



2017–2018 Minerals Yearbook

AUSTRALIA

THE MINERAL INDUSTRY OF AUSTRALIA

By Spencer D. Buteyn

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

Australia's nominal gross domestic product (GDP) was 1.81 trillion Australian dollars (AUD) (\$1.33 trillion¹) in 2017. Australia's real GDP increased by 2.5% in 2017 compared with that of 2016. Investment increased in nonmetallic mineral mining, by 23%; coal mining, 16%; and metallic mineral mining, 12%; this was the first time since 2012 that investment increased in all these sectors. Investment in exploration and mining support services continued to increase in 2017—by 3% compared with that of 2016. Investment in natural gas and petroleum extraction, however, continued to decrease in 2017, down by 25%. This decrease was owing to the Gorgon and Wheatstone liquefied natural gas (LNG) projects moving from the development phase to the production phase during the past 2 years, which required less capital expenditure. Owing to this decrease, total investment in the mineral industry continued to decrease in 2017, totaling AUD37.3 billion (\$27.5 billion), which was down by 13% compared with that of 2016 and by 60% from the high of AUD94.5 billion (\$94.0 billion) in 2012 (Australian Bureau of Statistics, 2019c–i; Department of Industry, Innovation and Science, 2019a).

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 58% of world production; rutile, 38%; industrial garnet, 37%; iron ore (gross weight and Fe content), 36% each; zircon, 33%; bauxite, 28%; industrial diamond, 27%; alumina and manganese, 16% each; rare earths, 14%; ilmenite, 13%; lead, 10%; gold, 9%; nickel, 8%; zinc, 7%; and cobalt and copper, 4% each.² Australia was ranked second in global coal production (accounting for 8% of world production) and third in global uranium production (accounting for approximately 10% of world production) (World Nuclear Association, 2018; Bedinger, 2019a, b; BP p.l.c., 2019, p. 44; Bray, 2019a, b; Corathers, 2019; Curry, 2019; Flanagan, 2019; Gambogi, 2019; George, 2019; Jaskula, 2019; Klochko, 2019; McRae, 2019; Olson, 2019; Shedd, 2019; Thomas, 2019; Tuck, 2019).

Minerals in the National Economy

In 2017, the mineral industry (including exploration and mining support services) accounted for 8.1% of Australia's GDP,

¹Where necessary, values have been converted from Australian dollars (AUD) to U.S. dollars at an annual average exchange rate of AUD1.005=US\$1.00 for 2012, AUD1.154=US\$1.00 for 2014, AUD1.400=US\$1.00 for 2016, AUD1.358=US\$1.00 for 2017, and AUD1.340=US\$1.00 for 2018.

²Word rankings and percentages do not include U.S. production for bauxite, lithium, and rutile.

the same share as in 2016. The gross value added of the mineral industry increased by 2.3% to AUD147 billion (\$108 billion). Iron ore mining accounted for 30% of the gross output of the mineral industry, followed by coal mining, 29%; natural gas and petroleum extraction, 25%; other mining (which included nonferrous metals, industrial minerals, and uranium), 11%; and exploration and mining services, 5%. The gross output of natural gas and petroleum extraction increased by 12%, followed by iron ore mining, which increased by 3%. On the other hand, exploration and mining support services decreased by 7%, the gross output of other mining decreased by 4%, and the gross output of coal mining decreased by 2% (Australian Bureau of Statistics, 2019c).

The mineral industry employed 156,712 people at the end of June 2017 compared with 163,652 in 2016 and a peak of 194,205 in 2012. Mining accounted for about 1.3% of Australia's total employment at the end of June 2017. Metallic ore mining accounted for 40% of mineral industry employment, followed by coal mining, 22%; exploration and other mining services, 19%; natural gas and petroleum extraction, 11%; and nonmetallic mineral mining and quarrying, 7%. Employment in every mineral industry category decreased in 2017 compared with that of 2016, except for exploration and other mining services, which increased by 0.4%. Employment in natural gas and petroleum extraction decreased by 11%, followed by coal mining and nonmetallic ore mining, 5% each. In 2017, expenditures on exploration totaled AUD2.97 billion (\$2.19 billion) compared with AUD2.80 billion (\$2.00 billion) in 2016. This was the first annual increase in exploration expenditures since the high of AUD7.66 billion (\$7.62 billion) in 2012. Exploration for minerals other than petroleum accounted for 59% of total exploration expenditures in 2017, whereas offshore petroleum exploration accounted for 27% and onshore petroleum exploration accounted for 14%. Exploration expenditures for minerals other than petroleum and for onshore petroleum increased by 23% each compared with that of 2016, whereas exploration expenditures for offshore petroleum decreased by 23% (Australian Bureau of Statistics, 2019a, d; 2020).

In 2017, the net inflow of foreign direct investment (FDI) toward Australia was valued at AUD60.5 billion (\$44.6 billion), which was a 6% decrease from that of 2016. The mineral industry was the second largest FDI recipient (after the financial and insurance services sector), accounting for 17% of the total net inflow of FDI in 2017. The net inflow of FDI towards mining decreased by 66% in 2017. The largest source of FDI was Hong Kong (a Special Administrative Region of China), which accounted for 21% of the net inflow in 2017, followed by the United Kingdom, 14%; Japan, 10%; and the United States, 9%. The stock of inward FDI at the end of 2017

was AUD849 billion (\$625 billion), of which the mineral industry accounted for the largest share at 37%, followed by the manufacturing industry at 12%. The United States accounted for 22% of Australia's inward FDI stock at the end of the year. Other countries with large shares of FDI stocks included Japan, which accounted for 11% of Australia's inward FDI stock; the United Kingdom, 10%; the Netherlands, 6%; and China (excluding Hong Kong), 5% (Department of Foreign Affairs and Trade, 2018b, p. 70, 76).

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 Federal Government of Australia or individual State governments. The right to extract these minerals is under the jurisdiction of the respective State governments (Australian Trade and Investment Commission, 2018).

In Australia's three-tiered Government system—local, State or Territory, 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. All States and Territories, apart from the Australian Capital Territory, have identified mineral resources and established mineral industries. Federal and State or Territory governments do invest in the collection and release of geoscientific data. The Federal Government sets national policies regarding the mineral sector, 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. Environmental and safety issues are overseen by the National Offshore Petroleum Safety and Environmental Management Authority. States and Territories manage and allocate mineral and petroleum property rights onshore and in coastal waters. Coastal waters are defined as adjacent to a State or Territory's jurisdiction from the low-water mark out to the outer limit of the first 3 nautical miles [5.6 kilometers (km)] of the Territorial Sea Baseline. 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, 2017, p. 18–19).

The mining and petroleum industries of New South Wales are regulated under the Mining Act 1992 No. 29 and the Petroleum (Onshore) Act 1991 and are managed by the Division of Resources and Energy, Department of Industry, Skills and Regional Development. The mining and petroleum industries of the Northern Territory are regulated under the Minerals Act 2012 and the Petroleum Act 1984 and are managed by the Department of Primary Industry and Resources. The Queensland mining and petroleum industries are regulated

under the Mineral Resources Act 1989, Petroleum and Gas (Production and Safety) Act 2004, and Petroleum Act 1923 and are managed by the Department of Natural Resources and Mines. South Australia's mining and petroleum industries are regulated under the Mining Act 1971, the Mining Regulations 2011, and the Petroleum and Geothermal Energy Act 2000 and are managed by the Energy Resources Division and the Mineral Resources Division, both part of the Department of State Development. The Tasmania mining and petroleum industries are regulated under the Mineral Resources Development Act 1995 and managed by the Mineral Resources Tasmania, Department of State Growth. Victoria's mining and petroleum industries are regulated under the Mineral Resources (Sustainable Development) Act 1990 and the Petroleum Act 1998 and are managed by the Energy and Earth Resources Division, Department of Economic Development, Jobs, Transport, and Resources. Western Australia's mining and petroleum industries are regulated under the Mining Act 1978, the Petroleum and Geothermal Energy Resources Act 1967, and the Petroleum (Submerged Lands) Act 1982 and managed by the Department of Mines, Industry Regulation, and Safety (Geoscience Australia, 2017, p. 19, 26, 28; Department of the Premier and Cabinet, 2018, p. 6).

Offshore exploration and production of petroleum that is beyond State and Territory coastal waters, known as Commonwealth Waters, are regulated under the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Commonwealth), Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009, Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009, and Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011. Regulations of petroleum exploration in Commonwealth Waters are administered jointly by the Federal Government and the State and Territory governments. The National Offshore Petroleum Titles Administrator and the National Offshore Petroleum Safety and Environmental Management Authority perform the regulatory activities associated with offshore petroleum exploration and production (Geoscience Australia, 2017, p. 32–33).

The exploration and production of offshore minerals other than petroleum in Commonwealth Waters are regulated under the Commonwealth Offshore Minerals Act 1994. Most States have developed legislation for offshore minerals within their respective coastal waters based on the Commonwealth Offshore Minerals Act 1994. This legislation includes the Offshore Minerals Act 1999 in New South Wales, the Offshore Minerals Act 1998 in Queensland, the Offshore Minerals Act 2000 in South Australia, and the Offshore Minerals Act 2003 in Western Australia. Offshore minerals management in coastal waters is covered by the Mineral Resources Development Act 1995 in the Northern Territory and the Mineral Resources (Sustainable Development) Act 1990 in Victoria. Tasmania has no legislation relating directly to nonpetroleum offshore minerals in its coastal waters (Geoscience Australia, 2017, p. 32, 37).

