



2012 Minerals Yearbook

AUSTRALIA

THE MINERAL INDUSTRY OF AUSTRALIA

By Pui-Kwan Tse

Australia was subject to volatile weather in recent years that included heavy rains and droughts. The inclement weather conditions affected companies' abilities to expand their activities, such as port, rail, and road construction and repair, as well as to mine, process, manufacture, and transport their materials. Slow growth in the economies of the Western developed countries in 2012 affected economic growth negatively in many countries of the Asia and the Pacific region. China, which was a destination point for many Australian mineral exports, continued to grow its economy in 2012, although the rate of growth was slower than in previous years. As a result, Australia's gross domestic product (GDP) increased at a rate of 3.1% during 2012, which was higher than the 2.3% rate of growth recorded in 2011. The economic growth of Australia was owing mainly to the mining sector, which increased in value by 8.8% in 2012 compared with the value in 2011. Strong export growth, especially by the mineral and mineral fuels sectors, contributed to the economic growth. Increased demand from China supported exports of coking coal and iron ore (Australian Bureau of Statistics, 2013a, p. 4–5; Reserve Bank of Australia, 2013, p. 37).

Australia's total mineral exploration spending was estimated to be A\$3.9 billion (US\$4.1 billion) in fiscal year 2012 (the Australian fiscal year ran from July 1, 2011, to June 30, 2012), which was an increase of 34% from that of fiscal year 2011. The increase in exploration spending was the result of an increase in exploration for base metals, coal, gold, and iron ore. About 65% of the country's total exploration expenditure was spent on known deposits, and the remaining 35% was spent on new exploration projects. The State of Western Australia accounted for 53% of the total exploration spending followed by Queensland, 25%; South Australia, 8%; and others, 14%. Iron ore exploration spending accounted for 29% of the exploration spending followed by coal, 21%; base metals, 20%; gold, 19%; and other commodities, 11%. As a result of the spending on exploration, significant mineral resources were discovered. These included the Nova copper-nickel deposit and the Dampier heavy-mineral sand deposit in Western Australia and the Mallee Bull copper-gold-silver deposit in New South Wales (Geoscience Australia, 2013, p. 1–2).

Minerals in the National Economy

Australia's mineral sector contributed more than \$142 billion, or about 10%, to the country's GDP in fiscal year 2012. The mineral sector employed 249,000 people. Expectations of sustained levels of global demand for minerals led to increased production of minerals and metals in Australia, and the mineral industry was expected to continue to be a major contributor to the Australian economy during the next several years (Australian Bureau of Resources and Energy Economics, 2013, p. 12–14).

Government Policies and Programs

The powers of Australia's Commonwealth Government are defined in the Australian Constitution; powers not defined in the Constitution belong to the States and Territories. Except for the Australian Capital Territory (that is, the capital city of Canberra and its environs), all Australian States and Territories have identified mineral resources and established mineral industries. Each State has a mining act and mining regulations that regulate the ownership of minerals and the operation of mining activities in that State. The States have other laws that deal with occupational health and safety, environment, and planning. All minerals in the land are reserved to the Crown; however, a very small percentage of minerals in Australia are owned by those who were granted titles to the land before the enactment of relevant State legislation that excludes mineral ownership. Companies or miners may obtain rights to conduct mining activities on unreserved Crown land where the permission of the landowner has been granted. Royalties on minerals are charged by State and Territorial governments. In most cases, royalties are payable on a percentage of value or a flat-rate per-unit basis. Each State sets its own rate. The Northern Territory's royalties are based on profit where the net value of a mine's production is used to calculate the applicable royalty. The royalty paid by a company is allowed to be deducted from reported income for income tax purposes. The amount of royalty paid can be reduced by deducting the costs incurred in the transportation of the mineral ore, concentrate, or metal.

The Australian Parliament passed the minerals resource rent tax (MRRT) bill in November 2011. A uniform national MRRT took effect on July 1, 2012. The MRRT, which applies only to coal and iron ore mining, is intended to target project profits rather than project production and to shift the tax burden from low-profitability projects to more profitable projects. The MRRT is set at an internationally competitive rate of 22.5%, and companies are charged the MRRT when the net mining profits are equal to or less than A\$75 million (US\$77.5 million). Companies are entitled to have an MRRT offset year if the company's group mining profit for the year is less than A\$125 million (US\$129.2 million). All Federal and State resource taxes would be credited towards tax payment. Fortescue Metals Group Ltd. (the third-ranked iron ore producer in Australia) filed a challenge to the tax in the Australian High Court, asserting that the MRRT discriminates among the States and curtails State sovereignty. The governments of the States of Queensland and Western Australia joined with Fortescue Metals Group in challenging the tax, arguing that the tax is unconstitutional. The Federal Government estimated that the MRRT would collect about A\$2 billion (US\$2.08 billion) in revenue during the first fiscal year in which it is in effect (fiscal year 2013). During the first 6 months of fiscal year 2013, the actual MRRT tax revenue was A\$126 million (US\$129 million) (Mining Weekly, 2012; Wilson, 2013).

The Department of Mines and Petroleum of the State of Western Australia introduced an A\$80 million (US\$84 million) exploration incentive scheme (EIS) fund to stimulate exploration in greenfield areas in Western Australia. The EIS program was to support companies generating new precompetitive geologic and geophysical information. Under the EIS, online systems for the management of administrative processes surrounding tenement applications, as well as other tenement-related processes (such as environmental databases), were being developed. The Government of Western Australia released guidelines to ensure a consistent planning process on mine closure in the State (Ellis, 2013; Risbey, 2013).

Production

Australia continued to be one of the world's leading producers of such mineral commodities as bauxite, coal, cobalt, copper, gem and near-gem diamond, gold, iron ore, lithium, manganese, tantalum, and uranium. The country's refined metal production capacity was moderate in the Asia and the Pacific region compared with that of China and Japan. Because of its large mineral resources, Australia was virtually self-sufficient in most mineral commodities. Petroleum production, however, supported only about 70% of the country's consumption. Australia was one of the world's leading exporting countries for alumina, coal, iron ore, and uranium. In general, the level of mineral and metal production was about the same in 2012 as it was in 2011. Some of the commodities for which production decreased in 2012 were iron and steel, refined lead, refined silver, and zircon. Mineral commodities for which reported production increased included mined antimony, cobalt, iron ore, ilmenite, and mined and refined nickel. The increase in iron ore output was from record production at mines operated by BHP Billiton Ltd., Fortescue Metals Group, and Rio Tinto Ltd. BHP Billiton's Olympic Dam returned to full production in 2011. An increase in mined nickel production reflected increased output from BHP Billiton's Nickel West and Western Areas NL's Spotted Quoll and Forrestania operations (table 1).

Structure of the Mineral Industry

The Australian mineral industry is characterized by free enterprise in which private companies are involved in exploration, mine development, mineral production, mineral processing, and marketing. A number of Australian mineral companies were affiliates or subsidiaries of European and U.S. companies, which controlled a large part of the mining, smelting, and refining sectors and a significant portion of the mineral fuels sector (table 2).

Each State and Territorial government administers the mineral industries within its own borders, which includes registering land titles; issuing exploration and development permits; conducting inspections and assuring compliance with health, safety, and environmental regulations; and levying royalties and taxes. Because the Commonwealth Government may restrict mineral exports for the good of the country, it effectively has control over most mineral production.

Mineral Trade

Australia continued to rely heavily on exports of the majority of its mineral production to sustain the country's mineral industry development. In 2012, the value of Australia's total foreign trade of goods was A\$617.9 billion (US\$642.6 billion), of which the value of exports was A\$301.0 billion (US\$313.0 billion) and the value of imports was A\$316.9 billion (US\$329.6 billion). As a result of moderated energy and mineral commodity prices, Australia's export revenue decreased to A\$120 billion (US\$126 billion) in 2012 from A\$180 billion (US\$190 billion) in 2011. Mineral and metal exports accounted for about 40.2% of the total value of exports. Mineral commodities for which the export volume was higher than in 2011 included bauxite, thermal coal, copper, iron ore, lead, manganese ore, nickel, uranium, and zinc. Australia's mineral and metal exports went mostly to Asian countries, such as China, Japan, the Republic of Korea, India, and Thailand (in descending order by volume of exports). Australia remained one of the world's leading exporters of alumina, coal, iron ore, mined lead, rutile, and zircon. Crude petroleum and refined petroleum products remained Australia's leading imported fuel and mineral commodity category, followed by gold, iron and steel, potassium fertilizer, and silver (Australian Bureau of Statistics, 2013b, p. 29–31).

Commodity Review

Metals

Aluminum.—Australia was the leading bauxite-producing country in the world. Bauxite was mined at the Gove Mine in Northern Territory; the Weipa Mine in the northern part of Queensland; and the Huntly, the Willowdale, and the Worsley Mines in Western Australia. Australia was also the leading alumina-producing country in the world. All Australia's alumina refineries were located in close proximity to their bauxite mines and shipping facilities. Western Australia remained the leading bauxite-producing State and accounted for about 59.1% of the country's total output of bauxite followed by Queensland, 30.5%, and Northern Territory, 10.4%. Australia exported 10.4 million metric tons (Mt) of bauxite compared with 11.3 Mt in 2011. Western Australia accounted for about 60% of the country's alumina output. The country exported 18.3 Mt of alumina in 2012, which was about 13% more than in 2011. China retook its place as the leading destination for exported Australian alumina; it received about 26% of the total exported volume, followed by the United Arab Emirates, 16%; South Africa, 12%; and other countries, less than 10% each. The consumption of domestic aluminum smelters was less than 20% of the country's total alumina output, and the remainder was exported. In 2012, Australia exported 1.65 Mt of aluminum. Japan was the leading destination for Australian aluminum exports and accounted for 33.8% of the total, followed by the Republic of Korea, 16.4%; Taiwan, 11.1%; Thailand, 9.0%; and Indonesia, 8.0%; the remainder went to other countries (Australian Bureau of Resources and Energy Economics, 2013, p. 162; Department of Mines and Petroleum, 2013b, p. 9).

The government of Western Australia granted a 5-year extension to Alcoa of Australia Ltd.'s (a subsidiary of Alcoa Inc. of the United States) expansion of the Wagerup alumina refinery's output capacity to 4.7 million metric tons per year (Mt/yr) from 2.6 Mt/yr in 2012. Alcoa's expansion project remained on hold because of unfavorable economic conditions and the need to obtain a competitive price for alumina in the world market and additional energy supplies in Western Australia. Alcoa had two operating mines in the Darling Range of Western Australia, and the mineral leases for the mines had been extended to 2045 and could be renewed beyond 2045. Bauxite output from these mines was supplied to Alcoa alumina refineries. The available alumina content in the Darling Range mines was about 32.9% aluminum oxide, and for each ton of alumina produced, between 2.5 metric tons (t) and 3.8 t of bauxite was consumed (Department of Mines and Petroleum, 2013a, p. 35; Alcoa Inc., 2013, p. 6–20).

Rio Tinto Alcan was conducting a feasibility study and an environmental impact study to develop the bauxite resource in an area south of Embley River and the existing Weipa Mine. The new operation would progressively replace depleted resources at the Andoom and the East Weipa mining areas in Weipa. It could extend the mine life in the area by 40 years. The new development would increase output capacity to 50 Mt/yr from the current 23 Mt/yr in the region south of the Weipa Peninsula and would enable the continuity of supply to the company's two Gladstone alumina refineries. The Weipa area had indicated bauxite resources of 1.35 billion metric tons (Gt) containing an average of 51.2% aluminum oxide. The Queensland Coordinator-General provided the required conditions for approval for the South of Embley project in 2012. Rio Tinto Alcan prepared a final environmental impact study that incorporated its response to public submissions and submitted the study to the Queensland and Commonwealth Governments for approval. Whether or not Alcan moves forward with the project could depend on the supply of bauxite in the region. China's dependence on bauxite imports was expected to continue, and although Indonesia had been a source of bauxite for China, the Indonesian Government introduced regulations in 2012 to restrict the export of raw materials. As a result, supply of bauxite in the Asia and the Pacific region could be uncertain. Once all major Government approvals have been granted, Rio Tinto Alcan's decision about whether to proceed with the project will likely depend on market conditions at that time (Rio Tinto plc, 2013a; 2013b, p. 55).

In 2008, the Board of BHP Billiton Ltd. approved an investment of \$3 billion to expand the output capacity of the Worsley alumina refinery to 4.6 Mt/yr from 3.5 Mt/yr and to increase the capacity of the bauxite mining operation at Boddington to 19 Mt/yr of bauxite. The Worsley expansion project was fully completed and put into operation in 2012. The Boddington bauxite mining area had indicated resources of 587 Mt containing 32.3% aluminum oxide and 2.5% silicon oxide and had proven ore reserves of 263 Mt containing 31.1% aluminum oxide and 1.8% silicon oxide in 2012 (BHP Billiton Ltd., 2013, p. 63).

In 2004, the government of Queensland invalidated the permit for the bauxite deposit near Aurnkun that had been awarded to

Pechiney S.A., and Aluminum Corp. of China Ltd. (Chalco) was subsequently awarded a permit to mine the bauxite deposit and to build an alumina refinery at the site. Chalco concluded that under economic conditions in the world in 2010, the company would have difficulty implementing the project in accordance with the development agreement between the company and the government of Queensland. The Queensland government re-opened the bidding for the development rights of the Aurnkun bauxite deposit in 2012 and subsequently finalized a short list of five bidders, which included Australian Indigenous Resources Ltd., Cape Alumina Consortium, Chalco, Glencore International plc of Switzerland, and Rio Tinto. The shortlisted companies had until September 2013 to submit detailed proposals for the development of the deposit. The right to mine would not be tied to the requirement to build an alumina refinery in the area (Foley, 2012).

