



# 2013 Minerals Yearbook

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## AUSTRALIA

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# THE MINERAL INDUSTRY OF AUSTRALIA

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During the past decade, increased mineral exports—supported by ongoing capacity expansions, particularly for iron ore—had led to substantial economic growth in Australia. This mining boom substantially increased the standard of living in Australia. After this strong growth in the mining sector during the past several years, however, investment in the mining sector decreased in 2013, and investment in the nonmining sectors also decreased in the last quarter of 2013. The slowing of the economy in Australia was partly owing to slow growth in the economies of Western developed countries in 2013, where nonmining business activity remained weak. Also, the rate of economic growth in China, which was the destination country for many of Australia's mineral exports, remained unchanged from that of 2012. As a result, the expansion rate of Australia's economy was slower than in 2012. Australia's gross domestic product (GDP) increased at a rate of 2.8% in 2013, which was slower than the 3.1% rate of growth recorded in 2012 (Australian Bureau of Statistics, 2014a, p. 1; Reserve Bank of Australia, 2014, p. 29).

Australia's total mineral exploration spending was expected to be A\$2.5 billion (US\$2.4 billion) in 2013, which was a decrease of about 28% from that of 2012. The decrease in exploration spending was the result of a decrease 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 60% of total exploration spending followed by Queensland, 17%; New South Wales, 7%; South Australia, 6%; and others, 10%. Iron ore exploration spending accounted for 34% of the exploration spending followed by gold, 21%; coal, 17%; base metals, 16%; and other commodities, 12%. As a result of the spending on exploration, significant mineral resources were discovered, including 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. In 2013, the exploration expenditure for natural gas and oil was A\$4.5 billion (US\$4.3 billion), of which offshore exploration accounted for 70% of the total. Australia's total fuel and nonfuel mineral exploration spending was A\$7.0 billion (US\$6.7 billion) (Australian Bureau of Statistics, 2014c, p. 7–12).

## Minerals in the National Economy

Australia's mineral sector contributed more than A\$154 billion (US\$146 billion), or about 10%, to the country's GDP in fiscal year 2013. The mineral sector employed 266,000 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, 2014, p. 166; Australian Bureau of Statistics, 2014a, p. 39).

## 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 of Australia's 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. 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 projected 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\$120 million). Australia's mineral industry, which opposed the MRRT, had dealt with the effects of increased production costs (wages, power, and transportation) in recent years and was concerned that the MRRT would affect its ability to attract international investment. The mineral industry urged the Government to revoke the MRRT (Lismore-Scott and Ollett, 2013).

In 2012, the Australian Government implemented a carbon tax. The mineral industry indicated that the carbon tax made projects uneconomical to develop because of increased development costs. Iluka Resources Ltd. shut down its Eneabba Mine in 2013 because of the effect of the carbon tax and the decrease in demand for mineral sand. The Association of Mining and Exploration Companies indicated that a significant amount of money raised on the Australian Stock Exchange was being directed to African countries because of the carbon tax. In 2013, the mineral industry urged the Government to repeal the carbon tax to help make Australia a more competitive place in which to do business (Parliament of the Commonwealth of Australia, 2013, p. 4).

The Australian Parliament passed the 2013–14 (July 2013 to June 2014) budget, which included a provision allowing companies to immediately claim a tax deduction for exploration permits purchased from other mining companies. The tax deduction for the cost of the permit or license would be depreciated over 15 years. The changes were intended to prevent exploration permits from being sold through several companies without any real exploration taking place. The Parliament also provided an additional A\$34 million (US\$32.3 million) to Geoscience Australia to conduct geoscientific studies on offshore petroleum acreage, which might lead to more exploration and development of offshore petroleum resources (St John, 2013).

The government of the Northern Territory announced that mining companies would be required to pay an annual levy equivalent to 1% of the value of the environmental rehabilitation security deposit, effective as of October 2013. The government of the Northern Territory would continue to hold securities equivalent to 100% of the cost of rehabilitation for both new and existing mine sites. Mining companies in the Northern Territory objected to the levy because it would discourage investment in the Northern Territory (Allion Legal Pty Ltd., 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, 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 2013 as it was in 2012. Mineral commodities for which reported production increased in 2013 included mined antimony, cobalt, iron ore, natural gas, refined nickel, petroleum, and zircon. 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 2012. An increase in nickel production reflected increased output from BHP Billiton's Nickel West operation (Leinster Mine) 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 2013, the value of Australia's total foreign trade of goods was A\$660.1 billion (US\$627.1 billion), which was an increase of 6.8% from that of 2012. The value of exports was A\$345.5 billion (US\$328.2 billion) and the value of imports was A\$314.6 billion (US\$298.9 billion), which was an increase of 14.8% and a decrease of 0.1%, respectively, from that of 2012. As a result of moderated energy and mineral commodity prices, Australia's export revenue decreased to A\$116.9 billion (US\$110.1 billion) in 2013 from A\$120 billion (US\$126 billion) in 2012. Mineral and metal exports accounted for about 33.8% of the total value of exports in 2013, which was a decrease of 40.2% from that of 2012. Mineral commodities for which the export volume was higher in 2013 than in 2012 included bauxite, coal, copper, iron ore, lead, tin, and zinc. Australia's mineral and metal exports went mostly to Asian countries, such as (in descending order by tonnage of exports) China, Japan, the Republic of Korea, India, and Thailand. 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, 2014b, p. 30–33).