Foreign investment in Australia is regulated under the Foreign Acquisitions and Takeovers Act 1975. Foreign government-controlled investors must receive approval before acquiring interest in a mineral or petroleum exploration permit. However, nongovernment foreign investors may be issued exploration

permits by a State or Territory government without approval under the Foreign Acquisition and Takeover Act. Acquisitions of an interest of 15% or more in an Australian business valued at more than AUD252 million (\$186 million) (indexed in 2017) by a foreign investor requires approval. Nongovernment investors from Chile, China, Japan, New Zealand, the Republic of Korea, Singapore, and the United States can acquire an interest of 15% in Australian businesses valued at less than AUD1,094 million (\$806 million) (indexed in 2017) without approval, under associated Australian free trade agreement commitments (Foreign Investment Review Board, 2017; Geoscience Australia, 2017, p. 22).

Production

Output of the following mineral commodities increased by 10% or more in 2017: lithium (spodumene), increased by 287%; tantalum (tantalite concentrate, Ta content), 96%; silicomanganese, 44%; rare earths (mineral concentrate, rare-earth-oxide equivalent), 27%; LNG, 26%; barite, 25%; manganese (mine, gross weight), 25%; gem-grade and industrial-grade diamond, 23% each; manganese (mine, Mn content), 21%; natural gas (marketable), 17%; and salt and tin (mine, Sn content), 12% each. Output decreased by 10% or more for the following mineral commodities: tungsten (concentrate, W content), decreased by 81%; gypsum, 52%; magnesite and perlite, 38% each; garnet (natural, abrasives), 37%; silver (mine, Ag content), 21%; smelted copper (primary), refined copper (primary), and refined lead bullion (primary), 19% each; refined silver and zirconium (mineral concentrates), 16% each; uranium (mine, U content), 14%; antimony (mine, Sb content) and copper (leaching, electrowon), 13% each; and copper (mine, Cu content) and refined cobalt (metal powder and oxide hydroxide), 10% each (table 1).

Structure of the Mineral Industry

The Australian Government and State and Territory governments did not engage in the exploration for, nor 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. In 2017, 30.8% of mining businesses had some foreign ownership: 10.2% were less than 10% foreign owned, 4.1% were between 10% and 50% foreign owned, and 16.5% were greater than 50% foreign owned. Table 2 is a list of major mineral industry facilities (Geoscience Australia, 2017, p. 18; Department of Foreign Affairs and Trade, 2018b, p. 52).

Mineral Trade

In terms of value, iron ore and concentrates, coal (undifferentiated), and natural gas ranked first, second, and fourth, respectively, in Australia's leading goods and service exports in 2017. Australia's nonfuel mineral exports were valued at AUD122.5 billion (\$90.2 billion), which was a 14% increase compared with that of 2016 and followed a 4% increase in 2015. The value of Australia's mineral fuel exports increased by 34% to AUD91.8 billion (\$67.6 billion) in 2017. Exports of iron ore increased by 17% to AUD63.1 billion (\$46.5 billion),

followed by metallurgical coal, which increased by 37% to AUD36.3 billion (\$26.7 billion); LNG, which increased by 43% to AUD25.6 billion (\$18.9 billion); thermal coal, which decreased by 32% to AUD20.8 billion (\$15.3 billion); and gold, which decreased by 5% to AUD16.9 billion (\$12.4 billion) (Department of Foreign Affairs and Trade, 2018a, p. 5; Department of Industry, Innovation and Science, 2019a, p. 17).

Australia's total exports in 2017 were valued at AUD387 billion (\$285 billion), which was an increase of 13% compared with the value of exports in 2016. China (excluding Hong Kong), Japan, and the United States were Australia's leading export markets. Exports to China in 2017 increased by 21.2% to AUD116 billion (\$85.4 billion), accounting for 30% of Australia's total exports. In 2017, Australia's major mineral commodity exports to China included 687 million metric tons (Mt) of iron ore (including pellets), 42.0 Mt of thermal coal, 29.7 Mt of metallurgical coal, 991,000 metric tons (t) of copper ore and concentrates, 576,000 t of zinc concentrates, 174,000 t of refined zinc, 132,000 t of refined copper, 26,500 t of lead concentrate (a substantial increase of 200% from that of 2016), 21,600 kilogram (kg) of gold bullion (refined and unrefined) (a substantial decrease of 57%), and 6 million barrels (Mbb) of crude petroleum (including other refinery feedstock) (a substantial decrease of 65%) (Department of Foreign Affairs and Trade, 2019a, p. 34; Department of Industry, Innovation and Science, 2019a, p. 24–25, 27–29, 31, 36).

Exports to Japan in 2017 increased by 22.8% to AUD47.2 billion (\$34.8 billion), accounting for 12.2% of Australia's total exports. In 2017, Australia's major mineral commodity exports to Japan included 81.7 Mt of thermal coal, 66.8 Mt of iron ore, 35.8 Mt of metallurgical coal (48% high quality and 52% other), 394,000 t of aluminum, 306,000 t of copper ore and concentrates, 165,000 t of zinc concentrates, 46,000 t of lead concentrate, and 3.9 Mbb of crude petroleum (including other refinery feedstock).

Exports to the United States in 2017 increased by 1.7% to AUD21.0 billion (\$15.4 billion), accounting for 5.4% of Australia's total exports. Australia exported 21,840 t of refined zinc (a substantial decrease of 58%) and 648,000 barrels of crude petroleum (including other refinery feedstock) (a substantial decrease of 51%) to the United States (Department of Foreign Affairs and Trade, 2019a, p. 34; Department of Industry, Innovation, and Science, 2019a, 23–25, 28–29, 31, 36).

The Republic of Korea was a substantial importer of lead concentrate, zinc concentrate, and aluminum from Australia, accounting for 40%, 36%, and 19% of Australia's total exports, respectively, by volume. India accounted for 24% of Australia's metallurgical coal exports, 17% of its refined lead exports, and 11% of its copper ore and concentrates exports. Malaysia and Taiwan were substantial importers of refined copper from Australia, accounting for 29% and 17% of Australia's exports, respectively. For the first time, Hong Kong accounted for the largest share of Australia's gold bullion (refined and unrefined) exports, accounting for 52%, followed by the United Kingdom, which accounted for 17% (Department of Industry, Innovation and Science, 2019a, p. 23–25, 27–29, 31, 36).

The value of Australia's mineral imports increased by 14% to AUD41.9 billion (\$30.9 billion). Australia's leading

mineral import, by value, was petroleum refinery products valued at AUD20.0 billion (\$14.7 billion), followed by crude petroleum (including other refinery feedstock), AUD9.7 billion (\$7.1 billion); and gold bullion (refined and unrefined), AUD5.6 billion (\$4.1 billion). Australia's leading supplier of crude petroleum (including other refinery feedstock) was Malaysia, which supplied 34% of Australia's imports, followed by the United Arab Emirates, 15%; Indonesia, 9%; and New Zealand and Papua New Guinea, 6% each. Nauru supplied 11% of Australia's imports of phosphate rock; Morocco, 7%; and China, 6% (Department of Industry, Innovation and Science, 2019a, p. 19, 31–32).

Commodity Review

Metals

Bauxite and Alumina and Aluminum.—Western Australia remained Australia's leading bauxite-producing State, accounting for 53% of the country's bauxite production in 2017, followed by Queensland, 35%; and the Northern Territory, 13%. In 2017, seven bauxite mines operated in the country—three in the Darling Range in Western Australia, two near Weipa in Queensland, one at Gove in the Northern Territory, and one at Campbell Town in Tasmania. By capacity, Rio Tinto Ltd. operated the country's leading bauxite mine, the Weipa Mine, in Queensland, followed by the Huntly Mine in Western Australia, which was operated by Alcoa of Australia Ltd. (Alcoa Corp. of the United States, 60%, and Alumina Ltd. 40%), and the Boddington-Worsley Mine in Western Australia, which was operated by Worsley Alumina Pty. Ltd. [South32 Ltd., 86%; Japan Alumina Associates (Australia) Pty. Ltd., 10%; and Sojitz Alumina Pty. Ltd., 4%] (table 2; Department of Industry, Innovation and Science, 2019a, p. 23).

In 2017, six alumina refineries operated in Australia—four in the Darling Range at Kwinana, Pinjarra, Wagerup, and Worsley, and two near Gladstone, Queensland. In October, Rio Tinto announced the closure of its Gove alumina refinery in the Northern Territory, which had been on care-and-maintenance status since 2013. Production at the alumina refineries in Queensland was disrupted by Cyclone Debbie in late March. A total of four aluminum smelters operated in 2017; they were located in Tomago, New South Wales; Bell Bay, Tasmania; Boyne Island, Queensland; and Portland, Victoria (table 2; Department of Industry, Innovation and Science, 2017c, p. 90; Rio Tinto plc, 2018, p. 40).

Rio Tinto continued to develop its Amrun bauxite project located south of the existing Weipa Mine in Queensland and reported that construction was 62% complete at the end of 2017. The project was expected to have an initial production capacity of 22.8 million metric tons per year (Mt/yr). The Amrun project was expected to begin operating in 2019 and had a capital expenditure of \$1.9 billion. Metro Mining Ltd.'s Bauxite Hills project in Queensland was expected to begin operating in mid-2018 and to have a capacity of 5 Mt/yr. Smaller bauxite projects expected to begin producing in the next 5 years included Metallica Minerals Ltd.'s Urquhart project, Metro Mining Ltd.'s Skarndon River project, and Australian Bauxite Ltd.'s Binjour project

(Department of Industry, Innovation and Science, 2017a, p. 110; Geoscience Australia, 2018, p. 19; Rio Tinto plc, 2018, p. 41).