Australia's primary aluminum production ranked Australia with Canada, China, and Russia as the world's leading aluminum-producing countries. Aluminum output was produced mainly from Alcoa of Australia's Point Henry and Portland smelters in Victoria, Hydro Aluminium Kurri Kurri Pty. Ltd.'s Kurri Kurri smelter in New South Wales, and Pacific Aluminum's Bell Bay smelter in Tasmania, as well as the Boyne Island smelter in Queensland and the Tomago smelter in New South Wales. Norsk Hydro ASA of Norway decided to close its aluminum operation at its Kurri Kurri smelter in October 2012 because of low aluminum prices in the world market and increased production costs. Alcoa considered shutting down its Point Henry smelter because the global aluminum price was at or below the break-even point of production costs (Australian Aluminium Council Ltd., 2012; Fitzgerald, 2013).

Antimony.—Compared with China, Australia was a relatively minor antimony producer in the world. Australia's antimony was produced from Mandalay Resources Ltd.'s Costerfield Mine in Victoria and Straits Resources Ltd.'s Hillgrove Mine in New South Wales. Straits Resources placed the Hillgrove Mine on care-and-maintenance status and planned to sell the mine to Bracken Resources Pty Ltd. (Straits Resources Ltd., 2012).

Mandalay Resources acquired the Augusta Mine in December 2009 after its operation was suspended in 2008 because of low antimony prices. Mandalay restarted the exploration in 2010 and discovered new reserves deeper on the Augusta E and Augusta W lodes. The company discovered additional resources in the Cuffley lode and found new veins in the district and subsequently renamed the Augusta Mine as the Costerfield Mine. At yearend 2012, the mine had ore reserves of 534,000 t at an average grade of 9.4 grams per metric ton (g/t) gold and 4.0% antimony. The mine produced 2,481 t of antimony, 90.5 t of silver, and 1.1 t of gold in 2012, which was higher than the company's output target. Mandalay planned to increase antimony production to about 2,800 t in 2013 (Mandalay Resources Ltd., 2013, p. 3).

In Nullagene, eastern Pilbara, Western Australia, the Blue Spec deposit was first discovered in 1906, and the Gold Spec deposit was discovered in 1956. Anglo American plc of the United Kingdom shut down the Blue Spec Mine in 1978 because of poor metal recoveries, and Chase Minerals Ltd. shut down the Gold Spec operation in 1992. Northwest Resources Ltd.

acquired these properties in the 2000s. The Blue Spec Shear (also known as Nullagene), which included the Blue Spec and the Gold Spec Mines, had total mineral reserves of 646,000 t grading 15.8 g/t gold and 1.2% antimony. Northwest Resources planned to develop an underground mine that would produce 1,900 metric tons per year (t/yr) of antimony and 2.0 t/yr of gold for a 5-year mine life starting in 2013 (Northwest Resources Ltd., 2013, p. 6–7).

Copper.—Australia's copper resources occur largely at Olympic Dam in South Australia and at Mount Isa in Queensland. Other significant copper resources are located at the CSA and the Northparkes deposits in New South Wales; the Ernest Henry, the Mammoth, and the Osborne deposits in Queensland; and the Golden Grove and the Nifty deposits in Western Australia. Australia's mined copper output ranked the country among the top five producers in the world. In 2012, South Australia accounted for 31% of the country's mined copper output, followed by Queensland, 27%; Western Australia, 21%; and New South Wales, 18%. Tasmania's mined copper output was mainly from Mount Lyell, which accounted for 3% of total mined copper output.

Australia's copper mine production for the year was slightly lower than that of 2011. The lower mined copper production was the result of a planned decrease in production at the Ernest Henry Mine as the mine transitioned from an open pit operation to an underground operation. Also, Kagara Ltd.'s mining operations in Queensland were placed on care-and-maintenance status because the company went into voluntary administration in early 2012. Several new mines were expected to start up, including Sandfire Resources NL's Degruusa and MMG Ltd.'s Golden Grove operations, and, as a result, mined copper output was expected to increase during the next 2 years. The decreases in refined copper production reflected the power outages that had been disrupting output at the Olympic Dam and the Port Pirie operations and lower concentrate production at the Ernest Henry Mine.

Australia exported a total of 2.0 Mt of copper concentrates compared with 1.8 Mt in 2011. China was the leading destination for exports of Australian copper concentrates and received 33% of the total exported; India, 30%; Japan, 23%; the Republic of Korea, 7%; and others, 7%. Australia decreased its refined copper exports to 370,000 t in 2012 from 379,000 t in 2011. China was the leading destination and received 31% of the total exported; Malaysia, 24%; Thailand, 16%; Taiwan, 12%; and Indonesia, 9% (Australian Bureau of Resources and Energy Economics, 2013, p. 165).

Sandfire Resources NL discovered the high-grade DeGrussa volcanogenic copper-gold deposit in the northeastern part of its Doolgunna tenement area, which is located 900 kilometers (km) northeast of Perth, in 2009. Exploration work continued in 2010. As of March 2012, the mine contained indicated and inferred mineral resources of 11.91 Mt of ore at average grades of 5.3% copper and 1.6 g/t gold. Construction of the DeGrussa project started in 2011 and was completed in the fourth quarter of 2012. Mining began in February 2012, and the 1.5-Mt/yr concentrator was fully operational in October. The project was being developed as an open pit and underground mine. The company planned to have two-stage open pit mining in

operation within 2 years to mine 143,000 t/yr of high-grade direct-shipment ore at average grades of 25.6% copper and 2.5 g/t gold and 298,000 t/yr of sulfide material at average grades of 6.0% copper and 2.4 g/t gold. The company planned for the underground operation to extract a total of 10.72 Mt of ore grading 5% copper and 1.7 g/t gold during a mine life of about 7 years. Sandfire Resources had secured the sale of 100% of its direct-shipment ore to MRI Trading AG and Yunnan Copper Corporation Ltd. of China in 2011. The nondirect shipment ore would be processed together with underground ore to produce copper concentrate at an average grade of 27% copper for exporting to international customers. The company also planned to recover copper from copper oxide ore through a heap-leaching and solvent extraction-electrowinning process (Sandfire Resources NL, 2013, p. 11).

Newcrest Mining Ltd.'s Cadia Valley mines were located in the central part of western New South Wales. After 14 years of operation, Newcrest placed the Cadia Hill open pit copper and gold mine on care-and-maintenance status in June 2012 after mining of the Cutback 3 area was completed. The company's production plan did not include plans to mine the Cutback 4 area. The Ridgeway underground copper-gold mine is located 3 km from the Cadia Hill Mine. The company used sublevel cave extraction and block caving technology to mine Ridgeway. The mine contained about 180 Mt of mineral resources grading 0.35% copper, 0.69 g/t silver, and 0.35 g/t gold. The Cadia East Mine is adjacent to the Cadia Hill Mine and had mineral resources of 2,800 Mt grading 0.26% copper, 0.57 g/t silver, and 0.41 g/t gold. The construction of the Cadia East Mine started in 2010 and was completed in 2012. Newcrest also expanded the capacity of the existing Cadia Valley processing plant to 26 Mt/yr from 24 Mt/yr. The company expected that the output of the Cadia Valley operations would increase to 90,000 t of copper and 25 t of gold in 2016 (Newcrest Mining Ltd., 2013a, p. 4–5; 2013b, p. 7–9).

China Minmetals Corp. (CMC) through its subsidiary China Minmetal Nonferrous Metals Co. Ltd. established the Mineral and Metal Group Australia Ltd. (MMG) in 2009 to acquire the majority of OZ Minerals's assets in Australia, Indonesia, and Thailand. In 2010, MMG was acquired by Minmetals Resources Ltd., which was a subsidiary of CMC and was listed on the Hong Kong Stock Exchange. In 2012, Minmetals Resources Ltd. changed the registered name of the company to MMG Ltd. MMG Ltd. operated the Century, the Golden Grove, the Rosebery, and the Sepon Mines in Australia. The Golden Grove operation included the Gossan Hill Mine and the Scuddles Mine. In 2010, MMG completed a feasibility study evaluating the development of an open pit operation to mine the oxide resource above the Gossan Hill underground mine. The open pit was expected to extend the copper mining operation to 2016. In 2011, MMG approved \$22 million for the development of an open pit at Gossan Hill as part of the Golden Grove operation. The open pit operation began in January 2012 and was expected to produce a total of 235,000 t/yr of copper concentrates containing 25% copper during its mine life (Resource Information Unit, 2012, p. 273–274).

Gold.—Gold mine output in Australia ranked the country among the world's top three producers, together with China

and the United States. In 2012, Australia's mined gold output decreased by about 4% from that of 2011, and output of refined gold decreased by about 3%. The decrease in production was attributed to a number of mines taking advantage of high gold prices to target lower ore grades that would have been uneconomic to extract at lower prices. Western Australia remained the leading gold-producing State, with a 71.6% share, followed by New South Wales, 10.8%; Queensland, 6.4%; and the Northern Territory, South Australia, Tasmania, and Victoria accounting for the remaining 11.2% share. The country's gold resources occur and are mined in all States, as well as in the Northern Territory, and much of the gold was produced from large open pit mines. Owing to higher prices of gold in the world markets, gold operators could afford to reduce the grade of ore fed into their processing plants in order to extend mine life. In 2012, Australia exported 282 t (compared with 308 t in 2011) of refined gold produced from domestic mines or from imports of gold dore and scrap that were shipped from overseas, refined into gold bullion, and then reexported. Weaker global demand for gold bullion coins and bars had contributed to the decrease in refined gold exports. The United Kingdom replaced India as the leading destination for Australian refined gold. The United Kingdom, India, Singapore, and Thailand accounted for 56.4% of Australia's total gold exports (Australian Bureau of Resources and Energy Economics, 2013, p. 167).

Regis Resources Ltd. had operations at Duketon in the northeastern goldfield in Western Australia and McPhillamys gold project in the central part of western New South Wales. The Duketon gold project was located 130 km north of Laverton. The company completed the construction of the Moolart Well Mine in 2010, which produced about 3.1 t/yr (100,000 troy ounces per year) of gold for 5 years. The company also completed the construction of the Garden Well Mine at Duketon in 2012. The mine life of the Garden Well Mine was about 9 years at an average production rate of 5.6 t/yr (180,000 troy ounces per year) of gold. The Garden Well Mine had mineral resources of 61.9 Mt grading 1.29 g/t gold in 2011. The company started the construction of the Rosemont Mine, which is located 9 km northwest of the Garden Well Mine, in 2012. The mine had reserves of 12.0 Mt grading 1.72 g/t gold and 33.2 Mt of indicated and inferred resources grading 1.62 g/t gold in 2013. Regis planned to mine 1.5 Mt/yr of ore to produce about 2.5 t (80,000 troy ounces) of gold in 2013. The Petra gold deposit is located 15 km east-southeast of the Moolart Well Mine. The company planned to continue exploring for gold resources in Duketon during the next several years. Regis completed the acquisition of the McPhillamys gold project, which was located in the Bathurst region, from Alkane Resources Ltd. and Newmont Exploration Pty Ltd. in November 2012. The McPhillamys gold project had a total mineral resource of 57.4 Mt of ore grading 1.36 g/t gold. The company planned to continue exploring in the region in 2013 (Regis Resources Ltd., 2012, p. 5–9; 2013, p. 4–8).

The Paddington goldfield, which is located about 35 km north of Kalgoorlie, Western Australia, included the Enterprise, the Havana, the Homestead, the Janet Ivy, the Navajo Chief, the Nemesis, and the Robinson deposits. Norton Gold Fields Ltd. acquired the Paddington goldfield in 2007. Construction

of the Homestead underground mine was started in 2009 and the mine was put into operation in 2010. The company started the construction of the Navajo Chief open pit mine in 2010, and the mine started production in late 2010. Ores from these mines were shipped to the Paddington Mill for processing. In 2012, Zijin Mining Group Co. Ltd. of China through its Hong Kong-based wholly owned subsidiary Jinyu International Mining Co. Ltd. offered an off-market takeover to become a majority shareholder in Norton. The Board of Norton Gold Fields Ltd. approved US\$40 million for the development of the Enterprise open pit mine in 2012. The Paddington goldfield had proven and probable mineral reserves of 22.8 Mt of ore grading 1.53 g/t gold. The company continued to explore for mineral resources in the area (Norton Gold Fields Ltd., 2013, p. 26).

Evolution Mining Ltd. was formed through the merger of Catalpa Resources Ltd. and Conquest Mining Ltd. in 2011. Newcrest Mining was the major shareholder in Evolution Mining. Evolution Mining operated three gold mines in Queensland—the Cracow, the Mount Rawdon, and the Pajingo Mines—and the Edna May gold mine in Western Australia. In 2011, Evolution Mining invested US\$180 million to develop the Mount Carlton open pit gold-silver-copper mine, which is located 150 km south of Townsville, Queensland. Construction of an 800,000-t/yr ore processing plant started in December and was scheduled to be completed at yearend 2012. In 2012, the mine had mineral resources of 22 Mt grading 19 g/t silver, 1.7 g/t gold, and 0.24% copper. The mine life was about 12 years. The production of concentrate was expected to begin in March 2013 (Evolution Mining Ltd., 2012, p. 28; 2013, p. 7).

Reed Resources Ltd. acquired the Meekatharra gold project from previous owners in 2011. The project included a tenement holding of about 1,000 square kilometers within the Murchison District of Western Australia. The company committed a US\$40 million to upgrade and refurbish the 3-Mt/yr Bluebird processing plant in the Yaloginda region. In Stage 1 of the project, the plant would recover about 4.2 t (134,000 troy ounces) of gold during the first 19 months of the operation from the Yaloginda region. In Stage 2, the company planned to expand the open pit operation and exploit the underground operation at Paddy's Flat to the north and Reedys to the south of the ongoing operations at Yaloginda. The company would continue to explore for mineral resources in its tenement area. As of June 2012, the Meekatharra gold project had mineral resources of 63.9 Mt grading 1.8 g/t gold to sustain a 10-year mine life with an annual production of between 3.1 t (100,000 troy ounces) and 4.7 t (150,000 troy ounces) of gold at a total cost of less than US\$1,000 per troy ounce (Reed Resources Ltd., 2012, p. 8; 2013, p. 4).