## Commodity Review

### Metals

**Aluminum.**—Australia was the leading bauxite-producing country in the world. Bauxite was mined at the Gove Mine in the 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 57.6% of the country's total output of bauxite followed by Queensland, 32.3%, and the Northern Territory, 10.1%. Australia exported 15.7 million metric tons (Mt) of bauxite compared with 10.4 Mt in 2012. Western Australia accounted for about 60% of the country's alumina output. The country exported 18.5 Mt of alumina in 2013, which was about 11% more than in 2012. The United Arab Emirates retook its place as the leading destination for exported Australian alumina; it received about 19% of the total exported volume, followed by China, 15%; Bahrain and South Africa, 13% each; Mozambique, 10%; 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 2013, Australia exported 1.54 Mt of aluminum. Japan was the leading destination for Australian aluminum exports and accounted for 29.1% of the total followed by the Republic of Korea, 21.2%; Taiwan, 13.8%; Thailand, 10.9%; and Indonesia, 7.6%; the remainder went to other countries (Australian Bureau of Resources and Energy Economics, 2014, p. 185; Department of Mines and Petroleum, 2014, 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 (60%) and Alumina Ltd. (40%)] expansion of the Wagerup alumina refinery's output capacity to 4.7 million metric tons per year (Mt/yr) from 2.65 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; the mineral leases for the two mines had been extended to 2045 and could be renewed beyond 2045. Bauxite output from these mines was supplied to Alcoa's alumina refineries. Alcoa planned to close its Point Henry aluminum smelter and two rolling mills in Geelong in the State of Victoria permanently. The Point Henry smelter had been under strategic review since 2012, and the owners were finding it difficult to keep the 50-year-old smelter competitive under current economic conditions. The two rolling mills, which supplied can sheet to domestic and Asian markets, had been affected by excess capacity in the region. The smelter was expected to be shut down in August 2014 and the rolling mills were expected to be shut down by yearend 2014 (Alcoa Inc., 2014a; 2014b, 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 the Embley River and the existing Weipa Mine. The new operation was intended to replace depleted resources progressively at the Andoom and the East Weipa mining areas in Weipa and could extend the mine life in the area by 40 years. The new development was projected to increase output capacity to 50 Mt/yr from the current 23 Mt/yr in the region south of the Weipa Peninsula and was expected to make a continuous supply of bauxite available to the company's two Gladstone alumina refineries. The Weipa area had indicated bauxite resources of 1.35 billion metric tons with an average grade of 51.2% aluminum oxide. The Queensland Coordinator-General and the

Australian Government provided the required conditions for approval for the South of Embley project in 2012 and 2013, respectively. Rio Tinto Alcan prepared a final environmental impact study that incorporated its response to public comments and submitted the study to the government of Queensland and the Commonwealth Government for approval. 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 starting in 2014. As a result, the 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 South of Embley project will likely depend on market conditions at that time (Rio Tinto Alcan, 2013).

Rio Tinto Ltd. announced that the company would suspend alumina production at the Gove alumina refinery in Nhulunbuy, Northern Territory, in the first quarter of 2014. Throughout the year, the company, the government of the Northern Territory, and the Australian Government had discussed the current market environment and tried to find a sustainable solution for the refinery to continue operating. The ongoing low alumina prices, high exchange rates, and substantial after tax losses for the refinery were key factors in the decision to close the refinery. Rio Tinto would continue its bauxite operations in the Northern Territory (Rio Tinto Ltd., 2013a).

Bauxite Resources Ltd. (BRL) had two exploration projects—the Felicitas and the Fortuna—in the Darling Range in the State of Western Australia. The Felicitas bauxite project was a joint venture with Yankuang Resources Pty Ltd., which was a subsidiary of state-owned Yankuang Group Co. Ltd. of China. The project was located about 120 kilometers (km) from Kwinana Port. BRL and Yankuang agreed in 2011 to develop bauxite mining and alumina refining capacity in Western Australia. Yankuang would pay 91% of the cost of building the refinery and would receive 70% of the alumina output. Yankuang would help BRL arrange financing to cover the remaining costs. Yankuang would offtake one-half of BRL's share of alumina production for 10 years. The bauxite resources at the Felicitas deposit were gibbsitic. The joint venture had identified about 243 Mt of resources at grades of 39.7%  $\text{Al}_2\text{O}_3$  and 10.6%  $\text{SiO}_2$ . The Fortuna bauxite project was near the town of Wundowie, Western Australia. The deposit extended across an area of 658 hectares. Initial exploration results indicated that the area had bauxite resources of 39.5 Mt at grades of 37.3%  $\text{Al}_2\text{O}_3$  and 5.2%  $\text{SiO}_2$ . BRL continued exploring these two areas in 2014 (Bauxite Resources Ltd., 2013, p. 13–15).