Copper.—South Australia remained Australia's leading State in the production of copper ore and concentrate, by copper content, accounting for 31% of the amount produced in the country, followed by Queensland, 26%; New South Wales and Western Australia, 21% each; and Tasmania, 0.2%. By capacity, the Olympic Dam Mine was Australia's leading copper mine; it was owned and operated by BHP Billiton Ltd. through its wholly owned subsidiary BHP Billiton Olympic Dam Corp. Pty Ltd. The Capricorn Copper Mine in Queensland, which was operated by Capricorn Copper Pty Ltd., began producing copper concentrate in November. Production at Newcrest Mining Ltd.'s Cadia Valley mining complex was disrupted for 5 months by a seismic event on April 14. Newcrest reported underground mining was suspended while damage to the underground works was evaluated. The company processed low-grade stockpiled ore during this disruption (Capricorn Copper Pty. Ltd., 2017; Newcrest Mining Ltd., 2017, p. 21; Department of Industry, Innovation and Science, 2018, p. 93; 2019a, p. 25).

Gold.—Western Australia remained Australia's leading gold-producing State, accounting for 69% of the country's gold production in 2017, followed by New South Wales, 12%; Queensland, 7%; the Northern Territory, 5%; Victoria, 4%; South Australia, 3%; and Tasmania, 0.4%. Major gold mines in Western Australia included the Boddington Mine, which was operated by Newmont Mining Corp. of the United States, and the Kalgoorlie Mine, which was operated by Kalgoorlie Consolidated Gold Mine Pty Ltd. (Barrick Gold Corp. of Canada, 50%, and Newmont Mining Corp., 50%). The Cadia Valley mining complex was the leading gold-producing operation in New South Wales (table 2; Department of Industry, Innovation and Science, 2019a, p. 27).

Vista Gold Corp. of the United States continued the development of its Mount Todd Mine in the Northern Territory. The Mount Todd Mine was expected to begin production in 2018 with a capacity of 13 metric tons per year (t/yr) of gold. Dacian Gold Ltd. continued construction of the Mount Morgans gold project and expected gold production to begin in mid-2018. The capacity of the Mount Morgans project was expected to be 5 t/yr (Dacian Gold Ltd., 2017, p. 29; Department of Industry, Innovation and Science, 2017c, p. 79).

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 2017. 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. In this region, Rio Tinto owned and operated nine mines through its wholly owned subsidiary Hamersley Iron Pty Ltd. Another two mines were operated by Hope Downs Iron Ore Pty Ltd. (Hancock Prospecting Pty Ltd., 50%, and Rio Tinto, 50%). Other Rio Tinto joint ventures in the Pilbara Region included the Bao-HI Ranges Joint Venture (Hamersley, 54%, and Shanghai Baosteel Group Corp. of China, 46%) which operated the Eastern Range Mine; the Channar Joint Mining Venture (Hamersley, 60%, and China Iron and Steel Industry & Trade Group Corp. of China, 40%), which operated the Channar Mine; and the Robe River Iron Associates

Joint Venture (Rio Tinto, 53%; Mitsui & Co. Ltd. of Japan, 33%; and Nippon Steel & Sumitomo Metal Corp. of Japan, 14%), which operated three mines. BHP Billiton owned a majority stake (85%) in four iron ore mines in the Pilbara Region. The remaining shares of these mines are owned by ITOCHU Corp. of Japan and Mitsui through their various subsidiaries (table 2; Department of Industry, Innovation and Science, 2019a, p. 28).

In March, mining commenced at the Iron Hill Mine, which was an expansion of Mount Gibson Iron Ltd.'s Extension Hill Mine. The Iron Hill Mine was expected to produce 5.5 Mt of iron ore before its planned closure in late 2018. In April, Mount Gibson announced that it had begun the reconstruction of the Koolan Island Mine seawall, which failed in 2014. The company expected the mine, which remained on care-and-maintenance status through 2017, to restart operations in early 2019. In August, Rio Tinto commissioned the 10-Mt/yr Silvergrass Mine as part of its Hamersley operations. In September, the Roy Hill Mine in the Pilbara Region reached its nameplate capacity of 55 Mt/yr. The Roy Hill Mine was owned by Hancock Prospecting (70%), Marubeni Corp. of Japan (15%), POSCO of the Republic of Korea (12.5%), and China Steel Corp. of China (2.5%) (Department of Industry, Innovation and Science, 2017c, p. 33; McKinnon, 2017; Mount Gibson Iron Ltd., 2017, p. 17–19).

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, 20%; the Northern Territory, 11%; Tasmania, 8%; and Western Australia, 2%. Queensland produced 60% of the country's silver, followed by New South Wales, 13%; Tasmania, 9%; Western Australia, 8%; and the Northern Territory and South Australia, about 5% each. Queensland produced 38% of the country's zinc ore and concentrate (Zn content), followed by the Northern Territory, 25%; New South Wales, 17%; and Tasmania and Western Australia, 10% each. The leading lead and zinc mines were, in order by capacity, the Cannington Mine in Queensland, operated by South32, and the McArthur River Mine in the Northern Territory, operated by McArthur River Mining Pty Ltd. (Glencore plc of Switzerland, 100%) (table 2; Department of Industry, Innovation and Science, 2019a, p. 29, 33, 36).

After a 6-month rampup period, the Dugald River Mine (owned by MMG Ltd.) in Queensland produced its first shipment of zinc concentrate in November. The company expected the mine to ramp up to its nameplate capacity of 170,000 t/yr of zinc by 2019. In February, EMR Capital acquired the Golden Grove Mine from MMG Ltd. In July, New Century Resources Ltd. acquired the Century Mine in northwestern Queensland from MMG. The Century Mine, which began operating in 1999 before being put on care-and-maintenance status in early 2016, was one of the leading zinc-producing mines in the world. New Century Resources planned to extract zinc ore from existing tailings dams, and production was expected to begin in 2018 (table 2; MMG Ltd., 2018, p. 7, 22).

Nickel.—Western Australia remained Australia's sole nickel-producing State. In 2017, major nickel operations included, in order by capacity, the Leinster Mine complex and the Mount Keith Mine, both operated by BHP Billiton; the Murrin Murrin Mine, which was operated by Minara Resources Ltd. (Glencore, 100%);

and the Forrestania project (including the Fly Fox and Spotted Quoll Mines), which was operated by Western Areas Ltd. The Ravensthorpe Mine, which was operated by First Quantum Minerals Ltd. of Canada, was placed on care-and-maintenance status in October owing to low nickel prices (table 2; First Quantum Minerals Ltd., 2018, p. 11; Department of Industry, Innovation and Science, 2018, p. 98; 2019a, p. 30).

Industrial Minerals

Diamond.—Western Australia remained the sole diamond-producing State in Australia. The Argyle Mine, which was operated by Argyle Diamonds Ltd. (Rio Tinto, 100%) and the Merlin Mine, which was owned and operated by Merlin Diamonds Ltd., were the only operating diamond mines in 2017 (table 2; Department of Industry, Innovation and Science, 2019a).

Lithium and Tantalum.—Western Australia was the sole lithium-producing and the sole tantalum-producing State in Australia. Talison Lithium Pty. Ltd. mined a lithium-cesium-tantalum-type pegmatite deposit at the Greenbushes Mine, which was owned by Windfield Holding Pty. Ltd. (jointly owned by Tianqi Lithium Corp. of China, 51%, and Albemarle Corp. of the United States, 49%). Global Advanced Metals Pty Ltd. held the rights to tantalum produced at the Greenbushes Mine, and it produced tantalum pentoxide from tantalum concentrate (produced by Tianqi Lithium) at a facility near the mine. Lithium concentrate produced at Greenbushes was shipped to lithium-carbonate- and lithium-hydroxide-producing facilities in Jiangxi and Sichuan, China, that were operated by Albemarle (Albemarle Corp., 2018, p. 4, 23; Global Advanced Metals Pty. Ltd., 2018; Roskill, 2018).

Galaxy Resources Ltd. completed the rampup of its Mount Cattlin Mine and began full commercial production in April, producing 155,679 t of spodumene concentrate in 2017. Galaxy Resources produced tantalum as a byproduct at the mine. Reed Industrial Minerals Pty. Ltd. (jointly owned by Mineral Resources Ltd., 43.1%; Jiangxi Ganfeng Lithium Co. Ltd. of China, 43.1%; and Neometals Ltd., 13.8%) reached full capacity of 400,000 t/yr of spodumene concentrate at its Mount Marion Mine in February. In March, Mineral Resources began producing a lithium direct-shipping ore (DSO) (unprocessed spodumene ore) at its Wodgina Mine. Mineral Resources exported 2.5 Mt of lithium DSO to Asia in 2017. Global Advanced Metals retained the rights to the Wodgina Mine's tantalum resources (Mineral Resources Ltd., 2017, p. 13; 2018, p. 17; Galaxy Resources Ltd., 2018, p. 12, 14).

Development of the Bald Hill Mine, which was jointly owned by Alliance Mineral Assets Ltd., 50% and Tawana Resources NL, 50%, continued through 2017, and spodumene concentrate production was expected to begin in early 2018. The companies also expected the recommissioning of the mine's existing tantalum circuit to take place in 2018. Pilbara Minerals continued development of its Pilgangoora lithium-tantalum project, with mining operations scheduled to commence in December 2017. The initial ore produced at the mine was sold as DSO to Atlas Iron Ltd. The mine's 2-Mt/yr ore-processing plant was expected to be commissioned in early 2018 (Pilbara Minerals Ltd., 2018, p. 18; Tawana Resources NL, 2018, p. 12).

Mineral Fuels and Related Materials

Coal.—Queensland remained Australia’s leading producer of anthracite and bituminous coal (reported as black coal by Geoscience Australia), accounting for 54% of the country’s production in 2017, followed by New South Wales, 44%; Western Australia, 1%; and Tasmania, 0.1%. The BHP Billiton Mitsubishi Alliance (BMA) (owned by BHP Billiton, 50%, and Mitsubishi Corp. of Japan, 50%) was the leading producer of anthracite and bituminous coal in Australia. BMA operated seven mines in Queensland. In March, Cyclone Debbie affected coal operations at multiple mines in the Bowen basin in northern Queensland and caused coal export delays, which led to an increase in global coal prices. The affected mines stockpiled coal while repairs to rail and port infrastructure were completed. The majority of lignite was produced in Victoria and used for domestic energy generation. Loy Yang Power Ltd. operated the Loy Yang Mine, which was Australia’s leading lignite mine by capacity. The Hazelwood Mine, which was owned by ENGIE SA of France, and the associated Hazelwood coal-fired powerplant closed in March owing to the powerplant no longer being commercially viable (table 2; Department of Industry, Innovation and Science, 2017b, 8, 11, 30; 2017c, p. 40; 2019a, p. 24; ENGIE SA, 2018, p. 153; Geoscience Australia, 2018, p. 43).