Iron Ore.—Australia was among the top three iron ore producers (in terms of iron content) in the world, along with Brazil and China. Australia's most significant iron ore mines were located in the Pilbara region of Western Australia, which accounted for 97.1% of the country's total iron ore production, followed by South Australia, 2.1%, and the Northern Territory and Tasmania, 0.4% each. Owing to its limited domestic demand and production capacities for iron and steel, Australia exported more than 90% of its iron ore output to such Asian countries as China (the world's leading importer of iron ore), Japan, the

Republic of Korea, and Taiwan. In 2012, Australia's iron ore and pellet exports increased to 493 Mt from 439 Mt in 2011. Faced with declining iron ore grades of domestic iron ore mines during the past two decades, Chinese iron and steel producers relied on imported iron ore to meet their demand, and this trend was expected to continue during the next 5 years. Australia's iron ore exports to China increased to 358 Mt in 2012 from 306 Mt in 2011. Australia's iron ore exports to the Republic of Korea increased to 46 Mt from 45 Mt and those to Japan and Taiwan remained the same at 75 Mt and 12 Mt, respectively (Australian Bureau of Resources and Energy Economics, 2013, p. 168).

As a result of an increase in investment during the past several years, expansions and new mines in Australia were expected to support strong growth in iron ore exports from Australia. Australian iron ore producers were expanding their iron ore production facilities to meet expected increased demand from Australia's neighboring countries. A number of greenfield and brownfield iron ore projects were at various stages of development. Rio Tinto expanded the capacity of its Pilbara iron ore operations to a total of 360 Mt/yr in 2015. BHP Billiton was expected to increase production capacity to 220 Mt/yr in 2014. Fortescue Metals Group's Chichester Hub and Solomon Hub expansion projects were projected to increase the company's iron ore output capacity to 155 Mt/yr in 2014 (BHP Billiton Ltd., 2013, p. 33; Rio Tinto plc, 2013b, p. 31).

Australia-based CITIC Pacific Mining Management Pty Ltd. (a subsidiary of Hong Kong-based CITIC Pacific Ltd., which was, in turn, a member of China's state-owned CITIC Group) had invested about \$5 billion to develop its Sino iron ore project at Cape Preston, which is located 100 km southwest of Karratha in Western Australia. The company had planned to produce about 21 Mt/yr of 67% iron in concentrates and 6 Mt/yr of pellets in 2011. Concentrates would be moved by conveyor belt to barges, loaded into offshore vessels at Cape Preston, and then shipped to China. Owing to a shortage of skilled laborers, however, the first production line was completed only in November 2012. The second production line was scheduled to be completed in May 2013, and the remaining four production lines were planned to be put into operation in 2014. CITIC Pacific signed an agreement with Mineralogy Pty Ltd. to mine 2 Gt of magnetite ore between 2006 and 2008. CITIC Pacific had four options to acquire an additional 4 Gt of magnetite ore (1 Gt per option) at the same location. In April 2012, CITIC Pacific exercised the first option. Mineralogy alleged that CITIC Pacific was liable for royalties on the magnetite ore mined; however, CITIC Pacific argued that the royalty was due when the ore was ready for processing and not when it was mined. The dispute was to be ruled on by the Australian court in 2013. CITIC Pacific and Mineralogy were also in discussions about other issues related to access rights to the port that CITIC Pacific had built at Cape Preston (CITIC Pacific Ltd., 2013, p. 43–49).

The first phase of the development of the Karara iron ore mine, which was a joint venture of Gindalbie Metals Ltd. (50%) and Angang Group Investment (Australia) Pty Ltd. (50%) (a subsidiary of Anshan Iron and Steel Group Corp. of China), continued in 2012. The Karara deposit, which is located 220 km east of Geraldton, Western Australia, had magnetite iron ore resources of 1.4 Gt at average grades of 27.2% iron, 46.0%

silicon oxide, 5.5% aluminum oxide, and 0.05% phosphorus. The area also had hematite iron ore resources of 6.1 Mt at average grades of 59.8% iron, 7.8% silicon oxide, 1.71% aluminum oxide, and 0.08% phosphorus. The company started mining the hematite iron ore in 2011 and planned to complete mining activities at the Blue Hill North area in early 2013. The concentrator had a design capacity to produce 8 Mt/yr of concentrates containing 68% iron. Iron ore would be transported by railway from Karara to Geraldton Port for shipping. The company performed a feasibility study on the proposed expansion of iron ore operations at Karara to a total of 16 Mt/yr of hematite and magnetite (Gindalbie Metals Ltd., 2012, p. 12–13; 2013).

The West Pilbara iron ore project, which was a joint venture project of Aquila Resources Ltd. (50%), AMCI Group (25.5%), and Pohang Iron and Steel Co. Ltd. (24.5%) of the Republic of Korea, is located 70 km south of Pannawonica, Western Australia. The feasibility study of Stage 1 development of the project was completed in 2010. The Mount Stuart and Red Hill deposits accounted for the majority of iron ore resources to be mined during Stage 1. The company planned to mine a total of 70 Mt of iron ore during a 14-year mine life at the Mount Stuart operation and a total of 289 Mt of iron ore in a 16-year mine life at the Red Hill operation. The Western Pilbara area had total iron ore resources (measured, indicated, and inferred) of 2.2 Gt that ranged from 54.4% to 60.8% iron, 3.9% to 11.9% silicon oxide, 2.4% to 3.8% aluminum oxide, and 0.04% to 0.16% phosphorus. When iron ore prices reached a 3-year low in September, the partners decided to suspend the project until June 2013. China's Boshan Iron and Steel Co. had a 14% share in Aquila Resources (Aquila Resources Ltd., 2012, p. 16–18; 2013; Sydney Morning Herald, The, 2013).

Lead, Silver, and Zinc.—Australia's lead, silver, and zinc mines were predominantly based on ore bodies with zinc as the major component and lead and silver as byproducts. An exception was BHP Billiton's Cannington underground mine in the State of Queensland, where lead and silver were major components and zinc was a minor component. In 2012, Australian zinc mine production increased slightly. The output of zinc was expected to increase during the next 2 years because Xstrata plc planned to expand the Black Star Open Cut Deeps at the Mount Isa Mine and the Handle Bar Hill Mine and also to develop the Lady Loretta deposit. Queensland remained the leading lead- and zinc-producing State in Australia. In 2012, Australia exported 469,000 t of lead concentrates compared with 428,000 t in 2011. China remained the leading destination for Australian lead concentrate exports and accounted for 36.0% of the total, which was an increase from 35.0% in 2011, followed by the Republic of Korea, 26.0%; Japan, 14.9%; and others, 23.1%. Australia exported 2.38 Mt of zinc concentrates in 2012. China replaced the Republic of Korea to become the leading destination for Australia's zinc exports, accounting for 31.3% of the total, followed by the Republic of Korea, 19.2%; the Netherlands, 14.4%; Japan, 12.2%; and other countries in the world, the remaining 22.9%. Australia also exported 201,000 t of refined lead, for which the Republic of Korea replaced Malaysia as the leading destination, followed by India, Malaysia, Vietnam, and Thailand. In 2012, zinc metal exports

increased to 455,000 t and went to such destinations as, in descending order of volume exported, China, the United States, Taiwan, Hong Kong, and Malaysia. Australia's zinc production was expected to increase during the next 2 years (Australian Bureau of Resources and Energy Economics, 2013, p. 169, 181).

Xstrata's subsidiary, Xstrata Zinc, operated several lead and zinc mines and a processing plant in Mount Isa, Queensland. The company planned to expand the output capacities of its Black Star open pit mine and George Fisher underground mine. The executive committee of Xstrata approved \$246 million to increase the output capacity of the George Fisher Mine. Zinc reserves in the mine had increased to 70 Mt in 2010 from 33 Mt in 2003 when Xstrata acquired the operation. Xstrata completed the expansion of the George Fisher underground mine in October, 6 months ahead of schedule. The output capacity was increased to 4.5 Mt/yr from 3.5 Mt/yr. The company planned to mine ore at a depth of 400 meters (m) below the surface, or 100 m below the current design of the Black Star open pit mine, and the life of the mine at the current production rate of 4.6 Mt/yr would be extended to 2016.

Mine construction at Xstrata's Lady Loretta lead-silver-zinc deposit in northwestern Queensland was also completed in 2012. The deposit, which is located 140 km northwest of the Mount Isa operation, had reserves of 13 Mt grading 15% zinc, 5.3% lead, and 89 g/t silver at yearend 2012. Lady Loretta was designed to produce 1 Mt/yr of ore; however, the company decided to expand the operating capacity to 1.6 Mt/yr by 2016. Ore from these mines would be processed at the Mount Isa concentrator. Xstrata submitted an environmental impact assessment for the phase 3 expansion of the McArthur River operation to the government of the Northern Territory for approval. The company planned to invest US\$360 million to increase production to 300,000 t/yr from 200,000 t/yr of zinc in concentrate in 2014. The McArthur River Mine had reserves of 110 Mt grading 10% zinc, 4.7% lead, and 47 g/t silver. In the area of Mount Isa, Xstrata had reserves of 235 Mt grading 8.7% zinc, 4.2% lead, and 55 g/t silver (Xstrata plc, 2013a, p. 26; 2013b, p. 44).

Nickel.—Australia's main nickel ores were primary sulfides of nickel, which occur as lodes within mafic and ultramafic (iron- and magnesium-rich) igneous rocks that have a volcanic and subvolcanic origin. Western Australia was the leading State for mined nickel output and accounted for more than 90% of the country's total output. The top five nickel producers accounted for 80% of the total sales. BHP Billiton's Nickel West project was Australia's leading nickel operation. Nickel West included the Leinster and the Mount Keith Mines. A number of smaller sulfide nickel operations were operated by Mincor Resources NL and Xstrata Nickel Australia Pty Ltd. [a subsidiary of Xstrata plc (Xstrata)]. The increase in mined nickel output was a result of the redevelopment and restart of OJSC MMC Norilsk Nickel (Nornickel) of Russia's nickel operations in Australia and First Quantum Mineral Ltd.'s Ravensthorpe Mine in late 2011.

Nornickel shut down its nickel operations in 2009 and 2010, and most of its nickel operations remained closed in 2011. The company tried to enrich its nickel at the Lake Johnston operation, which was located about 500 km east of Perth in Western Australia. The concentrator was started and reached

design capacity during the second half of 2011. The ore for the concentrator was sourced from the Maggie Hays Mine. Nornickel planned to use its hydrometallurgical technology (Activox® process) at its processing facility at Cawse to process nickel sulfide ore from the company's deposits in Australia. Nornickel planned to produce a nickel hydroxide solution that would contain about 50% nickel and then refine it into the metal product. In 2012, the Lake Johnston operation produced 8,975 t of nickel in concentrates. In early 2013, owing to the low world nickel price, the company placed the Lake Johnston operation on care-and-maintenance status. Nornickel also planned to sell its other Australian assets, including the Waterloo nickel operation and the Honeymoon Well nickel project, which the company had planned to develop by 2017. Australian nickel output was expected to decrease in 2013 as a result of Xstrata placing its Cosmos Mine on care-and-maintenance status and BHP reducing the output of its Nickel West operation by 30% (Heber, 2013; OJSC MMC Norilsk Nickel, 2013).

Tin.—Compared with other tin-producing countries in the Asia and the Pacific region, Australia was not a significant tin producer. Australia's tin was mined mainly in Tasmania, and to a lesser extent, in Western Australia. In Western Australia, tin production was mainly from Iluka Resources Ltd.'s heavy-mineral sand operation, but the company had not released any tin preconcentrate information. In Tasmania, tin was produced from Metal X Ltd.'s tin operations. Tin concentrates were smelted at Global Advanced Metals Pty Ltd.'s Greenbushes smelter. No primary refined tin production was reported in 2012. In 2012, Australia imported 506 t of refined tin and exported 13,399 t of tin concentrates (Australian Bureau of Resources and Energy Economics, 2013, p. 178).

In 2010, Metals X sold 50% of its interest in its Tasmanian tin assets to YT Parksong Australia Holding Pty Ltd. (a joint venture between L'sea Resources International Holdings Ltd. and Yunnan Tin Group of China). The former name of L'sea was Goodtop Tin International Holdings Ltd., which was incorporated in the Cayman Islands. The two parties established a joint-venture company, Bluestone Mines Tasmania Joint Venture Pty Ltd., to manage the assets. The joint venture completed the mine development at the North Renison decline in 2012 and started mining from both the North Renison and the South Renison declines at a rate of about 60,000 metric tons per month (t/mo) to produce about 7,000 to 8,000 t/yr of tin in concentrates. The joint venture estimated that the Renison Mine had mineral resources of 2.97 Mt grading 1.38% tin and 0.27% copper in 2012. The Mount Bischoff Mine ceased operations at yearend 2010 and was placed on care-and-maintenance status in 2012; significant tin resources remained at depth under the mine pit, and numerous historically mined areas remained unexplored (L'sea Resources International Holdings Ltd., 2013, p. 14; Metals X Ltd., 2013, p. 13–20).

Consolidated Tin Mines Ltd.'s major shareholder, Hong Kong-based Snow Peak Mining Pty Ltd. (SPM), completed the acquisition of Kagara Ltd.'s Central Region project for \$40 million at Mount Garnet, near Cairns in northern Queensland. The Central Region project included the Baal Gammon open pit copper mine and the Mount Garnet processing plant, which had a designed capacity of 1 Mt/yr.

The processing plant had both copper and polymetallic circuits, and each circuit had a capacity to process 500,000 t/yr. SPM contracted Consolidated Tin to manage the processing plant and to process ore from the Baal Gammon Mine. The Baal Gammon Mine was owned by Monto Mineral Ltd. but was mined under a royalty agreement by Kagara. Consolidated Tin was expected to complete the feasibility study on the Mount Garnet tin project, and, if the prospecting feasibility study result is positive, Consolidation Tin and SPM would form a 50-50 joint venture to develop the Mount Garnet tin project. Tin production at Mount Garnet could start in 2014 and had the potential to produce 5,000 t/yr of tin. The processing plant could recover tin byproducts from Baal Gammon. The four deposits—Deadmans Gully, Gillian, Pinacles, and Windermere—in the Mount Garnet area had total resources of 10.57 Mt grading 0.44% tin (Consolidated Tin Mines Ltd., 2013a; 2013b, p. 4).

