituminous, recoverable[2]	billion metric tons	69
Lignite, recoverable[3]	do.	64
Cobalt, Co content	thousand metric tons	1,400
Copper, Cu content	million metric tons	93
Diamond	million carats	11
Gold, Au content	metric tons	10,800
Iron ore:		
Gross weight	billion metric tons	51
Fe content	do.	25
Lead, Pb content	million metric tons	37
Lithium, Li content	thousand metric tons	5,700
Magnesite, $MgCO_3$ content	million metric tons	285
Manganese ore	do.	272
Molybdenum, Mo content	thousand metric tons	248
Nickel, Ni content	million metric tons	21
Niobium, Nb content	thousand metric tons	216
Platinum-group metals (Ir, Os, Pd, Pt, Rh, Ru)[4]	kilograms	35,600
Phosphate rock:		
Gross weight	million metric tons	1,090
P_2O_5 content	do.	178
Potash, K_2O content	do.	35
Rare earths (rare-earth oxides plus Y_2O_3)	thousand metric tons	4,030
Silver, Ag content	do.	90
Tantalum, Ta content	do.	94
Tin, Sn content	do.	561
Titanium:		
Ilmenite	million metric tons	265
Rutile	do.	33
Tungsten, W content	thousand metric tons	403
Uranium, U content	do.	1,090
Vanadium, V content	do.	6,020
Zinc, Zn content	million metric tons	69
Zirconium, Zircon	do.	77

do. Ditto.

[1]Accessible economic demonstrated resources (AEDR) as of December 2019, as reported by Geoscience Australia. AEDR refers to the portion of total economic demonstrated resources (EDR), which include Joint Ore Reserves Committee (JORC) reserves, and measured and indicated resources, that is accessible for mining. It excludes resources that are inaccessible for mining because of environmental restrictions, government policies, or military lands.

[2]Reported as black coal by Geoscience Australia.

[3]Reported as brown coal by Geoscience Australia.

[4]Platinum-group metals are produced as a byproduct of nickel-cobalt mining; the reserves and resources of these platinum-group metals are not reported.