Natural Gas.—Australia’s export of LNG continued to increase in 2017, up by 26% compared with that of 2016. In March, the Gorgon LNG project commissioned its third of three production trains and ramped up production at trains 1 and 2, which were commissioned in 2016. The reported capacity for the Gorgon project was 15.6 Mt/yr of LNG. In October, production began at the Wheatstone LNG project, which was expected to reach its design capacity of 8.9 Mt/yr with the commissioning of its second production train in mid-2018 (Chevron Corp., 2018a, p. 3, 4, 16; 2018b; 2018c; Department of Industry, Innovation and Science, 2019a, p. 31).

Uranium.—South Australia produced the majority of uranium in Australia, accounting for 64% of the country’s production in 2017, followed by the Northern Territory, which accounted for the remaining 36%. Australia had three operating uranium mines in 2017—the Four Mile Mine, which was owned by Quasar Resources Pty Ltd. (a subsidiary of Heathgate Resources Pty Ltd.); the Olympic Dam Mine, which was owned by BHP Billiton; and the Ranger Mine, which was owned by Energy Resources of Australia Ltd. (Rio Tinto, 68.4%, and publicly held, 31.6%) in the Northern Territory (table 2; Department of Industry, Innovation, and Science, 2019a, p. 35).

Reserves and Resources

Under Australia’s National Classification System for Identified Mineral Resources, “economic demonstrated resources” (EDR) is a collective term for mineral resources the Australian Government has determined are economical. The EDR of the following minerals increased in 2017 compared with those of 2016: graphite, increased by 636%; platinum-group elements, 370%; vanadium, 88%; phosphate, 9%; zinc, 6%; and cobalt and manganese ore, 5% each. The EDR for diamond decreased by 66%, and this was the largest decrease in EDR in 2017. Other decreases in EDR included those of tantalum,

by 27%; molybdenum and niobium, 24% each; tin, 15%; and rare-earth elements, 5%. Accessible economic demonstrated resources³ for select minerals at the end of 2017 are shown in table 5 (Geoscience Australia, 2019, p.17–18).

For the exploration of minerals other than petroleum, identified deposits accounted for 68% of exploration expenditures, and new deposits accounted for the remaining 32%. In 2017, 8,360 km was drilled for exploration of minerals other than petroleum, which was a 24% increase compared with the amount drilled in 2016. Gold deposits accounted for the largest share of exploration expenditures among minerals other than petroleum in 2017, accounting for 43% of the total, followed by iron ore deposits, 17%; copper deposits, 9%; nickel-cobalt deposits, 8%; coal (undifferentiated), 7%; silver-lead-zinc deposits, 5%; mineral sands [composed of titanium ore minerals (ilmenite, leucoxene, and rutile), and zircon] and uranium, 1% each; 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 9% of the exploration expenditures. Exploration expenditures on diamond increased by 189% in 2017 compared with that of 2016; nickel-cobalt, by 170%; silver-lead-zinc, 85%; other minerals, 37%; gold, 21%; copper, 15%; mineral sands, 7%; and iron ore, 1%. Exploration expenditures decreased only for uranium and coal in 2017, by 15% and 0.2%, respectively (Australian Bureau of Statistics, 2019d–g).

The total expenditure on petroleum exploration was valued at AUD1.22 billion (\$898 million) in 2017, which was a 13% decrease compared with that of 2016, and a 74% decrease from a peak of AUD4.74 billion (\$4.11 billion) in 2014. Offshore exploration accounted for 65% of the total expenditure on petroleum exportation. Drilling accounted for 57% of the total onshore exploration expenditure, whereas it accounted for 53% of the total offshore expenditure (Australian Bureau of Statistics, 2019d, h).

MINERAL INDUSTRY HIGHLIGHTS IN 2018

Minerals in the National Economy

In 2018, Australia’s nominal GDP was AUD1.90 trillion (\$1.42 trillion). Australia’s real GDP increased by 2.7% in 2018. The mineral industry accounted for 8.2% of Australia’s GDP. The gross output of the mineral sector increased by 6.4% to AUD156 billion (\$117 billion) in 2018. Iron ore mining accounted for 29% of the gross output of the mineral industry, followed by coal mining, 28%; natural gas and petroleum extraction, 27%; other mining (which includes nonferrous metals, industrial minerals, and uranium), 11%; and exploration and mining services, 5%. The gross value added of natural gas and petroleum extraction increased by 14%, followed by exploration and mining support services, 11%;

³Accessible economic demonstrated resources (AEDR) as defined by Geoscience Australia refers to the portion of total economic demonstrated resources, which include Joint Ore Reserves Committee-compliant reserves, and measured and indicated resources, that is accessible for mining. It excludes resources that are inaccessible for mining because of environmental restrictions or government policies, or because they are on military lands.

other mining, 8%; coal mining, 3%; and iron ore mining, 2% (Australian Bureau of Statistics, 2019b, c).

Investment towards the mineral industry totaled AUD34.6 billion (\$25.8 billion) in 2018, which was down by 7% compared with that of 2017, driven by a 31% decrease in investment in the natural gas and petroleum sector, which totaled AUD15.4 billion (\$11.5 billion). Investment in all other sectors of the mineral industry increased, however. Investment in exploration and mining support services increased by 108%, followed by nonmetallic mining and quarrying, 102%; coal mining, 25%; and metal mining, 18% (Australian Bureau of Statistics, 2019i).

The mineral industry employed 168,487 people at the end of June 2018, which was a 7.5% increase compared with that of 2017. Metallic ore mining accounted for 39% of mineral industry employment, followed by exploration and other mining services, 22%; coal mining, 21%; natural gas and petroleum extraction, 10%; and nonmetallic mineral mining and quarrying, 8%. Employment in every mineral industry category increased compared with employment in 2017. Employment in exploration and other mining services increased by 20%, followed by nonmetallic ore mining, 10%; metallic ore mining, 6%; coal mining, 2%; and petroleum and natural gas extraction, 1% (Australian Bureau of Statistics, 2019a).

In 2018, expenditures on exploration increased by 12% to AUD3.33 billion (\$2.49 billion). Exploration for minerals other than petroleum accounted for 65% of the total exploration expenditure in 2018, whereas offshore petroleum exploration accounted for 23%, and onshore petroleum exploration, 12%. Exploration expenditures for minerals other than petroleum increased by 24% compared with those in 2017, whereas exploration expenditures for onshore petroleum decreased by 6%, and that for offshore petroleum, by 4% (Australian Bureau of Statistics, 2019d).

In 2018, for exploration of minerals other than petroleum, identified deposits accounted for 63% of the exploration expenditures and new deposits accounted for the remaining 37%. A total of 9,833 km was drilled for exploration of minerals other than petroleum; this was an 18% increase compared with the total drilled in 2017. Gold deposits accounted for the largest share of exploration expenditures among minerals other than petroleum in 2018, accounting for 41% of the total, followed by iron ore deposits, 14%; copper deposits, 12%; nickel-cobalt deposits, 10%; other minerals, 9%; coal (undifferentiated), 8%; silver-lead-zinc deposits, 5%; mineral sands, 2%; uranium, 1%; and diamond, 0.4%. Exploration expenditures on diamond increased by 71% in 2018, followed by copper, 67%; mineral sands, 66%; nickel-cobalt, 50%; coal (undifferentiated), 40%; other minerals, 22%; gold, 19%; silver-lead-zinc, 14%; and iron ore, 4%. Exploration expenditures decreased only for uranium in 2018, by 38% (Australian Bureau of Statistics, 2019d–g).

In 2018, the total expenditure on petroleum exploration decreased by 6% to AUD1.15 billion (\$857 million). Offshore exploration continued to account for 65% of the total expenditure on petroleum exploration. Drilling accounted for 71% of the total onshore exploration expenditure in 2018, whereas it accounted for 51% of the total offshore expenditure (Australian Bureau of Statistics, 2019d, h).

In terms of value, Australia's three leading goods and services exports were iron ore, coal (undifferentiated), and natural gas, in 2018. Australia's nonfuel mineral exports were valued at AUD134.7 billion (\$100 billion), which was a 10% increase compared with the value in 2017. Iron ore and concentrate exports were valued at AUD63.3 billion (\$47.3 billion), followed by LNG, AUD43.3 billion (\$32.3 billion); metallurgical coal, AUD41.2 billion (\$30.8 billion); and thermal coal, AUD25.6 billion (\$19.1 billion) (Department of Foreign Affairs and Trade, 2019a, p. 5; Department of Industry, Innovation, and Science, 2019a, p. 17).

In 2018, Australia's major mineral commodity exports to China (excluding Hong Kong) included 678 Mt of iron ore, 49.8 Mt of thermal coal, 31.0 Mt of metallurgical coal, 1.24 Mt of copper concentrates (a substantial increase of 25%), 849,000 t of zinc concentrate (a substantial increase of 47%), 168,000 t of refined zinc, 133,000 t of refined copper, 119,000 t of lead concentrate (a substantial increase of 350%), 106 t of gold bullion (refined and unrefined) (a substantial increase of 390%), and 8 Mbbbl of crude petroleum (including other refinery feedstock) (an increase of 29%). Australia's major mineral commodity exports to Japan included 81.0 Mt of thermal coal, 65.4 Mt of iron ore, 35.8 Mt of metallurgical coal (48% high quality and 52% other), 521,000 t of aluminum, 386,000 t of copper ore and concentrates, 156,000 t of zinc concentrates, 43,200 t of lead concentrate, and 3.8 Mbbbl of crude petroleum (including other refinery feedstock). Australia's exports of crude petroleum and refined zinc to the United States decreased to zero in 2018 (Department of Industry, Innovation and Science, 2019a, p. 24–25, 27–29, 31, 36).