Titanium and Zirconium.—Australia's titanium and zircon were produced mainly from mineral sands. Iluka Resources Ltd. was the leading heavy-mineral producer in Australia, and its operations were located in the Eucla basin in South Australia, the Murray basin on the border of New South Wales and Victoria, and the Perth basin in Western Australia. Jacinth-Ambrosia in the Eucla basin was the major zircon production site in Australia. Rutile was produced from the Murray basin, where ilmenite and zircon were in the production stream. The Perth basin was the main supply source of ilmenite for synthetic rutile. The company operated two mineral separation facilities—Hamilton in Victoria and Narngulu in Western Australia. The Narngulu mineral separation plant was upgraded to process an additional 300,000 t/yr of heavy-mineral concentrate. Owing to weak demand for mineral sands in the global market, only two of its four synthetic rutile kilns were operated in 2012. These kilns used ilmenite to produce various synthetic rutile products containing a titanium oxide content of between 85% and 95%. The Chinese and United States construction and housing sectors were significant sources of demand for titanium dioxide and zircon. Because economic growth in China was expected to slow down and economic recovery in the United States remained weak, Iluka planned to reduce its production of rutile, synthetic rutile, and zircon and to idle some operations in Australia in 2013 (Iluka Resources Ltd., 2013a; 2013b, p. 12–16).

Tungsten.—Australia's tungsten was produced from three mines—Wolfram Camp and Mount Carbine in Queensland and Kara in Tasmania. The Wolfram Camp Mine, which is located 90 km west of Cairns, was discovered in 1894. In 2011, Metallic Minerals sold its 85% interest in Wolfram Camp to Deutsche Rohstoff AG of Germany. Deutsche Rohstoff acquired Tropical Metals Pty Ltd., which held a 15% interest in the Wolfram Camp Mine and 100% of the Bamford Hill deposit, which was located 25 km south of Wolfram Camp. The Wolfram Camp Mine was reopened in July 2012; the mine had resources of 1.42 Mt grading 0.6% tungsten trioxide and 0.12% molybdenum. The company planned to produce about 7,000 t of tungsten concentrates and 800 t of molybdenum concentrate during the next 4 years (Deutsche Rohstoff AG, 2012).

Carbine Tungsten Ltd.'s Mount Carbine Mine was closed in 1987 because of the low price of tungsten. In 2010, the

company commissioned a feasibility study to recover tailings and mineralized wastes. The report indicated that the tailings could be treated to produce a salable mixed concentrate with a grade of 52% tungsten trioxide. The company decided to proceed to extract tungsten from the tailings. The tailings retreatment plant was completed in 2012. The company signed an offtake agreement with Mitsubishi Corp. of Japan to supply all concentrates produced from the retreatment plant at a price based on the monthly London Metal Bulletin price. Carbine also commissioned a hard-rock feasibility study within the existing mine lease area. The mine had resources of 47 Mt grading 0.13% tungsten trioxide. The company expected that the hard-rock project and tailings retreatment plant would produce about 21,800 metric ton units of tungsten trioxide per month (Carbine Tungsten Ltd., 2013, p. 5).

Industrial Minerals

Cement.—Australia had three major integrated cement companies (Adelaide Brighton Cement Pty Ltd., Blue Circle Southern Cement Ltd., and Cement Australia Pty Ltd.) and a number of small independent companies. The three major cement companies accounted for all integrated production of clinker and cement in Australia. Domestic clinker capacity was about 8 Mt/yr and cement capacity was about 10 Mt/yr. The highly efficient dry precalciner technology accounted for 87% of Australia's cement production in 2012. During the past several years, the three integrated cement producers produced about 9 Mt/yr for the domestic market. Small independent producers used imported clinker from Asian countries to produce cement and accounted for about 15% of the domestic supply of cement.

The Government implemented a carbon tax in 2011 that affected the cement sector in Australia. This is because carbon dioxide is emitted as a product of the chemical reaction during clinker production. To reduce carbon dioxide emission, some Australian cement companies were required to technically upgrade their production plants or relocate their operations overseas. Byproducts used in blending included fly ash from coal-fired powerplants and ground-granulated blast furnace slag from steel plants. The Government also introduced a Coastal Trading Bill in 2012 that would increase transshipping costs for dry bulk commodities, such as cement. Owing to weak demand for cement in the construction sector, Cement Australia Pty Ltd. shut down part of its operations in Queensland in late 2012 (Cement Industry Federation, 2013, p. 5).

Lithium.—Australia's lithium was produced by Talison Lithium Ltd.'s Greenbushes Mines and Galaxy Resources Ltd.'s Mount Cattlin Mine in Western Australia. The increase of Australia's economic demonstrated resources of lithium in 2011 from those of 2010 was a result of a large increase of the identified resources in the Greenbushes spodumene deposit. The lithium resource at the Mount Cattlin Mine was 17.2 Mt at an average grade of 1.09% lithium oxide. The mined pegmatite ore was processed onsite to produce a spodumene concentrate and a tantalum byproduct. The processing plant was designed to process 1 Mt/yr of ore to produce about 137,000 t/yr of spodumene concentrate grading 6% lithium oxide and 25 t/yr (56,000 pounds per year) of contained tantalum oxide for

18 years. In 2012, Galaxy Resources mined 454,912 t of ore at an average grade of 1.22% lithium oxide to produce 54,047 t of spodumene. Galaxy Resources exported its spodumene concentrate to its lithium carbonate plant in China. In July, the company decided to halt production at Mount Cattlin because an accident took place at Galaxy Resources' Jiangsu lithium carbonate plant in China. As a result, the Jiangsu plant was shut down for the second half of 2012. Spodumene concentrate was stockpiled at the Mount Cattlin site. The Board of Galaxy Resources decided to stop mining and instead signed a 3-year purchase agreement with Talison Lithium to supply spodumene concentrate to its Jiangsu plant (Galaxy Resources Ltd., 2013, p. 9).

As of September 2012, Talison Lithium's lithium resource at Greenbushes was 61.5 Mt at an average grade of 2.8% lithium oxide, and the estimated life of the Greenbushes Mine had been increased to 24 years. Talison Lithium invested \$65 million to double the output capacity to 1.5 Mt/yr of ore feed to produce about 740,000 t/yr of lithium concentrate (about 100,000 t/yr of lithium carbonate equivalent). The construction of the Stage 2 expansion started in 2011 and was completed in the second quarter of 2012. In 2012, Talison Lithium and Windfield Holding Pty Ltd. [a subsidiary of Chengdu Tianqi Industry (Group) Co. Ltd. of China] agreed to acquire the balance of the ordinary shares that it did not already own and options in Talison for C\$7.50 (US\$7.90) per share. Tianqi held a 19.99% interest in Talison Lithium before the acquisition. The Australian Foreign Investment Board had no objections to Tianqi's acquisition in November 2012 (Talison Lithium Ltd., 2012, p. 13; 2013).

Magnesium Compounds.—All Australian magnesite deposits were mined by the open pit method. The Queensland Magnesia Pty Ltd.'s Kunwarara Mine, which is located 70 km northwest of Queenstown in Queensland, was the leading operating magnesite mine in the country. About 3 Mt/yr of ore was mined and processed at Kunwarara. The beneficiated magnesite was transported to the company's Parkhurst plant for calcination to produce the required magnesia products, such as high-grade deadburned, electrofused, and calcined magnesite. The Parkhurst plant had a designed capacity of 320,000 t/yr. In recent years, the Parkhurst plant operated at about 30% of its designed capacity. Sibelco Group of Belgium acquired Queensland Magnesia in 2012 (Resource Information Unit, 2012, p. 201).

There were two active magnesite mines—Thuddungra in New South Wales and Salt Creek in South Australia. The processing plant at the Thuddungra Mine had the capacity to produce 80,000 t/yr of high-purity magnesium carbonate that contains low contents of iron. During the past several years, production was between 35,000 t/yr and 40,000 t/yr. The Salt Creek Mine produced products that had magnesium carbonate content that ranged from 50% to 74% (Resource Information Unit, 2012, p. 110, 234).

Rare Earths.—China dominated global production of rare earths and accounted for more than 90% of the world total in 2011. China's share of rare-earth output was expected to decrease during the next several years. China was also a leading rare-earth consumer. During the past decade, the Chinese Government restricted rare-earth production and exports. As a result, the availability of rare earths in the international market

became tighter during the past several years. Small-scale production of rare earths had been reported in Australia in the 20th century but records on these activities were incomplete. Lynas Corp. Ltd. started construction of an open pit mine and a concentration plant at the Mount Weld deposit in 2007; the deposit was located 35 km south of Laverton, Western Australia, and mining started at the Central Lanthanide pit in 2010. The construction of the concentration plant started in 2010, and the plant was put into operation in 2011 to produce at a target grade of 36% rare-earth oxide (REO) in concentrates; the recovery rate was expected to be 68.7%. The plant was designed to process 121,000 t/yr of ore and to produce 33,000 t/yr of rare-earth concentrate. The company reported a stockpile of 15,200 t of concentrates containing 5,410 t of REO at the end of December 2012. Some of the rare-earth concentrates were planned to be shipped to Lynas' advanced materials plant in Kuantan, Malaysia, in 2012. Owing to legal challenges from local residents in Kuantan, the Malaysian Government delayed issuing the temporary operating license to the plant.

Lynas also planned to develop the Duncan deposit, which is located southeast of the Central Lanthanide deposit. The mineral resource at Duncan was estimated to be 8.9 Mt grading 4.8% REO. The Duncan deposit could be exploited using the open-pit mining method. The cost of developing the Duncan deposit was estimated to be \$600 million. Lynas and Sojitz Corp. of Japan formed a strategic alliance and signed an offtake, distribution, and financing agreement to enable Lynas to accelerate the development of the phase 2 operation. Under the agreement, Sojitz was allocated a minimum of 8,500 t/yr of rare-earth products for the Japanese market for 10 years (Lynas Corp. Ltd., 2012, p. 51; 2013, p. 24).

Mineral Fuels and Related Materials

Coal.—Australia ranked behind China and India in the Asia and the Pacific region in coal output; the country, however, was the world's leading exporter of coal. Queensland and New South Wales were Australia's leading coal-producing States and accounted for more than 95% of the country's total output. In 2012, Australia mined 477 Mt of raw black (bituminous and anthracite) coal, of which 365 Mt was salable coal. Open pit coal mines accounted for about 79% of the total output. Coal from Queensland was mainly mined from the Bowen basin, which extends south from Collinsville to Blackwater and Moura, and from mines at Blair Athol, Newlands, and near Brisbane. Coal from New South Wales was mined near the eastern and western edges of the large Sydney Gunnedah basin. Australia exported more than 315.5 Mt of coal (which included 144.6 Mt of metallurgical coal and 170.9 Mt of thermal coal) compared with 280.6 Mt in 2011. Japan received 28.1% of Australia's metallurgical coal exports followed by India, 19.2%; China, 15.9%; the Republic of Korea, 8.2%; and others, 28.6%. Japan was also the leading destination for Australian thermal coal exports, receiving 44.0% of those exports followed by the Republic of Korea, 17.6%; China, 9.8%; Taiwan, 9.6%; and others, 19.0%. Domestic coal consumption was about 70 Mt, of which the power sector accounted for about 85% of total domestic consumption, followed by steel, 6.7%; cement,

1.3%; and others, 7%. Owing to increased demand from other countries in the Asia and the Pacific region, such as China and India, Australia's metallurgical coal exports were expected to increase during the next several years (Australian Bureau of Resources and Energy Economics, 2013, p. 163).

BHP Billiton approved funding for the development of the Caval Ridge project and the expansion of the Peak Downs Mine in the Bowen basin in Queensland. The total investment was \$4.2 billion, of which BHP Billiton's share was \$2.1 billion. BHP Billiton's partner, Mitsubishi Development Pty Ltd. of Japan provided the remaining funds. The Caval Ridge Mine would have the capacity to produce 5.5 Mt/yr of metallurgical coal, and the capacity of the Peak Downs Mine would increase by 2.5 Mt/yr and have a mine life of more than 60 years. BHP Billiton decided to delay the development of the Peak Downs Mine, but the construction of the Caval Ridge Mine remained on schedule to be completed in 2014. The Caval Ridge project was one of the four components of BHP Billiton Mitsubishi Alliance Coal Operations Pty Ltd.'s coal growth project in the Bowen basin. The Daunia Mine, which was a new open pit coal mine and coal handling preparation plant, was scheduled to be completed in 2013; the plant would have the capacity to produce 4 Mt/yr of coal for 21 years (BHP Billiton Ltd., 2013, p. 37).

Uranium.—Australia was the third-ranked uranium producer in the world after Kazakhstan and Canada. Australia's uranium production was mainly from three mines—the Beverley, the Olympic Dam, and the Ranger Mines. A number of undeveloped deposits also occur in the Northern Territory, and in Queensland, South Australia, and Western Australia.

The Australian Government permits uranium mining provided that all the relevant environmental safeguards and health requirements are met. Regulation of Australia's uranium mines is mainly a State and Territorial government responsibility. In October 2012, the government of Queensland decided to overturn the State's ban on uranium mining. Australia exported all its uranium output under long-term contracts. Australia's uranium production was expected to decrease during the next 2 years because of the shutdown of the Ranger Mine in December 2012. The Honeymoon project, which was a joint venture of Uranium One Inc. of Canada (51%) and Mitsui & Co. Ltd. of Japan (49%), is located 75 km northwest of Broken Hill, South Australia. The Honeymoon deposit had indicated resources of 4.2 Mt at an average grade of 0.129% uranium oxide. The company planned to produce 400 t/yr (880,000 pounds per year) of uranium oxide for 6 years. The mine produced 100.2 t (220,800 pounds) of uranium in 2012. Uranium One installed only 51 production wells instead of following the original plan of adding 96 production wells in 2012. Australian Government issued its approval for Mitsui to withdraw from the joint venture. Other new projects that were under feasibility study included Mega Uranium Ltd.'s Lake Maitland project in Western Australia and Marathon Resources Ltd.'s Mount Gee project in South Australia (Uranium One Inc., 2013, p. 20).