In terms of amount received, Hong Kong continued to account for the largest share of Australia's gold bullion exports, accounting for 37%. Australia exported 127 t of gold bullion to Hong Kong, which was a decrease of 23%. The Republic of Korea was a substantial importer of zinc concentrate, lead concentrate, and aluminum from Australia, accounting for 35%, 28%, and 20% of the total exports, respectively. India received 25% of Australia's metallurgical coal exports, 23% of its refined lead exports, and 10% of its copper ore and concentrates exports. Malaysia and Taiwan were substantial importers of refined copper from Australia, accounting for 27% and 17% of Australia's exports, respectively (Department of Industry, Innovation and Science, 2019a, p. 23–25, 27–29, 31, 36).

Production

Output of the following mineral commodities increased by 10% or more in 2018: zinc (mine, Zn content), increased by 31%; manganese (mine, gross weight), 27%; magnesite, 26%; manganese (mine, Mn content), 23%; LNG, 22%; lithium (spodumene), 20%; ferromanganese, 19%; natural gas (marketable), 15%; raw steel and tantalum (tantalite concentrate, Ta content), 13% each; silver (mine, Ag content), 12%; rare earths (mineral concentrate, rare-earth-oxide equivalent), 11%; and liquefied petroleum gas, salt, and uranium, 10% each. Output decreased by 10% or more for the following mineral commodities: nickel matte, decreased by 70%; titanium (mine, rutile), 33%; antimony (mine, Sb content) and palladium (mine, Pd content), 30% each; platinum (mine, Pt content), 29%; barite, 27%; lead (refined, secondary), 23%;

silicon (metal) and titanium (mine, ilmenite and leucosene), 20% each; gem-grade and industrial-grade diamond, 18% each; silver (refined, Ag content), 15%; nickel (mine, Ni content), 13%; copper (leaching, electrowon), 12%; and lead bullion, 11% (table 1).

Structure of the Mineral Industry

In 2018, the percent of mining businesses that had some foreign ownership increased to 38.7%. Of foreign-owned mining businesses, 11.1% were less than 10% foreign owned, 5.7% were between 10% and 50% foreign owned, and 21.9% were greater than 50% foreign owned (Department of Foreign Affairs and Trade, 2018b, p. 52; 2019b, p. 50).

In 2018, nongovernment foreign investors required approval to acquire 15% or more in Australian businesses valued at AUD261 million (\$195 million). Nongovernment investors from Chile, China, Japan, New Zealand, the Republic of Korea, Singapore, and the United States could acquire an interest of 15% or more in Australian businesses valued under AUD1,134 million (\$846 million) (indexed in 2018) without approval, under associated Australian free trade agreement commitments (Foreign Investment Review Board, 2018).

Commodity Review

Metals

Bauxite and Alumina.—In 2018, Rio Tinto began operations at the Amrun bauxite project and dispatched its first shipment of bauxite in December. The project was expected to achieve its nameplate capacity of 22.8 Mt/yr of bauxite in 2019. Metro Mining began operating its Bauxite Hills Mine in April and produced 2 Mt of bauxite. Metro Mining expected the mine to reach a production rate of 3.5 Mt/yr in 2019 (Metro Mining Ltd. 2019, p. 7; Rio Tinto plc 2019, p. 41).

Gold.—Dacian Gold began operations at its Morgans Gold project in the June quarter of 2018. The project produced 3,150 kg of gold in 2018 (Dacian Gold Ltd., 2019, p. 3).

Nickel.—The continued decrease in nickel concentrate production was owing to the closing of the Independence Group NL's Long Mine in June. BHP continued efforts to upgrade its Kwinana nickel refinery to a capacity of 100,000 t/yr of refined nickel. The company expected this upgrade to be completed by mid-2019 (Department of Industry, Innovation and Science, 2019b, p. 88; Independence Group NL, 2019, p. 42).

Industrial Minerals

Lithium and Tantalum.—Bald Hill Mine, operated jointly by Alliance Mineral Assets Ltd. and Tawana Resources NL, began production of lithium concentrate in March and tantalum concentrate in April. In December, Alliance Mineral Assets acquired Tawana Resources. Pilbara Minerals completed the construction of its 2-Mt/yr processing plant at the Pilgangoora lithium-tantalum project and began producing spodumene concentrate and tantalite concentrate in June (Alliance Mineral Assets Ltd., 2018, p. 20; 2019, p. 7; Pilbara Minerals Ltd., 2018, p. 18).

Mineral Fuels

Natural Gas.—Australia's LNG exports continued to increase in 2018, up by 23% compared with exports in 2017. The Ichthys project in the Northern Territory dispatched its first LNG shipment in October. The project was operated by INPEX Corp. of Japan and owned by INPEX and other parties. INPEX expected to commission the second train of production in early 2019. The Ichthys project's nameplate capacity was 8.9 Mt/yr of LNG, 1.6 Mt/yr of liquefied petroleum gas, and 36.5 million barrels per year of petroleum condensate. In 2018, Chevron's Wheatstone project achieved its full capacity of 8.9 Mt/yr of LNG with the commissioning of its second production train (BP p.l.c., 2019, p. 40; Chevron Corp., 2019, p. 31; Department of Industry, Innovation and Science, 2019b, p. 110; Department of Jobs, Tourism, Science and Innovation, 2019; INPEX Corp., 2020).

Outlook

Overall investment in mining is expected to continue to decrease, driven mainly by decreases in gas and petroleum investment as large LNG projects (such as the Gorgon, Ichthys, and Wheatstone projects) complete development and begin production. Investment in metallic minerals is expected to remain steady, whereas investment in coal mining is expected to continue to increase slowly. With the full rampup of the Gorgon project and the commissioning of the Wheatstone project, Australia's LNG exports will continue to increase to record levels as the country becomes a major global source for LNG. Although expenditures on petroleum exploration are expected to continue to decrease, expenditures on nonfuel mineral exploration are expected to increase. This expected increase is attributed to increased gold exploration related to high gold prices and increased cobalt and nickel exploration related to increased demand from the electric vehicle industry. Expenditures on iron ore exploration are not expected to increase along with other nonfuel minerals owing to slowing steel production in China (Australia's major iron ore trading partner) and increased iron ore production in Brazil. Australia's lithium production is expected to continue to increase rapidly in the near future as major lithium projects ramp up to their nameplate capacities (Department of Industry, Innovation and Science, 2019b, p.101–102, 106–7).

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TABLE 1
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons, gross weight, unless otherwise specified)

Commodity		2014	2015	2016	2017	2018
METALS						
Aluminum:						
Bauxite	thousand metric tons	78,631 ^r	80,909 ^r	83,517	89,421	95,948
Alumina	do.	20,476 ^r	20,097	20,681	20,486	20,062
Aluminum, metal, primary	do.	1,704 ^r	1,646	1,635	1,487	1,574
Antimony, mine, concentrate, Sb content ³		3,639	3,712	3,598 ^r	3,115	2,173
Cadmium, refinery, primary ^e		350	380	400	400	400
Chromium, mine, chromite, 41.6% Cr ₂ O ₃		10,519	--	--	--	--
Cobalt, Co content:						
Mine, laterite ore, Ni concentrate, and Zn concentrate ⁴		6,201	5,721	5,140	5,034	4,878
Refinery, metal powder and oxide-hydroxide		5,419	5,150	3,350 ^{e,r}	3,000	3,200
Copper:						
Mine:						
Concentrates, Cu content	thousand metric tons	936 ^r	956 ^r	918	830	890
Solvent extraction ⁵	do.	43	40 ^r	30	26	23
Smelter, primary	do.	468 ^r	433	445	360	378
Refinery, primary:						
Electrowon, only ⁵	do.	43	40 ^r	30	26	23
Other	do.	468 ^r	435	445	360	385
Ferroalloys:						
Ferromanganese ⁶		161,900 ^r	150,000 ^r	116,900 ^r	125,100	148,300
Silicomanganese ⁶		119,400 ^r	130,700 ^r	83,700 ^r	120,200	112,900
Gold:						
Mine, Au content	kilograms	269,138 ^r	275,160 ^r	290,800 ^r	294,171	313,028
Refinery, primary and secondary	do.	303,500	302,271	344,253	327,609	342,706
Iron ore, mine:						
Gross weight	thousand metric tons	739,682	809,882	858,026	885,357	907,819
Fe content	do.	457,409	500,994	531,075	548,297	562,137
Iron and steel:						
Pig iron	do.	3,282	3,594	3,642	3,758	3,882
Raw steel	do.	4,582	4,935	5,160 ^r	5,335	6,035
Lead:						
Mine, Pb content		727,954	653,488	441,338 ^r	459,487	431,552
Refinery:						
Primary:						
Bullion ^{e,7}		109,000	161,000 ^r	155,000 ^r	125,000	111,000
Other		175,842	182,258	182,830	168,300	155,482
Secondary, excluding remelt ^c		50,000 ^r	45,000 ^r	41,000 ^r	43,000	33,000
Manganese, mine:						
Gross weight	thousand metric tons	7,505 ^r	7,400 ^r	5,164 ^r	6,473	8,193
Mn content	do.	3,255 ^r	3,247 ^r	2,325 ^r	2,821	3,475
Nickel:						
Mine, Ni content	do.	266	225	203	185	161
Smelter, matte ⁸	do.	62	44	38	37	11
Refinery:						
Metal, electrolytic ⁹		129,862	132,074	117,920	108,500	113,500
Unspecified ¹⁰		7,901	20,904	2,600	--	--
Platinum-group metals, mine, elemental content:^{e,11}						
Palladium, Pd content	kilograms	600	420	590 ^r	600	420
Platinum, Pt content	do.	170	120 ^r	170 ^r	170	120
Total	do.	770	540 ^r	760	770	540
Rare earths, mineral concentrate, rare-earth-oxide equivalent ^c		8,000	12,000	15,000	19,000	21,000
Silicon, metal ^e		48,000	48,000	48,000 ^r	50,000	40,000
Silver:						
Mine, Ag content		1,847	1,430	1,418	1,120	1,254
Refinery		944	1,064	1,209	1,019	865

See footnotes at end of table.

TABLE 1—Continued
 AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons, gross weight, unless otherwise specified)

Commodity	2014	2015	2016	2017	2018
METALS—Continued					
Tantalum, mine, tantalite concentrate, Ta content kilograms	17,000 ^c	68,200	10,300	20,200	22,900
Tin, mine, Sn content	6,898	7,158	6,635	7,402	6,871
Titanium, mineral concentrates:					
Ilmenite and leucoxene thousand metric tons	1,250	1,156 ^r	1,400 ^r	1,500	1,200 ^c
Rutile do.	212	320	300	300	200 ^c
Tungsten, mine, concentrate, W content	477	348	108	20 ^c	20 ^c
Zinc:					
Mine, Zn content thousand metric tons	1,506	1,610	885 ^r	852	1,112
Smelter, primary do.	482	489	464	462	490
Zirconium, mineral concentrate do.	798	601	600	505	530
INDUSTRIAL MINERALS					
Abrasives, garnet, natural	274,662	283,108	574,660	363,573	360,133
Barite	14,676	6,017 ^r	7,139	8,958	6,534
Cement, hydraulic ^c thousand metric tons	9,000	9,500 ^r	9,600 ^r	9,700	10,200
Clay:					
Bentonite ^c	66,000	76,000 ^r	92,000	90,000	90,000
Fuller's earth, attapulgite	10,176	16,216	12,200 ^c	12,000 ^c	12,000 ^c
Kaolin ^c	188,000 ^r	209,000 ^r	205,000 ^r	200,000	200,000
Diamond: ^c					
Gem, natural thousand carats	186 ^r	271 ^r	279 ^r	343	281
Industrial, natural do.	9,100 ^r	13,300 ^r	13,700 ^r	16,800	13,800
Total do.	9,290 ^r	13,600 ^r	14,000 ^r	17,100	14,100
Diatomite ^c	15,000	14,000	12,000	12,000	12,000
Feldspar, mine, includes nepheline syenite ^c	45,000	45,000	10,000 ^r	10,000	10,000
Graphite, crystalline flake	--	500	--	--	--
Gypsum, mine thousand metric tons	2,573 ^r	2,542	2,889 ^r	1,397	1,400 ^c
Lime ^c	1,950,000	1,990,000	2,000,000	2,000,000	2,000,000
Lithium, spodumene, concentrates	444,546 ^r	445,990 ^r	440,525 ^r	1,706,618	2,051,327
Magnesite ^{c, 12}	630,000 ^r	570,000 ^r	340,000 ^r	210,000	265,000
Nitrogen, ammonia, N content ^c	1,250,000	1,300,000	1,300,000	1,300,000	1,300,000
Perlite ^c	1,000 ^r	1,000 ^r	800 ^r	500	500
Phosphate rock: ^c					
Gross weight ¹³	2,900,000	3,300,000	3,000,000	3,000,000	2,800,000
P ₂ O ₅ content ¹³	750,000 ^r	860,000 ^r	750,000 ^r	750,000	680,000
Salt thousand metric tons	12,998	11,390	10,410	11,675	12,894
Stone, sand and gravel, construction:					
Sand and gravel do.	30,300	29,500	29,300	29,000 ^c	29,000 ^c
Stone, crushed ^c do.	27,000	24,700	24,900	25,000	25,000
Talc and related materials, chlorite, pyrophyllite, steatite, talc ^c	115,000	80,000	111,000	110,000	100,000
MINERAL FUELS AND RELATED MATERIALS					
Coal: ^c					
Anthracite thousand metric tons	16 ^r	179 ^r	800 ^r	790	818
Bituminous do.	264,000 ^r	259,000 ^r	256,000 ^r	253,000	262,000
Lignite do.	71,300 ^r	71,900 ^r	71,600 ^r	70,600	73,300
Metallurgical do.	210,000 ^r	215,000 ^r	213,000 ^r	210,000	218,000
Subbituminous do.	24,800 ^r	25,400 ^r	25,100 ^r	24,700	25,700
Coke, metallurgical ^c do.	2,820	2,920	2,500 ^r	2,500	2,500
Liquefied natural gas ^c do.	24,900	32,400 ^r	45,000 ^r	56,900	69,517
Natural gas, marketable million cubic meters	67,335	76,791	97,328	113,805	130,987
Petroleum:					
Crude, including condensate thousand 42-gallon barrels	128,954	117,619	106,800 ^r	103,706	107,539
Refinery products:					
Liquefied petroleum gas do.	24,925	17,883	19,970	18,209	19,971
Other ¹⁴ do.	219,817 ^r	174,652 ^r	172,245 ^r	168,039	175,394
Uranium, mine, U content	5,100	5,655	6,234	5,344	5,872

See footnotes at end of table.

TABLE 1—Continued
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES^{1,2}

⁶Estimated. ^fRevised. do. Ditto. -- Zero.

¹Table includes data available through January 31, 2020. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²In addition to the commodities listed, Australia produced dimension stone, jade, kyanite, opal, sapphire, sulfuric acid, and secondary tin metal, but available information was inadequate to make reliable estimates of output.

³Antimony content of antimony ore and concentrate, lead concentrates, and lead-zinc concentrates.

⁴Cobalt content of lateritic nickel ore and nickel concentrate reported by the government of Western Australia.

⁵The 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.

⁶Reported by the International Manganese Institute.

⁷Includes a substantial precious metal content, mainly silver.

⁸Figures exclude toll-refined material.

⁹Products with a nickel content of 99% or more. Includes electrolytic nickel, pellets, briquets, and powder.

¹⁰Products 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.

¹¹Platinum-group metals (PGMs) recovered from nickel ore that is processed domestically. PGMs 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.

¹²Estimates are based on reported data for the calendar year by the Dept. of State Development, South Australia, and for the fiscal year, ending June 30, by the Queensland Department of Natural Resources and Mines.

¹³Data include production from Christmas Island.

¹⁴Includes automotive gasoline, aviation gasoline, diesel fuel, and fuel oil and was listed as "Unspecified" in the Australia chapter of USGS Minerals Yearbook 2016.

TABLE 2
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2018

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ³
Aluminum:			
Bauxite	Amrun bauxite project (Rio Tinto Ltd., 100%)	South of Weipa, QLD	22,800
Do.	Bald Hill Mine (Australian Bauxite Ltd., 100%)	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 Aluminium (Rio Tinto Ltd., 100%)]	15 km southeast of Nhulunbuy, NT	11,200
Do.	Hey Point Mine (Green Coast Resources Pty Ltd., 100%)	Near Weipa, QLD	1,500
Do.	Huntly open pit bauxite mine [Alcoa of Australia Ltd. (Alcoa Corp., 60%, and Alumina Ltd., 40%)]	80 km south of Perth, WA	26,000
Do.	Weipa-Ely open pit bauxite mine [Rio Tinto Aluminium Ltd., operator (Rio Tinto Ltd., 40%)]	Weipa, QLD	30,900
Do.	Willowdale open pit bauxite mine [Alcoa of Australia Ltd. (Alcoa Corp., 60%, and World Alumina and Chemicals, 100%)]	130 km south of Perth, WA	10,000
Alumina, refinery	Gove alumina refinery ³ (Rio Tinto Ltd., 100%)	Nhulunbuy, Gove, NT	2,650
Do.	Kwinana alumina refinery [Alcoa of Australia Ltd. (Alcoa World Alumina and Chemicals, 100%)]	Kwinana, WA	2,200
Do.	Pinjarra alumina refinery [Alcoa of Australia Ltd. (Alcoa World Alumina and Chemicals, 100%)]	Pinjarra, WA	4,200
Do.	Queensland Alumina alumina refinery [Queensland Alumina Ltd., operator (Rio Tinto Ltd., 80%, and United Company RUSAL plc, 20%)]	Gladstone Region, QLD	3,950
Do.	Wagerup alumina refinery [Alcoa of Australia Ltd. (Alcoa World Alumina and Chemicals, 100%)]	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	3,400
Metal, smelter	Bell Bay aluminum smelter [Pacific Aluminium (Rio Tinto Ltd., 100%)]	Bell Bay, TAS	192
Do.	Boyne Island aluminum smelter [Boyne Smelters Ltd., operator (Rio Tinto Alcan, 59.39%; YKK Aluminium, 9.5%; UACJ Australia, 9.43%; Southern Cross Aluminium, 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 Aluminium, 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.	Waurm Ponds, VIC	250
Do.	Cement Australia Pty Ltd. (Hanson Ltd. and Holcim Australia Pty Ltd.)	Brisbane, QLD	1,200

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ⁶
Cement:—Continued			
Do.	Cement Australia Pty Ltd. (Hanson Ltd. and Holcim Australia Pty Ltd.)	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
Do.	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 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. (Glencore plc, 100%), 74.1%; Sumitomo Corp., 5%; Toyota Tsusho Mining (Australia) Pty Ltd. 4.75%; private, 14.44%]	24 km northwest of Lithgow, NSW	2,500
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 Billiton 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 Billiton 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.	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 Billiton Ltd., 50%, and Mitsubishi Corp., 50%)]	160 km west of Mackay, QLD	5,500
Do.	Carborough Downs underground coal mine (Vale S.A., 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