Outlook

Australia is a natural-resource-rich country with significant resources of metallic, nonmetallic, and fuel minerals. Mineral

and energy commodity production and exports are an important part of the country's economy. As a result of strong world demand for mineral commodities, especially in the Asia and the Pacific region, the Australian economy is expected to continue to benefit from higher commodity export earnings. Expenditures on mineral and energy exploration in Australia are expected to increase owing to higher costs of labor and equipment and increased global demand for mineral resources in the near future. Mineral production, such as production of bauxite, copper, iron ore, natural gas, nickel, and zinc, is expected to increase during the next several years; however, the rate of increase is expected to be slower than in the previous several years. Major projects, such as the Yarwun alumina refinery project; BHP Billiton's RGP iron ore project; Hamersley Iron's Yandicoogina iron ore expansion; Fortescue Metals Group's iron ore project; Rio Tinto's Brockman 4, Hope Downs, and Mesa A iron ore projects and Clermont and Kestrel coal projects; and Xstrata's Mangoola coal project, are expected to come onstream within this decade. If the slow economic recovery in the United States and the European Union continues, the volume of imports of manufactured goods from China and other Asia countries to the United States and the European Union is expected to continue to decline. China plans to slow down its economic growth to between 7% and 8% in the next several years from 10% during the past 10 years; as a result, China's demand for most mineral commodities from Australia is expected to decrease, and companies in Australia could, therefore, delay their investment in these projects. Western Australia is Australia's leading State for metallic mineral exports, and New South Wales and Queensland are its major coal exporting States; however, to sustain export growth, the country's infrastructure would require significant expansion and upgrading so that minerals for export could be transported from inland to port terminals. A carbon tax and mineral resource rent tax would not affect Australian mineral investment significantly. Australia is expected to remain a major mineral and fuel exporting country.

References Cited

- Alcoa Inc., 2013, 2012 annual report: Pittsburgh, Pennsylvania, Alcoa Inc., March, 196 p.
- Aquila Resources Ltd., 2012, Annual report 2012: Perth, Western Australia, Australia, Aquila Resources Ltd., 92 p.
- Aquila Resources Ltd., 2013, West Pilbara iron ore project resource statement increase: Perth, Western Australia, Australia, Aquila Resources Ltd., April 18, 6 p.
- Australian Aluminium Council Ltd., 2012, Hydro Kurri Kurri Pty Ltd. (Accessed May 9, 2013, at <http://aluminium.org.au/australian-aluminium/aluminium-hydro-kurri-kurri>.)
- Australian Bureau of Resources and Energy Economics, 2013, Resources and energy quarterly—March quarter 2013: Canberra, Australian Capital Territory, Australia, Australian Bureau of Resources and Energy Economics, March, 184 p.
- Australian Bureau of Statistics, 2013a, Australian national accounts—National income, expenditure and product: Canberra, Australian Capital Territory, Australia, Australian Bureau of Statistics, 80 p.
- Australian Bureau of Statistics, 2013b, Balance of payments and international investment position: Canberra, Australian Capital Territory, Australia, Australian Bureau of Statistics, 87 p.
- BHP Billiton Ltd., 2013, Annual report 2012: Melbourne, Victoria, Australia, BHP Billiton Ltd., 276 p.
- Carbine Tungsten Ltd., 2013, Half year financial report 31 December 2012: Abbotsford, Victoria, Australia, Carbine Tungsten Ltd., March 15, 21 p.

- Cement Industry Federation, 2013, Australian cement industry statistics 2012: Forrest, Australian Capital Territory, Australia, Cement Industry Federation, 15 p.
- CITIC Pacific Ltd., 2013, Annual report 2012: Hong Kong, China, CITIC Pacific Ltd., 230 p.
- Consolidated Tin Mines Ltd., 2013a, Completion of acquisition of Kagara Central Region project: Cairns North, Queensland, Australia, Consolidated Tin Mines Ltd., January 30, 7 p.
- Consolidated Tin Mines Ltd., 2013b, Consolidated Tin upgrades resource to 10.57 Mt at Mt Garnet tin project: Cairns North, Queensland, Australia, Consolidated Tin Mines Ltd., June 11, 17 p.
- Department of Mines and Petroleum [State of Western Australia], 2013a, Western Australian mineral and petroleum statistics digest 2011–12: East Perth, Western Australia, Australia, Department of Mines and Petroleum, 84 p.
- Department of Mines and Petroleum [State of Western Australia], 2013b, Western Australian mineral and petroleum statistics digest 2012: East Perth, Western Australia, Australia, Department of Mines and Petroleum, 45 p.
- Deutsche Rohstoff AG, 2012, Wolfram Camp Mining ships first concentrate: Heidelberg, Germany, Deutsche Rohstoff AG, March, 2 p.
- Ellis, Margaret, 2013, Western Australia's exploration incentive scheme: Journal of the Australasian Institute of Mining and Metallurgy, April, p. 24.
- Evolution Mining Ltd., 2012, Annual report 2012: Sydney, New South Wales, Australia, Evolution Mining Ltd., 116 p.
- Evolution Mining Ltd., 2013, Quarterly report for the period ending 31 December 2012: Sydney, New South Wales, Australia, Evolution Mining Ltd., 18 p.
- Fitzgerald, Barry, 2013, Alcoa cut threatens Geelong smelter: The Australian [Sydney, New South Wales, Australia], May 3. (Accessed May 4, 2013, at <http://www.theaustralian.com.au/business/mining-energy/alcoa-cut-threatens-geelong-smelter/story-e6frg9df-1226634237908>.)
- Foley, Mike, 2012, No refinery required—Gov. seeks Aurukun bauxite miner: Australian Journal of Mining, November 29. (Accessed November 29, 2012, at http://www.theajmonline.com.au/mining_news/news/2012/november/november-29-2012/no-refinery-required-gov.-seeks-aurukun-bauxite-miners.)
- Galaxy Resources Ltd., 2013, 2012 annual report: West Perth, Western Australia, Australia, Galaxy Resources Ltd., 100 p.
- Geoscience Australia, 2013, Australian mineral exploration—A review of exploration for the year 2012: Canberra, Australian Capital Territory, Australia, Geoscience Australia, February, 20 p.
- Gindalbie Metals Ltd., 2012, Annual report 2012: Perth, Western Australia, Australia, Gindalbie Metals Ltd., 98 p.
- Gindalbie Metals Ltd., 2013, March 2013 quarterly: Perth, Western Australia, Australia, Gindalbie Metals Ltd., 7 p.
- Heber, Alex, 2013, WA nickel mine to close this month: Australian Mining, April 9. (Accessed June 25, 2013, at <http://miningaustralia.com.au/news/wa-nickel-mine-to-close-this-month.>)
- Iluka Resources Ltd., 2013a, Idling of mining production at Eneabba: Perth, Western Australia, Australia, Iluka Resources Ltd. press release, January 17, 2 p.
- Iluka Resources Ltd., 2013b, Iluka review 2012: Perth, Western Australia, Australia, Iluka Resources Ltd., 53 p.
- L'sea Resources International Holdings Ltd., 2013, Announcement of annual results for the year ended 31 December 2012: Hong Kong, China, L'sea Resources International Holdings Ltd., March 28, 26 p.
- Lynas Corp. Ltd., 2012, Annual report 2012: Sydney, New South Wales, Australia, Lynas Corp. Ltd., 110 p.
- Lynas Corp. Ltd., 2013, Interim unaudited condensed consolidated financial report for the first year ended December 31, 2012: Sydney, New South Wales, Australia, Lynas Corp. Ltd., 24 p.
- Mandalay Resources Ltd., 2013, Annual report 2012: Toronto, Ontario, Canada, Mandalay Resources Ltd., 25 p.
- Metals X Ltd., 2013, Annual report 2012: East Perth, Western Australia, Australia, Metals X Ltd., 129 p.
- Mining Weekly, 2012, Too taxing?: Mining Weekly, v. 18, no. 34, September 7–13, p. 8–9.
- Newcrest Mining Ltd., 2013a, Mineral resources and ore reserve explanatory notes 2012: Melbourne, Victoria, Australia, Newcrest Mining Ltd., 34 p.
- Newcrest Mining Ltd., 2013b, Quarterly report for the three months ending 31 December: Melbourne, Victoria, Australia, Newcrest Mining Ltd., 10 p.
- Northwest Resources Ltd., 2013, Annual report 2012: Sydney, New South Wales, Australia, Northwest Resources Ltd., 57 p.
- Norton Gold Fields Ltd., 2013, Annual report 2012—31 December: Perth, Western Australia, Australia, Norton Gold Fields Ltd., 121 p.
- OJSC MMC Norilsk Nickel, 2013, MMC Norilsk Nickel announces preliminary consolidated production results for 4th quarter and 12 months 2012 and production outlook for 2013: Moscow, Russia, OJSC MMC Norilsk Nickel press release, January 30, 4 p.
- Reed Resources Ltd., 2012, Annual report 2012: West Perth, Western Australia, Australia, Reed Resources Ltd., 104 p.
- Reed Resources Ltd., 2013, Reed Resources Ltd. quarterly activities report for the quarter ended 31 March 2013: West Perth, Western Australia, Australia, Reed Resources Ltd., 14 p.
- Regis Resources Ltd., 2012, 2012 annual report: Subiaco, Western Australia, Australia, Regis Resources Ltd., 94 p.
- Regis Resources Ltd., 2013, Quarterly report to 31 December: Subiaco, Western Australia, Australia, Regis Resources Ltd., 13 p.
- Reserve Bank of Australia, 2013, Statement on monetary policy: Canberra, Australian Capital Territory, Australia, Reserve Bank of Australia, February, 68 p.
- Resource Information Unit, 2012, Register of Australian Mining: West Perth, Western Australia, Australia, Resource Information Unit, 973 p.
- Rio Tinto plc, 2013a, Rio Tinto Alcan South of Embley project: London, United Kingdom, Rio Tinto plc, newsletter, February, 8 p.
- Rio Tinto plc, 2013b, 2012 annual report: London, United Kingdom, Rio Tinto plc, 235 p.
- Risbey, Danielle, 2013, Planning for mine closure in Western Australia: Journal of the Australian Institute of Mining and Metallurgy, April, p. 60.
- Sandfire Resources NL, 2013, March 2013 quarterly report highlight: West Perth, Western Australia, Australia, Sandfire Resources NL, 14 p.
- Straits Resources Ltd., 2012, Hillgrove sale process: West Perth, Western Australia, Australia, Straits Resources Ltd. press release, November 9, 1 p.
- Sydney Morning Herald, The, 2013, Aquila puts \$7.4b iron ore project on ice: The Sydney Morning Herald, February 4. (Accessed June 6, 2013, at <http://www.smh.com.au/action/printArticle?id=4003974>.)
- Talison Lithium Ltd., 2012, Greenbushes lithium operations: Perth, Western Australia, Australia, Talison Lithium Ltd., December, 104 p.
- Talison Lithium Ltd., 2013, Talison Lithium update on Tainqi transaction: Perth, Western Australia, Australia, Talison Lithium Ltd. press release, February 25, 3 p.
- Uranium One Inc., 2013, 2012 annual report: Toronto, Ontario, Canada, Uranium One Inc., 83 p.
- Wilson, Lauren, 2013, FMG won't pay MRRT for five years: The Australian [Sydney, New South Wales, Australia], April 9. (Accessed April 22, 2013, at <http://www.theaustralian.com.au/national-affairs/fmg-wont-pay-mrrt-for-five-years/story-fin59niix-1226615323908>.)
- Xstrata plc, 2013a, Annual report 2012: Zug, Switzerland, Xstrata plc, 147 p.
- Xstrata plc, 2013b, Mineral resources and ore reserves: Zug, Switzerland, Xstrata plc, 51 p.

TABLE 1
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2008	2009	2010	2011	2012	
METALS						
Aluminum:						
Bauxite, gross weight	thousand metric tons	64,038	65,231	68,414	69,976	76,282
Alumina	do.	19,446	19,948	19,956	19,399	20,914
Metal, primary	do.	1,974	1,943	1,928	1,945	1,864
Antimony, Sb content of ores and concentrates ^e		1,500	1,000	1,106 ²	1,577 ²	2,481 ²
Cadmium: ^c						
Mine output, Cd content		700	460	-- ^r	--	--
Metal, smelter, refined		350 ^r	370 ^r	350 ^r	390	380
Chromium, chromite, gross weight		224,809	119,314	180,000 ^r	323,800 ^r	452,300
Of which, chromite content ^e		90,000	45,000	35 ^r	45 ^r	--
Cobalt:						
Co content in laterite ore, Ni concentrate, and Zn concentrate		4,780	4,345	3,852 ^r	3,848 ^r	5,882
Metal, refined		3,620	4,050	4,120	4,720 ^r	4,860
Copper:						
Mine output, Cu content	thousand metric tons	885	859	870	958	914
Metal:						
Smelter, primary and secondary	do.	447	422	410	441 ^r	421
Refined, primary	do.	503	446	417	477	461
Gold:						
Mine output, Au content		215	224	261	260	250
Metal, refined:						
Primary		244	256	280	271	264
Secondary		117	123	71	48	44
Iron and steel:						
Iron ore: ^c						
Gross weight	thousand metric tons	342,000	394,000	433,000	488,000	521,000
Fe content	do.	208,000	228,000	271,000	277,000	315,000
Metal:						
Pig iron	do.	6,409	4,370	6,259	5,396 ^r	3,711
Ferroalloys: ^c						
Ferromanganese		147,000	87,000	138,000	146,000	102,000
Silicomanganese		125,000	74,000	131,000	130,000	96,000
Total		272,000	161,000	269,000	276,000	198,000
Steel, crude	thousand metric tons	7,724	5,135	7,408	6,538	4,894
Semimanufactured products ^e		10,200	7,530	9,100 ^r	9,750 ^r	8,000
Lead:						
Mine output, Pb content	thousand metric tons	645	566	625	621	648
Metal:						
Bullion	do.	167	150	142	139	147
Refined:						
Primary	do.	220	204	178	187	160
Secondary, excluding remelt	do.	24	25	26	26	24
Manganese ore, metallurgical:						
Gross weight	do.	4,812	4,451	6,474	6,963	7,531
Mn content	do.	2,310	2,140	2,650	2,860	3,080
Nickel:						
Mine output, Ni content	do.	188	165	170	212	246
Matte	do.	31	28	54	57	66
Metal, smelter, refined Ni and Ni content of oxide	do.	103	131	108	110	129

See footnotes at end of table.

TABLE 1—Continued
 AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2008	2009	2010	2011	2012	
METALS—Continued						
Platinum-group metals: ^e						
Palladium, Pd content	kilograms	580	800	650	350 ^r	300
Platinum, Pt content	do.	120	230	130	95 ^r	90
Total	do.	700	1,030	780	445 ^r	390
Silver:						
Mine output, Ag content		1,926	1,633	1,864	1,725	1,728
Metal, refined		644	664	735	898	781
Tantalum, tantalite, Ta ₂ O ₅ equivalent		680	105	--	--	--
Tin:						
Mine output, Sn content ³		1,783	5,630	6,600	5,012 ^r	5,849
Metal, refined:						
Primary		170	--	--	--	--
Secondary ^e		400	400	400	400	400
Titanium concentrates, gross weight:						
Ilmenite	thousand metric tons	2,082	1,449	1,492	1,277	1,344
Leucoxene ^e		148,000	162,000	159,000	224,000	228,000
Rutile		325,000	285,000	429,000	474,000	439,000
Tungsten, mine output, W content		28	33	16	15	80
Zinc:						
Mine output, Zn content	thousand metric tons	1,519	1,290	1,479	1,515	1,541
Metal, smelter, primary	do.	499	525	499	507	498
Zirconium concentrates, gross weight	do.	514	400	549	762	605
INDUSTRIAL MINERALS						
Abrasives, natural, garnet		298,290	275,560	196,839	200,000	200,000
Barite ^e		17,000	12,000	12,000	12,000	12,000
Cement, hydraulic ^e	thousand metric tons	9,400	9,200	8,300	8,600	8,600
Diamond:						
Gem	thousand carats	273	220	100	86	65
Industrial	do.	15,397	10,575	9,900	7,500	11,895
Total	do.	15,670	10,795	10,000	7,586	11,960
Diatomite ^e		20,000	20,000	20,000	20,000	20,000
Feldspar, including nepheline syenite ^e		50,000	50,000	50,000	50,000	50,000
Gemstones, opal ^e	value, \$million	41	33	40	40	41
Gypsum	thousand metric tons	3,734	3,436	3,000 ^e	3,000 ^e	2,500 ^e
Kyanite ^e		1,000	1,000	1,000	1,000	1,000
Lime ^e		2,200,000	2,500,000 ^r	2,200,000 ^r	2,200,000 ^r	2,200,000
Lithium, spodumene		239,528	197,482	295,000	421,391 ^r	456,921
Magnesite		126,000	344,000	275,000 ^r	300,000 ^e	300,000 ^e
Perlite, crude ^e		6,500	6,500	7,000	7,000	7,000
Phosphate rock: ^e						
Gross weight		2,950,000	2,500,000	2,600,000	2,650,000 ^r	2,600,000
P ₂ O ₅ content		678,000	575,000	600,000	610,000 ^r	600,000
Rare earths, rare-earth oxide equivalent		--	--	--	2,188	3,222

See footnotes at end of table.

TABLE 1—Continued
 AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity		2008	2009	2010	2011	2012
INDUSTRIAL MINERALS—Continued						
Salt ⁴	thousand metric tons	11,160	10,316	11,968	11,744	10,821
Soda ash ^c	do.	310	310	310	310	300
Stone and sand and gravel: ^c						
Construction sand	do.	37,000	34,000	21,000 ^r	24,000 ^r	25,000
Crushed and broken stone	do.	110,000	115,000	100,000	100,000	100,000
Dimension stone	do.	230	180	120 ^r	140 ^r	140
Gravel	do.	12,000	12,000	6,000 ^r	8,000 ^r	8,000
Limestone	do.	18,400	16,800	17,000	18,000	18,000
Silica in the form of quartz, quartzite, glass sand	do.	5,500	4,000 ^r	3,100 ^r	3,500 ^r	3,500 ^c
Sulfur, byproduct: ^c						
Metallurgy	do.	880	870	800	800	800
Petroleum	do.	60	60	60	60	60
Total	do.	940	930	860	860	860
Talc, chlorite, pyrophyllite, steatite ^c		120,000	90,000 ^r	100,000 ^r	120,000	120,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, salable:						
Bituminous and subbituminous	thousand metric tons	332,000	348,000	356,000 ^r	348,000 ^r	365,000
Lignite ^c	do.	71,000	74,000	71,000	65,000	65,000
Total ^c	do.	403,000	422,000	427,000 ^r	413,000 ^r	430,000
Gas, natural, marketed	million cubic meters	38,256	42,345	51,868	51,253	55,970
Petroleum:						
Crude, includes condensate	thousand 42-gallon barrels	168,123	169,211	169,985	143,456	119,200
Refinery products	do.	246,717	241,233	235,971	239,618	234,734
Uranium, mine output, U ₃ O ₈ content		9,989	7,942	7,440	6,942	6,968

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

¹Table includes data available through July 9, 2013.

²Reported figure.

³Does not include tin production from heavy-mineral sands in Western Australia.

⁴Does not include production from Northern Territory and Victoria.

TABLE 2
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e
Aluminum:			
Bauxite	Gove open pit bauxite mine [Pacific Aluminum (Rio Tinto Ltd., 100%)]	15 km southeast of Nhulunbuy, NT	8,000
Do.	Huntly open pit bauxite mine (Alcoa World Alumina Australia, 100%)	80 km south of Perth, WA	20,000
Do.	Weipa-Andoom open pit bauxite mine [Comalco Ltd., operator (Rio Tinto Alcan, 100%)]	Weipa, QLD	23,000
Do.	Willowdale open pit bauxite mine (Alcoa World Alumina Australia, 100%)	130 km south of Perth, WA	8,600
Do.	Boddington-Worsley open pit bauxite mine {Worsley Alumina Pty. Ltd., manager [BHP Billiton Ltd., 86%; Japan Alumina Associates (Australia) Pty. Ltd., 10%; Sojitz Alumina Pty. Ltd., 4%]}	14 km south of Boddington, WA	19,000
Alumina, refinery	Gladstone alumina refinery [Queensland Alumina Ltd., operator (Rio Tinto Alcan, 80%, and United Company RUSAL, 20%)]	Gladstone, QLD	3,850
Do.	Gove alumina refinery {Alcan Gove Pty Ltd. [Pacific Aluminum, 100% (Rio Tinto Ltd., 100%)]}	Nhulunbuy, Gove, NT	3,800
Do.	Kwinana alumina refinery (Alcoa World Alumina Australia, 100%)	Kwinana, WA	2,100
Do.	Pinjarra alumina refinery (Alcoa World Alumina Australia, 100%)	Pinjarra, WA	4,200
Do.	Wagerup alumina refinery (Alcoa World Alumina Australia, 60%, and Western Mining Corp., 40%)	Waroona, WA	2,600
Do.	Worsley alumina refinery {Worsley Alumina Pty. Ltd., manager [BHP Billiton Ltd., 86%, and Japan Alumina Associates (Australia) Pty Ltd., 10%]}	20 km northwest of Collie, WA	4,600
Do.	Yarwun alumina refinery (Rio Tinto Alcan, 100%)	Gladstone, QLD	3,400
Metal smelter	Bell Bay aluminum smelter [Pacific Aluminum (Rio Tinto Ltd., 100%)]	Bell Bay, TAS	160
Do.	Boyne Island aluminum smelter [Boyne Smelters Ltd., operator [Pacific Aluminum, 64% (Rio Tinto Ltd., 100%); Sumitomo Light Metal Industries Ltd., 17%; Ryowa Development Pty. Ltd., 12%; Kobe Steel Ltd., 5%; Sumitomo Chemical Co. Ltd., 2%]	Boyne Island, QLD	550
Do.	Point Henry aluminum smelter (Alcoa of Australia, 100%)	Point Henry, VIC	185
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	345
Do.	Tomago aluminum smelter {Tomago Aluminium Co. Pty. Ltd., operator [Gove Aluminium Finance Ltd., 36.05%; Pacific Aluminum 51.55% (Rio Tinto Ltd., 100%); Hydro Aluminium, 12.40%]}	Tomago, NSW	525
Antimony	Costerfield underground antimony-gold mine [AGD Mining, operator (Mandalay Resources Ltd., 100%)]	50 km east and southeast of Bendigo, VIC	5
Do.	Hillgrove Mine (Straits Resources Ltd., 100%)	25 km east of Armidale, NSW	10
Bentonite	Arumpo open pit bentonite mine (Arumpo Bentonite Pty. Ltd., 100%)	95 km northeast of Mildura, NSW	10
Do.	Cedars open pit bentonite mine (PCP Douglass Pty. Ltd., 100%)	10 km southwest of Yarraman, QLD	20
Do.	Cressfield open pit bentonite mine (Unimin Australia Ltd., 100%)	20 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
Cement, plant	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., 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
Do.	do.	Gladstone, QLD	1,700
Do.	do.	Railton, TAS	1,000
Do.	Cockburn Cement Ltd., 100%	Munster, 30 km south of Perth, WA	700
Chromite	Coobina open pit chromite mine (Palmary Enterprises Ltd., 100%)	80 km southeast of Newman, WA	250

See footnotes at end of table.

TABLE 2—Continued
 AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e
Coal	Angus Place longwall coal mine (Centennial Coal Co. Ltd., 50%, and SK Corp., 50%)	16 km northwest of Lithgow, NSW	3,000
Do.	Appin longwall coal mine [Illawarra Coal Holdings Pty Ltd., operator (BHP Billiton Ltd., 100%)]	40 northwest of Wollongong, NSW	8,800
Do.	Ashton open pit/underground coal mine (Felix Resources Ltd., 60%; Chu Corp., 10%; private, 30%)	14 km northwest of Singleton, NSW	4,000
Do.	Awaba underground coal mine [Powercoal Pty. Ltd., operator (Centennial Coal Co. Ltd., 100%)]	30 km southwest of Newcastle, NSW	2,000
Do.	Baal Bone coal mine [Oakbridge Pty. Ltd., 74.1% (Xstrata plc, 100%); Sumitomo Corp., 5%; Toyota Tsusho Mining (Australia) Pty Ltd. 4.75%; private, 14.44%]	24 km northwest of Lithgow, NSW	2,500
Do.	Bengalla open pit coal mine [Coal and Allied Industries Ltd., 40%, manager; Wesfarmers Bengalla Ltd., 40%; MCDA Bengalla Investment Pty. Ltd., 10%; Taipower Bengalla Pty. Ltd., 10%]	5 km west of Muswellbrook, NSW	6,600
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/underground coal mine [BHP Billiton Mitsubishi Alliance, manager (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)]	30 km north of Moranbah, QLD ³	3,000
Do.	Bulga open pit coal mine [Oakbridge Pty Ltd., manager (Xstrata 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.	Camberwell open pit coal mine [Camberwell Coal Pty. Ltd., manager [Toyota Tsusho Mining (Australia) Pty. Ltd., 90%, and Dia Coal Mining (Australia) Pty Ltd., 10%]	10 km northwest of Singleton, NSW	4,000
Do.	Clarence underground coal mine [Centennial Coal Co. Ltd., 85%, (manager) and SK Australia Pty. Ltd., 15%]	10 km east of Lithgow, NSW	2,500
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 open pit coal mine (Cumnock Coal 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 (Anglo Coal Holdings Australia Ltd., 77.3%)	70 km north of Singleton, NSW ³	3,750
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 (BHP Billiton 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

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e
Coal—Continued	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%)	Bowen basin, QLD	3,600
Do.	German Creek and German Creek East open pit/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-Broadmeadow open pit coal mines (BHP Billiton Ltd., 50%, and Mitsubishi Corp., 50%)	140 km southwest of Mackay, QLD	16,000
Do.	Gregory Crinum open pit/underground coal mine [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) (Coal and Allied Industries Ltd., 100%)	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., 6.66%)	100 km west of Mackay, QLD	8,000
Do.	Hazelwood open pit coal mine (International Power Hazelwood, 100%)	150 km southeast of Melbourne, VIC	20,000
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 Mitsui & Co. (Australia) Ltd., 20%]	40 km north-northeast of Emerald, QLD	5,500
Do.	Liddell open pit coal mine (Xstrata Coal Australia Pty. Ltd., 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., 7%; 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 (Xstrata plc, 100%)	20 km northwest of Singleton, NSW	7,700
Do.	Mount Thorley open pit coal mine (Coal and Allied Industries Ltd., 80%, and POSCO Australia Pty. Ltd., 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	1,500
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 (Xstrata plc, 55%; Itochu Corp., 35%; Sumitomo Corp., 10%)	130 km west of Mackay, QLD	15,000
Do.	Newstan longwall coal mine (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 (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 (Xstrata plc, 55%; Sumitomo Coal Australia Pty. Ltd., 25%; Itocho Corp., 20%)	300 km west-northwest of Rockhampton, QLD	9,500
Do.	Peak Downs open pit coal mine (BHP Billiton Ltd., 50%, and Mitsubishi Development Pty. Ltd., 50%)	145 km north of Emerald, QLD	9,000
Do.	Premier open pit coal mine (Wesfarmers Premier Coal Ltd., 100%)	10 km southeast of Collie, WA	4,000