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ³
Coal—Continued			
Do.	Charbon open pit and underground coal mine ⁴ [Centennial Coal Co. Ltd. (Banpu Public Co. Ltd., 100%), 95%, and SK Energy Australia Pty Ltd., 5%]	Western coalfields near Kandos, NSW	1,300
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.	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
Do.	Daunia open pit coal mine [BHP Billiton Mitsubishi Alliance, manager (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)]	30 km east of Moranbah, QLD	4,500
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 Billiton Ltd., 50%, and Mitsubishi Corp., 50%)]	140 km southwest of Mackay, QLD	16,000
Do.	Gregory Crinum open pit and underground coal mine ⁴ [BHP Billiton Mitsubishi Alliance, manager (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)]	60 km north of Emerald, QLD	5,500
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.	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

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^c
Coal—Continued			
Do.	Hazelwood open pit coal mine ⁶ (ENGIE SA, 100%)	150 km southeast of Melbourne, VIC	20,000
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 (Vale S.A., 50%, and Sumitomo Corp., 50%)	7 km southeast of Moranbah, QLD	1,600
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%, and Nippon Steel Australia Pty. Ltd., 5%)	150 km southwest of Mackay, QLD	5,800
Do.	Mount Arthur open pit coal mine (BHP Billiton Ltd., 100%)	5 km southwest of Muswellbrook, NSW	15,000
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.	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 Moranbah, QLD	3,000
Do.	Norwich Park open pit coal mine ⁴ [BHP Billiton Mitsubishi Alliance, manager (BHP Billiton 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 Billiton Ltd., 50%, and Mitsubishi Development Pty. Ltd., 50%)]	145 km north of Emerald, QLD	9,000
Do.	Poitrel open pit coal mine [BHP Billiton 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

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^c
Coal—Continued				
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 Billiton Ltd., 50%, and Mitsubishi Corp., 50%)]	125 km north of Emerald, QLD	6,500
Do.		South Walker Creek open pit and underground coal mine [BHP Billiton 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 ^{4,5} (First Quantum Minerals Ltd., 100%)	155 km west of Esperance, WA	1,400
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.		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	65
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 ³	10
Do.		Mount Gordon open pit copper (solvent extraction-electrowinning) mine (Aditya Birla Minerals Ltd., 100%)	120 km north of Mount Isa, QLD	50

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ⁶	
Copper:—Continued				
Mine production, Cu content—Continued	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 Billiton 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 underground mine (includes New Cobar, New Occidental, and Perseverance) (New Gold Inc., 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.	Telfer copper and 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	250	
Do.	Olympic Dam copper smelter [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	70	
Refinery	Olympic Dam copper refinery [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	do.	235	
Do.	Townsville copper refinery (Glencore plc, 100%)	Townsville, QLD	300	
Diamond	thousand carats	Argyle diamond mine [Argyle Diamonds Ltd., operator (Rio Tinto plc, 100%)]	120 km southwest of Kununurra, WA	20,000
Do.	do.	Ellendale Mine ⁴ (Kimberley Diamond Ltd., 100%)	130 km east southeast of Derby, WA	700
Do.	do.	Merlin diamond mine (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.		Mount Sylvia Diatomite Pty Ltd.	Mount Sylvia Mine, 35 km southeast of Toowoomba, QLD	NA
Do.		Greenvale Silicon Pty Ltd.	Conjuboy Mine, 45 km northwest of Greenvale, QLD	NA
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
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

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ⁶
Gold:—Continued				
Mine production, Au content—Continued	kilograms	Bronzewing underground gold mine (includes Mount McClure, Venus, Success, Cockburn, Corboys, Mount Joel) (Audax Resources Ltd., 100%)	65 km northeast of Leinster, WA	9,000
Do.	do.	Burnside open pit mines (includes Union Reefs, Brocks Creek, North Point, Princess Louise, Rising Tide, Zapopan, Fountain Head) (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.	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 Morgans Mine (Dacian Gold Ltd., 100%)	25 km west of Laverton, WA	4,250
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 Billiton 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
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	1,000

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^c
Gold:—Continued				
Mine production, kilograms		Saint Ives open pit and underground gold mine (Gold Fields Ltd., 100%)	75 km south-southeast of Kalgoorlie, W	15,000
Au content—Continued				
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 mine gold (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		Perth Mint Refinery [Gold Corp. (Government of Western Australia, 100%)]	Newburn, WA	400
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 Billiton 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, WhiteKnight, Mount Lewin, Mount Nicholas, and Flinders) (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. (Rio Tinto Ltd., 100%), 54%, and Shanghai Baosteel Group Corp., 46%]}	10 km east of Paraburdoo, WA	10,000
Do.		Extension Hill and 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 Billiton 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

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^c
Iron and steel:—Continued			
Iron ore—Continued			
	Koolan Island open pit iron ore mine ⁴ (Mount Gibson Iron Ltd., 100%)	140 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
Do.	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 Billiton Ltd., 85%; Mitsui-ITOCU 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 Joint Venture, 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, WA	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 Joint Venture, 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 Billiton 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., 100%)	250 km north of Mount Isa, QLD	90
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, and Hilton Mines) (Glencore plc, 100%)	Mount Isa, QLD	150
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

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^c
Lithium:				
Direct shipping ore		Pilgangoora lithium-tantalum project (Pilbara Minerals Ltd., 100%)	120 km south of Port Hedland, WA	1,500
Do.		Wodgina Mine (Mineral Resources Ltd., 100%)	100 km south of Port Hedland, WA	3,500
Spodumene, concentrate		Bald Hill Mine (Alliance Mineral Assets Ltd., 100%)	50 km southeast of Kambalda, WA	155
Do.		Greenbushes open pit and underground tantalite-spodumene mine {Talisson Lithium Pty. Ltd., operator [Windfield Holding Pty. Ltd. (Tianqi Lithium Corp., 51%, and Albemarle Corp., 49%), 100%]}	70 km southeast of Bunbury, WA	740
Do.		Mount Cattlin spodumene mine (Galaxy Resources Ltd., 100%)	2 km north of Ravensthorpe, WA	180
Do.		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 Kaloorlie, WA	400
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, concentrate		Bootu Creek open pit manganese mine (OM Holding Ltd., 100%)	110 km north of Tennant Creek, NT	600
Do.		Groote Eylandt open pit manganese mine [Groote Eylandt Mining Co., operator (BHP Billiton 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	1,000
Alloys		Bell Bay Smelter [Tasmanian Electro Metallurgical Co. Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Bell Bay, TAS	250
Natural gas:				
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
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 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., 0.420%)	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
Liquefied natural gas	million metric tons	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 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., 0.420%)	South of Darwin, NT	9

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ⁶
Natural gas:				
Liquefied natural gas—Continued	million metric tons	Karratha Gas Plant {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	12
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 ³ (includes Silver Swan) (Poseidon Nickel Ltd., 100%)	53 km northeast of Kalgoorlie, WA	10
Do.		Cosmos open pit 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) (Panoramic Resources Ltd., 100%)	42 km south of Kambalda, WA	10
Do.		Leinster mine complex (BHP Billiton Ltd., 100%)	10 km north of Leinster, WA	44
Do.		Long underground mine ⁷ (Independence Group NL, 100%)	Near Kambalda East, WA	10
Do.		Mariners underground nickel mine ⁴ (Mincor Resources NL, 100%)	70 km south of Kambalda, WA	5
Do.		Miitel underground nickel mine ⁴ (Mincor Resources NL, 100%)	do.	5
Do.		Mount Keith open pit nickel mine (includes the Cliffs, Jericho, Venus, and Yakabindie deposits) (BHP Billiton 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 ⁵ (First Quantum Minerals Ltd., 100%)	Ravensthorpe, WA	25
Do.		Savannah underground mine ⁴ (Panoramic Resources Ltd., 100%)	120 km north of Halls Creek, WA	8
Smelter		Kalgoorlie nickel smelter (BHP Billiton Ltd., 100%)	Kalgoorlie, WA	100
Refinery		Kwinana nickel refinery (BHP Billiton Ltd., 100%)	Kwinana, WA	65
Do.		Murrin Murrin nickel refinery [Minara Resources Ltd. (Glencore plc, 100%)]	Murrin Murrin, WA	45
Petroleum, refinery	thousand 42-gallon barrels per day	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
Do.	do.	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

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ⁶
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 [Kermerton 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 Billiton Ltd., 100%)	85 km southwest of McKinlay, QLD	700,000
Do.	do.	Century open pit zinc-silver-lead mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	250 km north of Mount Isa, QLD	3,000
Do.	do.	Pasminco Ltd., 100%	Cockle Creek silver smelter, NSW	85,000
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 (also includes Enterprise, George Fisher, and Hilton 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 Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	27,000
Do.	do.	Peak underground gold-zinc-lead-copper-silver underground mine (includes New Cobar, New Occidental, and Perseverance) (GoldCorp Inc., 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 (OneSteel Ltd., 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 ₂ O ₅ content		Greenbushes open pit and underground tantalite-spodumene mine (Global Advanced Metals Pty. Ltd., 100%)	70 km southeast of Bunbury, WA	NA
Do.		Bald Hill tantalite mine ⁴ (Alliance Mineral Assests Ltd., 50%, and Tawana Resources NL, 50%)	50 km southeast of Kambalda, WA	NA
Do.		Pilgangoora lithium-tantalum project (Pilbara Minerals Ltd., 100%)	120 km south of Port Hedland, WA	NA
Do.		Wodgina open pit tantalite mine (Global Advanced Metals Pty. 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 2018