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(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	Ravensworth-Narama open pit coal mine (includes Ravensworth East) (Xstrata Coal Australia Pty. Ltd., 100% of Ravensworth and 50% of Narama; Iluka Resources Ltd., 50% of Narama)	20 km northwest of Singleton, NSW	3,500
Do.	Rixs Creek open pit coal mine (Bloomfield Colliers Pty. Ltd., 100%)	5 km northwest of Singleton, NSW	2,000
Do.	Rolleston open pit coal mine (Xstrata 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 Ltd., 50%, and Mitsubishi Corp., 50%)	125 km north of Emerald, QLD	6,500
Do.	South Walker Creek open pit/underground coal mine (BHP Mitsui Coal Pty. Ltd., 100%)	90 km southwest of Mackay, QLD	4,300
Do.	Springvale underground coal mine (Centennial Coal Co. Ltd. 50%; SK Corp., 25%; Korea Resources Corp. Australia, 25%)	16 km northwest of Lithgow, NSW	3,000
Do.	Tahmoor longwall coal mine (includes Tahmoor North and Bargo) (Centennial Coal Co. Ltd., 85.79%, and private, 14.21%)	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 (Xstrata plc, 90%, and Mitsubishi Corp., 10%)	45 km northwest of Mudgee, NSW	5,000
Do.	United Collieries underground coal mine (Xstrata plc, 95%, and private, 5%)	15 km west of Singleton, NSW	3,000
Do.	Wambo open pit/underground coal mine (Peabody Energy Corp., 100%)	30 km from Singleton, NSW	6,000
Do.	West Cliff longwall coal mine (BHP Billiton Ltd., 100%)	43 km northwest of Wollongong, NSW	2,300
Do.	West Wallsend longwall coal mine (Xstrata 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	Cawse open pit nickel-cobalt mine (OJSC MMC Norilsk Nickel, 100%)	50 km northwest of Kalgoorlie, WA	0.2
Do.	Murrin Murrin open pit nickel-cobalt mine (Minara Resources Ltd., 60%, and Glencore Australia Pty. Ltd., 40%)	60 km east of Leonora, WA	2.0
Do.	Radio Hill underground nickel-cobalt mine (Fox Resources Ltd., 100%)	35 km south of Karratha, WA	0.2
Do.	Ravensthorpe open pit mine (BHP Billiton Ltd., 100%)	155 km west of Esperance, WA	1.4
Refinery	Yabulu nickel-cobalt refinery (Nickel Consolidated Pty Ltd., Nickel House Pty, and Nickel Process Pty)	Townsville, QLD	3
Copper:			
Mine, Cu content	Boddington open pit/underground gold mine (Newmont Mining Corp., 100%)	130 km southeast of Perth, WA	35
Do.	Cadia Valley open pit/underground gold-copper mine (includes Cadia East, Cadia Hill, and Ridgeway) (Newcrest Mining Ltd., 100%)	21 km south-southwest of Orange, NSW	90
Do.	Cobar underground copper mine (Glencore International plc, 100%)	12 km northwest of Cobar, NSW	30
Do.	Doolgunna open pit/underground gold-copper mine (includes DeGrussa) (Sandfire Resources NL, 100%)	140 km north of Meekatharra, WA	300
Do.	Eloise underground copper mine (FMR Investments Pty Ltd., 100%)	60 km southeast of Cloncurry, QLD	70
Do.	Ernest Henry open pit/underground copper-gold mine (Xstrata plc, 100%)	35 km northeast of Cloncurry, QLD	115
Do.	Golden Grove underground zinc-copper mine [(MMG Ltd., operator) China Minmetals Group, 100%]	225 km east of Geraldton, WA	20
Do.	Hellyer underground zinc-lead-copper-silver mine (Bass Metals Ltd., 100%)	80 km south-southwest of Burnie, TAS	1
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
Do.	Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, and Hilton Mines) (Xstrata plc, 100%)	Mount Isa, QLD	190
Do.	Mount Lyell underground copper-gold mine [Sterlite Industries (India) Ltd., 100%]	2 km northeast of Queenstown, TAS	35

See footnotes at end of table.

TABLE 2—Continued
 AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e	
Copper—Continued:				
Mine, Cu content— Continued	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/underground copper-gold mine (Rio Tinto 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 [Olympic Dam Operations 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) (GoldCorp Inc., 100%)	8 km south of Cobar, NSW	3	
Do.	Prominent Hill open pit/underground copper-gold mine (OZ Minerals Ltd., 100%)	650 km northwest of Adelaide, SA	140	
Do.	Ridgeway underground gold-copper mine (Newcrest Mining Ltd., 100%)	5 km south of Orange, NSW	30	
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.	Tritton underground mine (Straits Resources Ltd., 100%)	Nyngan, NSW	30	
Smelter	Mount Isa copper smelter (Xstrata 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	
Do.	Port Kembla copper smelter (Furukawa Co. Ltd., 52.5%; Nittetsu Mining Co., 20%; NisshoIwai Corp., 17.5%; Itochu Corp., 10%)	Port Kembla, NSW	120	
Refinery	Olympic Dam copper refinery [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	235	
Do.	Port Kembla copper refinery (Furukawa Co. Ltd., 52.5%; Nittetsu Mining Co., 20%; NisshoIwai Corp., 17.5%; Itochu Corp., 10%)	Port Kembla, NSW	120	
Do.	Townsville copper refinery (Xstrata plc, 100%)	Townsville, QLD	300	
Diamond	thousand carats	Argyle Mine (AK-1 lamproite pipe and alluvial diamond mines) (Rio Tinto plc, 100%)	120 km southwest of Kununurra, WA	30,000
Do.	do.	Ellendale Mine (includes pipes 4 and 9) (Gem Diamond Ltd., 100%)	130 east southeast of Derby, WA	700
Do.	do.	Ellendale 9 North Mine (Blina Diamond NL, 100%)	140 east of Derby, WA	500
Diatomite		Barraba open pit diatomite mine (Australia Diatomite Mining Pty. Ltd., 100%)	85 km north-northwest of Tamworth, NSW	25
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
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	250
Gas:				
Condensate	thousand 42-gallon barrels per day	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
Natural	million cubic meters per day	do.	do.	20
Liquefied natural	million metric tons	do.	Four-train liquefaction plant, Burrup Peninsula, WA	12

See footnotes at end of table.

TABLE 2—Continued
 AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e
Gold:				
Mine	kilograms	Agnew open pit/underground gold mine (Gold Fields Ltd., 100%)	23 km west of Leinster, WA	5,600
Do.	do.	Boddington open pit/underground gold mine (Newmont Mining Corp., 100%)	130 km southeast of Perth, WA	31,000
Do.	do.	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 open pit/underground gold-copper mine (includes Cadia East, Cadia Hill, and Ridgeway) (Newcrest Mining Ltd., 100%)	21 km south-southwest of Orange, NSW	25,000
Do.	do.	Doolgunna open pit/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 (Xstrata plc, 100%)	35 km northeast of Cloncurry, QLD	3,000
Do.	do.	Granny Smith open pit gold mine (includes Wallaby) (Barrick Gold Corp., 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 (Barrick Gold 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/underground gold mine (Newmont Mining Corp., 100%)	45 km northeast of Wiluna, WA	12,000
Do.	do.	Kalgoorlie open pit/underground gold mine [Kalgoorlie Consolidated Gold Mine Pty Ltd., operator (Barrick Gold Australia, 50%, and Newmont Mining Corp., 50%)]	600 km east Perth, WA	20,000
Do.	do.	Kanowna Belle underground gold mine (Barrick Gold Corp., 100%)	18 km northeast of Kalgoorlie, WA	7,000
Do.	do.	Lawlers underground gold mine (Barrick Gold Corp., 100%)	30 km southwest of Leinster, WA	3,000
Do.	do.	Mount Lyell underground copper-gold mine [Sterlite Industries (India) Ltd., 100%]	2 km northeast of Queenstown, TAS	1,000
Do.	do.	Mount Magnet open pit/underground gold mine (includes Hill 50 and Star) (Ramelins Resources Ltd., 100%)	2 km from Mount Magnet, WA	8,500
Do.	do.	Norseman underground gold mine (Norseman Gold Plc, 100%)	Norseman, WA	3,700
Do.	do.	Northparkes open pit/underground copper-gold mine (Rio Tinto Ltd., 80%, and Sumitomo Metal Mining Oceania Pty. Ltd., 20%)	30 km north of Parkes, NSW	155,000
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/underground gold operation [Noron Gold Fields Ltd., operator (Zijin Mining Group Co. Ltd., 89%)]	35 km north of Kalgoorlie, WA	5,000
Do.	do.	Pajingo underground gold mine (includes Vera-Nancy) [North Queensland Metals Ltd. (operator), 60%, and Heemskirk Consolidated Ltd., 40%]	60 km south-southeast of Charters Towers, QLD	6,400
Do.	do.	Plutonic open pit/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.	Ridgeway underground gold-copper mine (Newcrest Mining Ltd., 100%)	25 km south of Orange, NSW	10,800
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
Do.	do.	Saint Ives open pit/underground gold mine (Gold Fields Ltd., 100%)	75 km south-southeast of Kalgoorlie, WA	15,000
Do.	do.	Selwyn underground copper-gold mine (Barrick Gold Corp., 100%)	160 km southeast of Mount Isa, QLD	700
Do.	do.	Stawell underground gold mine (Perseverance Corp. Ltd., 100%)	250 km west of Melbourne, VIC	3,000

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e	
Gold—Continued:				
Mine— Continued	kilograms	Sunrise Dam open pit mine gold (includes Cleo) (AngloGold Ashanti Ltd., 100%)	55 km south of Laverton, WA	15,000
Do.	do.	Super Pit open pit gold mine (includes Fimiston) [Kalgoorlie Consolidated Gold Mines Pty. Ltd., manager (Barrick Gold Corp., 50%, and Newmont Mining Corp., 50%)]	Southeast corner of the Kalgoorlie-Boulder Township, WA	25,000
Do.	do.	Tanami open pit gold mine (includes Central Desert Joint Venture) (Newmont Gold Corp., 100%)	650 km northwest of Alice Springs, NT	15,000
Do.	do.	Telfer copper and gold mine (Newcrest Mining Ltd., 100%)	400 km east southeast of Port Hedland, WA	15,000
Do.	do.	Thunderbox gold mine (LionOre Mining International Ltd., 100%)	90 km northeast of Leonora, WA	5,000
Do.	do.	Trident gold mine (Avoca Resources Ltd., 100%)	Higginsville, WA	5,000
Do.	do.	Wattle Dam gold mine (Ramelius Resources Ltd., 100%)	70 km south of Kalgoorlie, WA	3,000
Do.	do.	Wiluna open pit/underground gold mine (Apex Minerals NL, 100%)	7 km south of Wiluna, WA	3,300
Smelter	do.	Gidji Roaster gold smelter (Kalgoorlie Consolidated Gold Mines Pty. Ltd., 100%)	Kalgoorlie, WA	24,300
Refinery	do.	Perth Refinery [AGR Management Services Ltd. (Australian Gold Alliance Pty Ltd., 40%; Western Australian Mint, 40%; Johnson Matthey (Australian) Ltd., 20%]	Newburn, WA	300,000
Gypsum		Gypsum Resources Australia Pty. Ltd., 100%	Lake MacDonnell open pit gypsum mine, near Point Thevenard, SA	1,400
Do.		Dampier Salt Ltd., 100%	Lake MacLeod salt and gypsum solar	900
Iron and steel:				
Iron ore		Channar open pit iron ore mine [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.		Cockatoo Island open pit iron ore mine (BHP Billiton Ltd., 100%)	130 km north northeast of Derby, WA	1,500
Do.		Eastern Range open pit iron ore mine [Hamersley Iron Pty. Ltd., 54% (Rio Tinto Ltd., 100%), and Shanghai Baosteel Group Corp., 46%]	10 km east of Paraburdoo, WA	10,000
Do.		Extension Hill open pit iron ore mine (Mount Gibson Iron Ltd., 100%)	85 km of Perenjori, WA	3,000
Do.		Hamersley Operations (includes Brockman No. 2, Marandoo, Mount Tom Price, Nammuldi, Paraburdoo, and Yandicoogina open pit iron ore mines) [Hamersley Iron Pty. Ltd., 100% (Rio Tinto Ltd., 100%)]	30 km to 85 km northeast, northwest, and south of Tom Price, WA	90,000
Do.		Hope Downs Mine [Hope Downs Iron Ore Pty Ltd. (Hancock Prospecting Pty Ltd. 100%), 50%, and Rio Tinto Ltd., 50%]	75 km northwest of Newman, WA	30,000
Do.		Jimblebar open pit iron ore mine {BHP Iron Ore [Jimblebar], 85% [BHP Billiton Ltd., 100%]; Mitsui Itochu Iron Pty Ltd., 10% [Mitsui & Co. (Australia) Ltd. 100%]; CI Minerals Australia Pty Ltd., 5% [Itochu Corp., 100%]}	40 km east of Newman, WA	35,000
Do.		Karara open pit iron ore mine (Anshan Iron and Steel Group Corp., 50%, and Gindalbie Metals Ltd., 50%)	110 km south of Yalgoo, WA	8,000
Do.		Koolan Island open pit iron ore mine (Mount Gibson Iron Ltd., 100%)	140 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 Goldsworthy mining associates joint venture (includes Area C, Goldsworthy, and Nimingarra) [BHP Billiton Minerals Pty Ltd. (manager), 85%; ITOCHU Minerals & Energy of Australia Pty Ltd., 8%; Mitsui Iron Ore Corp. Pty. Ltd., 7%]	180 km east of Port Hedland, WA	42,000
Do.		Mount Gould open pit iron ore mine (Unimin Australia Ltd., 100%)	160 km west of Meekatharra, WA	6,000

See footnotes at end of table.

TABLE 2—Continued
 AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e
Iron and steel—Continued:			
Iron ore—Continued	Mount Newman open pit iron ore mine (includes Mount Whaleback, Orebody 23–25, Orebody 29, and Orebody 30–35) {BHP Billiton Minerals Pty Ltd., 85% [BHP Billiton Ltd., 100%]; Mitsui Itochu Iron Pty Ltd., 10% [Mitsui & Co. (Australia) Ltd., 100%]; CI Minerals Australia Pty Ltd., 5% [Itochu Corp., 100%]}	Within 13 km of Newman, WA	30,000
Do.	Pannawonica (includes Mesa A and J) open pit iron ore mine [Robe River Iron Associates, manager (Rio Tinto Ltd., 53%; Mitsui & Co. (Australia) Ltd., 33%; Nippon Steel Australia Pty. Ltd., 10.5%; Sumitomo Metal Australia Pty. Ltd., 3.5%]	130 km south-southwest of Dampier, WA	32,000
Do.	Savage River open pit iron ore mine (Stemcor Holdings 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.	Whyalla open pit iron ore mines (OneSteel Ltd., 100%)	270 km northwest of Adelaide, SA	2,600
Do.	Yandi open pit iron ore mine (BHP Billiton Minerals Pty Ltd., 85%, manager; ITOCHU Minerals & Energy of Australia Pty Ltd., 8%; Mitsui Iron Ore Corp. Pty. Ltd., 7%)	92 km north of Newman, WA	42,000
Pig iron	Hismelt pig iron plant [Hismelt Corp. Pty Ltd. (Rio Tinto Ltd., 60%; Nucor Corp., 25%; Mitsubishi Corp., 10%; and Shougang Corp., 5%]	Kwinana, WA	800
Steel	OneSteel Whyalla steelworks (OneSteel Ltd., 100%)	Whyalla, SA	1,200
Do.	Port Kembla steelworks (Blue Scope Steel Ltd., 100%)	Port Kembla, NSW	2,500
Do.	Smorgon Steel Group Ltd.	Laverton, Melbourne, VIC	700
Do.	do.	Waratch, NSW	285
Kaolin	Axedale Clays open pit kaolin mine (E Clay Pty Ltd., 100%)	18 km east of Bendigo, VIC	50
Do.	Pitong 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
Lead:			
Mine, lead content	Anges 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 (BHP Billiton Ltd., 100%)	85 km southwest of McKinlay, QLD	265
Do.	Century open pit zinc-silver-lead mine (Zinifex 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	24
Do.	Hellyer underground zinc-lead-copper-silver mine (Bae Metals Ltd., 100%)	80 km south-southwest of Burnie, TAS	44
Do.	Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, and Hilton Mines) (Xstrata plc, 100%)	Mount Isa, QLD	150
Do.	Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	5 km north of Queenstown, TAS	25
Smelter	Mount Isa smelter (Xstrata plc, 100%)	Mount Isa, QLD	240
Do.	Port Pirie smelter (Nyrstar Corp., 100%)	5 km north of Queenstown, TAS	235
Magnesite	Kunwarara open pit magnesite mine (includes Marlborough) [Queensland Magnesia Pty Ltd., operator (Sibelco Group, 100%)]	70 km northwest of Rockhampton, QLD	3,000
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

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e
Manganese:			
Mine, 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 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
Mineral sands	Broken Hill region mines (Cristal Australia Pty Ltd., 100%)	120 km north of Mildura, NSW	NA
Do.	Murray Basin heavy-mineral sands mine (Iluka Resources Ltd., 100%)	80 km southeast of Mildura, VIC	NA
Do.	Perth Basin heavy-mineral sands mine (Iluka Resources Ltd., 100%)	260 km north of Perth, WA	NA
Do.	North Capel open pit heavy-mineral sands mine (Iluka Resources Ltd., 100%)	7 km north of Capel, WA	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
Molybdenum metric tons	Wolfram Camp molybdenum-tungsten mine (Queensland Ore Ltd., 85%, and private, 15%)	85 km west of Cairns, QLD	120
Nickel:			
Mine, Ni content	Avebury nickel mine (includes Bison, North Avebury, Saxon, and West Viking) [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	Near Zeehan, TAS	7
Do.	Black Swan underground nickel mine (includes Silver Swan) (OJSC MMC Norilsk Nickel, 100%)	53 km northeast of Kalgoorlie, WA	10
Do.	Carnilya Hill open pit mine (Mincor Resources NL, 70%, and View Resources Ltd., 30%)	25 km northeast of Kambalda, WA	5
Do.	Cawse open pit nickel-cobalt mine (OJSC MMC Norilsk Nickel, 100%)	50 km northeast of Kalgoorlie, WA	9
Do.	Cosmos open pit nickel mine (Xstrata plc, 100%)	50 km north of Leinster, WA	13
Do.	Flying Fox underground mine (Western Areas NL, 100%)	108 km south of Marvel Loch, WA	15
Do.	Kambalda underground nickel mines (Palmary Enterprises Ltd., 100%)	5 km south of Kambalda, WA	35
Do.	Lake Johnson underground nickel mine (includes Maggie Hays, Maggie Hays Lake, and Emily Ann) (OJSC MMC Norilsk Nickel, 100%)	130 km west of Norseman, WA	12
Do.	Lanfranchi underground mine (includes Deacon, Schmitz, Tramway, and Winner) (Panoramic Resources Ltd., 100%)	42 km south of Kambalda, WA	10
Do.	Leinster open pit/underground nickel mines (BHP Billiton Ltd., 100%)	10 km north of Leinster, WA	44
Do.	Long underground mine (Independence Group NL, 100%)	Near Kambalda East, WA	10
Do.	Miitel underground nickel mine (includes Redross and Mariners) (Mincor Resources NL, 100%)	70 km south of Kambalda, WA	10
Do.	Mount Keith open pit nickel mine (includes Cliffs and Yakabindie) (BHP Billiton Ltd., 100%)	70 km south-southeast of Wiluna, WA	40
Do.	Murrin Murrin open pit nickel-cobalt mine (Minara Resources Ltd., 60%, and Glencore International plc, 40%)	60 km east of Leonora, WA	34
Do.	Radio Hill underground nickel-cobalt mine (Fox Resources Ltd., 100%)	35 km south of Karratha, WA	4
Do.	Ravensthorpe open pit mine (First Quantum Minerals Ltd., 100%)	155 km west of Esperance, WA ³	39
Do.	Savannah underground mine (Panoramic Resources Ltd., 100%)	120 km north of Halls Creek, WA	8
Do.	Spotted Quoll nickel mine (includes Tim King and Willy Willy) (Western Areas NL, 100%)	114 km south of Marvel Loch, WA	10
Do.	Waterloo underground nickel mine (includes Amoric) (OJSC MMC Norilsk Nickel, 100%)	90 km north of Leonora, WA	5

See footnotes at end of table.

TABLE 2—Continued
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e
Nickel—Continued:				
Smelter		Kalgoorlie nickel smelter (BHP Billiton Ltd., 100%)	Kalgoorlie, WA	100
Refinery		Kwinana nickel refinery (BHP Billiton Ltd., 100%)	Kwinana, WA	67
Do.		Murrin Murrin nickel refinery (Minara Resources Ltd., 60%, and Glencore International plc, 40%)	Murrin Murrin, WA	45
Do.		Yabulu nickel-cobalt refinery (Nickel Consolidated Pty Ltd., Nickel House Pty Ltd., and Nickel Process Pty Ltd.)	Townsville, QLD	40
Opal		Many small producers	Andamooka and Coober Pedy areas, SA; Lightning Ridge area, NSW	NA
Petroleum	thousand 42-gallon barrels per day	Exxon Mobil Corp., 100%	Altona Refinery, VIC	120
Do.	do.	Bulwer Island Refinery [BP Amoco Refinery (Bulwer Island) Pty. Ltd., 100%]	Bulwer Island, QLD	69.3
Do.	do.	Clyde Refinery [Shell Refining (Australia) Pty. Ltd., 100%]	Clyde, NSW	85
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
Do.	do.	Port Stanvac Refinery (Exxon Mobil Corp., 100%)	Port Stanvac, SA	69
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		Mount Weld Mine (Lynas Corp. Ltd.)	Mount Weld, WA	1,100
Salt		Dampier solar evaporation salt pans (Dampier Salt Ltd., 100%)	Near Dampier, WA	4,000
Do.		Lake MacLeod solar salt and gypsum evaporation pans (Dampier Salt Ltd., 100%)	65 km north of Carnarvon, WA	900
Do.		Port Hedland solar salt fields (Dampier Salt Ltd., 100%)	Port Hedland, WA	3,000
Silica		Itochu Corp., 50%, and Tochu Corp., 50%	Kemerton silica sands dredge, 25 km northeast of Bunbury, WA	450
Silver:				
Mine, 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-copper-silver mine (Intec Ltd., 50%, and Polymetals Mining Services Pty Ltd., 50%)	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) (Xstrata 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

See footnotes at end of table.

TABLE 2—Continued
 AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e
Silver:				
Mine, kilograms		Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	5 km north of Queenstown, TAS	35,000
Ag content— Continued				
Smelter	do.	Port Pirie smelter (Nyrstar Corp., 100%)	do.	450,000
Refinery	do.	Perth Refinery [AGR Management Services Ltd. (Australian Gold Alliance Pty Ltd., 40%; Western Australian Mint, 40%; and Johnson Matthey (Australian) Ltd., 20%)]	Newburn, WA	81,000
Spodumene		Greenbushes open pit/underground tantalite-spodumene mine {Windfield Holding Pty Ltd., operator [Chengdu Tianqi Industry (Group) Co. Ltd., 100%]}	70 km southeast of Bunbury, WA	260
Do.		Mount Cattlin spodumene mine (Galaxy Resources Ltd., 100%)	2 km north of Ravensthorpe, WA	140
Talc		Three Springs open pit talc mine (Imerys SA, 100%)	330 km north of Perth, WA	150
Tantalum, tantalite, Ta ₂ O ₅ content	metric tons	Greenbushes open pit/underground tantalite-spodumene mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA	550
Do.	do.	Bald Hill tantalite mine (Haddington Resources Ltd., 100%)	60 km southeast of Kambalda, WA ³	100
Do.	do.	Wodgina open pit tantalite mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA ³	250
Tin:				
Mine, Sn content	do.	Collingwood underground tin mine (Metals X Ltd., 100%)	35 km south of Cooktown, QLD ³	3,000
Do.	do.	Greenbushes open pit/underground tantalite-spodumene mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA ³	1,000
Do.	do.	Mount Bischoff open pit mine (Metals X Ltd., 50%; L'sea Resources International Holdings Ltd. and YT Parksong Australia Holdings Pty Ltd., 50%)	55 km southwest of Burnie, TSA ³	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 (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA ³	1,000
Tungsten, W content	do.	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 (Deutsche Rohstoff AG, 100%)	85 km west of Cairns, QLD	500
Uranium, U ₃ O ₈ content	do.	Beverley in situ leach uranium operation (Heathgate Resources Pty. Ltd., 100%)	300 km northeast of Port Augusta, SA	1,000
Do.	do.	Honeymoon uranium mine (UraniumOne Inc., 100%)	75 km northwest of Broken Hill, SA	400
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	4,400
Do.	do.	Ranger open pit uranium mine (Energy Resources of Australia Ltd., 100%)	230 km east of Darwin, NT	5,000
Vanadium, V ₂ O ₅ content	do.	Windimurra open pit mine vanadium (Precious Metals Australia Ltd., 90%, and Noble Group Ltd., 10%)	100 km east-southeast of Mount Magnet, WA3	8

See footnotes at end of table.

TABLE 2—Continued
 AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2012

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities ^{1,2}	Annual capacity ^e
Zinc:			
Mine, Zn content	Anges 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 [(MMG Ltd., operator) China Minmetals Group, 100%]	250 km north of Mount Isa, QLD	500
Do.	Endeavor underground zinc-silver-lead mine (CBH Resources Ltd., a subsidiary of Toho Zinc Co. Ltd. of Japan, 100%)	40 km northwest of Cobar, NSW	44
Do.	Golden Grove underground zinc-copper mine [(MMG Ltd., operator) China Minmetals Group, 100%]	225 km east of Geraldton, WA	150
Do.	Hellyer underground zinc-lead-copper-silver mine (Intec Ltd., 50%, and Polymetals Mining Services Pty Ltd., 50%)	80 km south-southwest of Burnie, TAS ³	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 (Xstrata plc, 100%)]	60 km southwest of Borroloola, NT	143
Do.	Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, and Hilton Mines) (Xstrata plc, 100%)	Mount Isa, QLD	175
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	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 Corp., 100%)	5 km north of Queenstown, TAS	45
Do.	Hobart smelter (Nyrstar Corp., 100%)	Hobart, TAS	320
Refinery	Sun Metals zinc refinery [Sun Metals Corp. Pty. Ltd., operator (Korea Zinc Co., 100%)]	Townsville, QLD	170

^eEstimated; 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.

³On care-and-maintenance status; expansion project development decision pending.

TABLE 3
AUSTRALIA: RESERVES OF MAJOR MINERAL COMMODITIES IN 2012

Commodity	Reserves ¹
Antimony, Sb content	105
Bauxite	5,670
Coal:	
Black:	
In situ	70
Recoverable	57
Brown:	
In situ	49
Recoverable	44
Cobalt, Co content	1,200
Copper, Cu content	86
Diamond	2,700
Gold, Au content	9,100
Iron ore	38
Lead, Pb content	36
Lithium, Li content	1,000
Magnesite (MgCO ₃ content)	330
Manganese ore	200
Mineral sands:	
Ilmenite	190
Rutile	27
Zircon	46
Molybdenum, Mo content	167
Nickel, Ni content	20
Niobium (columbium) and tantalum:	
Niobium (columbium), Nb content	200
Tantalum, Ta content	62
Platinum-group metals (Pd, Pt)	4
Rare earths (REO plus Y ₂ O ₃)	2,000
Silver, Ag content	88
Tin, Sn content	240
Tungsten, W content	370
Uranium, U content	1,200
Vanadium, V content	1,520
Zinc, Zn content	68

do. Ditto.

¹Economic demonstrated resources. Data are rounded to no more than three significant digits.

Source: Geoscience Australia, 2010, Australia's identified mineral resources 2012: Canberra, Australian Capital Territory, Australia, Geoscience Australia, p. 5.