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^c
Tin:				
Mine production, Sn content	metric tons	Collingwood underground tin mine ⁴ (Metals X Ltd., 100%)	35 km south of Cooktown, QLD	3,000
Do.	do.	Greenbushes open pit and underground tantalite-spodumene mine ⁴ (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%; L'sea Resources International Holdings Ltd. and YT Parksong Australia Holdings Pty Ltd., 50%)	55 km southwest of Burnie, TAS	6,000
Do.	do.	Renison Bell underground tin mine (Metals X Ltd., 50%; L'sea Resources International Holdings Ltd. and YT Parksong Australia Holdings Pty Ltd., 50%)	136 km south of Burnie, TAS	4,000
Smelter	do.	Greenbushes smelter ⁴ (Global Advanced Metals Pty. Ltd., 100%)	70 km southeast of Bunbury, WA	1,000
Titanium, mineral sands (ilmenite, rutile, and zircon)				
Do.		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				
Do.	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%)	75 km west of Cairns, QLD	4,000
Do.	do.	Wolfram Camp molybdenum-tungsten mine (Almonty Industries Inc., 100%)	85 km west of Cairns, QLD	500
Uranium, mine production, U₃O₈ content				
Do.	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 Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	4,400
Do.	do.	Ranger open pit uranium mine [Energy Resources of Australia Ltd. (Rio Tinto plc, 68.4%, and public 31.6%), 100%]	230 km east of Darwin, NT	5,000
Vanadium, mine production, V₂O₅ content				
Do.	do.	Windimurra vanadium project vanadium 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 Billiton 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., 100%)	65 km northwest of Cloncurry, QLD	80

See footnotes at end of table.

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

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ³
Zinc—Continued			
Mine production, Zn content—Continued	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
Do.	Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, Hilton Mines, and Lady Loretta) (Glencore plc, 100%)	Mount Isa, QLD	175
Do.	Peak underground gold-zinc-lead-copper-silver underground mine (includes New Cobar, New Occidental, and Perseverance) (New Gold Inc., 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	Port Pirie smelter (Nyrstar NV, 100%)	5 km north of Queenstown, TAS	45
Do.	Hobart smelter (Nyrstar NV, 100%)	Hobart, TAS	320
Refinery	Sun Metals zinc refinery [Sun Metals Corp. Pty. Ltd., operator (Korea Zinc Co., 100%)]	Townsville, QLD	170

³Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Abbreviations 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.

²Abbreviation(s) used for unit(s) of measure in this table include the following: km—kilometer.

³Closed in October 2017

⁴Remained on care-and-maintenance status through 2018.

⁵Placed on care-and-maintenance status in October 2017.

⁶Closed in March 2017.

⁷Placed on care-and-maintenance status in June 2018.

TABLE 3
AUSTRALIA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2017 AND 2018

(Thousand metric tons unless otherwise specified)

Commodity	2017		2018	
	Quantity	Value (million dollars)	Quantity	Value (million dollars)
METALS				
Aluminum:				
Bauxite	27,199	809	31,512	976
Alumina	17,872	5,543	17,868	7,729
Metal	1,303	2,485	1,437	3,191
Copper:				
Ores and concentrates, gross weight	1,772	3,526	2,072	4,567
Refined metal	354	2,093	354	2,355
Total Cu content	871	NA	941	NA
Gold, bullion, refined and unrefined	metric tons	318 ^e	341 ^e	14,072
Iron and steel:				
Iron ore, gross weight ¹	827,141	46,468	834,553	47,268
Raw steel	965	678	1,209	779
Lead:				
Bullion ²	127	363	109	286
Ores and concentrates, gross weight	155	326	243	440
Refined metal	219	487	192	438
Total Pb content	520	NA	528	NA
Nickel:				
Ores and concentrates, gross weight	172	202	164	193
Refined and intermediate, gross weight	178 ^e	1,630 ^e	234 ^e	3,010 ^e
Total Ni content	209 ^e	NA	262 ^e	NA
Silver, bullion, refined	metric tons	513	286	145
Tin, ores and concentrates:				
Gross weight	do.	12,661	121	13,068
Sn content	do.	6,989	NA	6,911
Titanium:				
Ilmenite concentrate	970 ^e	NA	804 ^e	NA
Leucoxene concentrate	154 ^e	NA	120 ^e	NA
Rutile concentrate	288 ^e	NA	312 ^e	NA
Synthetic rutile	96 ^e	NA	81 ^e	NA
Titanium dioxide pigment	219 ^e	NA	210 ^e	NA
Zinc:				
Ores and concentrates, gross weight	1,551	1,325	2,017	1,849
Refined metal	435	1,201	418	1,250
Total Zn content	1,098	NA	1,284	NA
Zirconium, mineral concentrates, zircon	568 ^e	NA	617 ^e	NA
INDUSTRIAL MINERALS				
Gemstones:				
Diamond:				
Gem	carats	69,000	207	169,000
Industrial	do.	160	1	299
Unsorted	do.	16,200,000 ^e	186 ^e	14,700,000 ^e
Total	do.	16,300,000 ^e	393 ^e	14,900,000 ^e
Opal:				
Rough		NA	7	NA
Cut and polished		NA	32	NA
Total		NA	39	NA
Sapphire, rough		NA	7	NA
Other ³		NA	15	NA

See footnotes at end of table.

TABLE 3—Continued
AUSTRALIA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2017 AND 2018

(Thousand metric tons unless otherwise specified)

Commodity	2017		2018		
	Quantity	Value (million dollars)	Quantity	Value (million dollars)	
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Metallurgical	million metric tons	173	26,731	179	30,779
Thermal	do.	200	15,340	208	19,108
Liquefied natural gas	do.	57	18,865	70	32,310
Petroleum:					
Crude ⁴	thousand 42-gallon barrels	77,288	4,163	87,715	6,428
Refinery products	do.	6,480	354	7,352	556
Uranium oxide (U ₃ O ₈)	metric tons	7,410 ^e	437 ^e	7,270 ^e	474

^eEstimated. do. Ditto. NA Not available.

¹Includes iron ores, concentrates, lump, and pellets.

²Lead bullion includes a substantial precious metal content, mainly silver.

³Includes cut and polished sapphires.

⁴Includes other refinery feedstock.

Source: Australian Government, Department of Industry and Science, 2019, Resources and energy quarterly, December 2019.

TABLE 4
AUSTRALIA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2017 AND 2018

(Thousand metric tons unless otherwise specified)

Commodity	2017		2018		
	Quantity	Value (million dollars)	Quantity	Value (million dollars)	
METALS					
Aluminum:					
Alumina		11	10	11	14
Bauxite		6	2	6	3
Metal		51	101	51	116
Gold, bullion, refined and unrefined		NA	4,110	NA	4,566
Iron and steel:					
Ferroalloys		37	57	60	92
Iron ore, gross weight ¹		344	19	725	43
Raw steel		2,268	1,933	2,399	2,482
Nickel, primary products ²		NA	56	NA	58
Phosphate rock		431	39	404	38
Silver, bullion, refined		NA	79	NA	62
Tin, refined	metric tons	263	5	335	6
INDUSTRIAL MINERALS					
Gemstones, diamond:					
Dust and powder	thousand carats	1,434	NA	1,182	1
Gem	do.	249	421	242	430
Industrial	do.	4	NA	1	NA
Total	do.	1,690 ^e	421 ^e	1,430 ^e	430 ^e
MINERAL FUELS AND RELATED MATERIALS					
Petroleum:					
Crude ³	thousand 42-gallon barrels	132,285	7,152	142,879	10,386
Refinery products	do.	231,978	14,732	239,775	19,727

¹Includes limonite ore used in the production of refined nickel products.

²Includes 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.

³Includes other refinery feedstock.

Source: Australian Government, Department of Industry and Science, 2019, Resources and energy quarterly, December 2019.

TABLE 5
AUSTRALIA: RESERVES OF MAJOR MINERAL COMMODITIES IN 2018

Commodity		Reserves ¹
Antimony, Sb content	thousand metric tons	138
Bauxite	million metric tons	6,020
Coal:		
Anthracite and bituminous, recoverable ²	billion metric tons	66
Lignite, recoverable ³	do.	66
Cobalt, Co content	thousand metric tons	1,220
Copper, Cu content	million metric tons	88
Diamond	million carats	40
Gold, Au content	metric tons	10,000
Iron ore:		
Gross weight	billion metric tons	48
Fe content	do.	23
Lead, Pb content	million metric tons	36
Lithium, Li content	thousand metric tons	2,800
Magnesite, MgCO ₃ content	million metric tons	316
Manganese ore	do.	231
Molybdenum, Mo content	thousand metric tons	160
Nickel, Ni content	million metric tons	20
Niobium, Nb content	thousand metric tons	216
Platinum-group metals (Ir, Os, Pd, Pt, Rh, Ru) ⁴	kilograms	22,300
Phosphate rock:		
Gross weight	million metric tons	1,170
P ₂ O ₅ content	do.	198
Potash, K ₂ O content	do.	58
Rare earths (rare-earth oxides plus Y ₂ O ₃)	thousand metric tons	3,270
Silver, Ag content	do.	90
Tantalum, Ta content	do.	55
Tin, Sn content	do.	415
Titanium:		
Ilmenite	do.	245
Rutile	do.	29
Tungsten, W content	do.	386
Uranium, U content	do.	1,230
Vanadium, V content	do.	3,970
Zinc, Zn content	million metric tons	68
Zirconium, Zircon	do.	72

do. Ditto.
¹Accessible Economic Demonstrated Resources (AEDR) as of December 2017, as reported by Geoscience Australia. AEDR refers to the portion of total economic demonstrated resources, which include Joint Ore Reserves Committee-compliant reserves, and measured and indicated resources, that is accessible for mining. It excludes resources that are inaccessible for mining because of environmental restrictions or government policies, or because they are on military lands.

²Reported as black coal by Geoscience Australia.

³Reported as brown coal by Geoscience Australia.

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