Australian Bauxite Ltd. began a drilling program to explore for bauxite at the Bald Hill area in the State of Tasmania in 2012. In 2013, the company reported inferred resources of 5.7 Mt of bauxite. The gibbsite resources graded 37.6%  $\text{Al}_2\text{O}_3$  and 3.2%  $\text{SiO}_2$ . The company's Binjour bauxite project was located between Gayndah and Mundubbera in central Queensland. The company reported that the Binjour project had total (inferred and indicated) resources of 24.5 Mt containing 39.0%  $\text{Al}_2\text{O}_3$  and 3.0%  $\text{SiO}_2$ . The company signed an offtake agreement with Xinfu Group of China in 2013. Xinfu Group intended to import bauxite from Australia to replace the raw

material that had been imported from Indonesia but was now banned (Australian Bauxite Ltd., 2014, p. 5–19).

Australia ranked 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, and Alcoa would shut down the Point Henry smelter in 2014 because of low aluminum prices on the world market and increased production costs. Australia's aluminum output was expected to decrease by about 15% in the near future (Fitzgerald, 2013; Alcoa Inc., 2014b).

**Antimony.**—Compared with China, Australia was a relatively minor antimony producer. 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 sold the mine to Bracken Resources Pty Ltd. in 2013 for \$30 million. Bracken Resources planned to restart mining gold and antimony in 2014 and planned to produce about 9,000 metric tons (t) and 15,000 t of concentrates in 2014 and 2015, respectively (Straits Resources Ltd., 2013).

Mandalay Resources acquired the Augusta Mine in December 2009 after the mine's operations were suspended in 2008 because of low antimony prices. Mandalay restarted exploration at the mine site 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 2013, the mine had ore reserves of 420,000 t at an average grade of 9.4 grams per metric ton (g/t) gold and 3.6% antimony. The company invested \$4.8 million in exploration in 2013 and had a total (measured and indicated) resource of 796,000 t at average grades of 9.3 g/t gold and 4.1% antimony. The mine produced 3,275 t of antimony and 894 kilograms (kg) of gold in 2013, which was higher than the company's output target (Mandalay Resources Ltd., 2014, p. 14–17).

**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 2013, Queensland replaced South Australia as the leading copper-producing State in the country and accounted for 30% of the country's mined copper output, followed by South Australia, 27%; Western Australia, 21%; and New South Wales, 19%. Tasmania's mined copper output was mainly from Mount Lyell, which accounted for 3% of total mined copper output (Australian Bureau of Resources and Energy Economics, 2014, p. 188).

Australia's copper mine production for the year was higher than that of 2012. The higher mined copper production was the result of higher production rates at existing mines without any major new mine starting up during the year. The Ernest Henry and Mount Isa operations increased their outputs compared with those of the previous year. Increased production at the Cadia Valley and the Lady Annie operations were recorded. Copper production at the Olympic Dam operation was affected by smelter disruptions in September. Several new mines were expected to be in full operation within the next 2 years, including Sandfire Resources NL's Degrussa and MMG Ltd.'s Golden Grove operations; as a result, mined copper output was expected to increase. The slightly increased refined copper production in 2013 was the result of the Lady Annie's solvent-extraction and electrowinning processing facility reaching full operation. Glencore plc (formerly Glencore Xstrata plc) planned to close its Townsville copper refinery in 2016 and was expected to decrease its refined copper production in Australia in the future (BHP Billiton Ltd., 2014c, p. 14).

Australia exported a total of 2.1 Mt of copper concentrates in 2013 compared with 2.0 Mt in 2012. China was the leading destination for exports of Australia's copper concentrates and received 47% of the total exported; India received 21%; Japan, 19%; the Republic of Korea, 8%; and others, 5%. Australia increased its refined copper exports to 404,000 t in 2013 from 370,000 t in 2012. China was the leading destination for Australia's refined copper exports and received 66% of the total exported; Malaysia received 20%; Thailand, 4%; and others, 10% (Australian Bureau of Resources and Energy Economics, 2014, p. 188).

OZ Minerals Ltd. completed the prefeasibility study on its Carrapateena copper and gold project, which the company acquired in 2011. The project comprised four exploration licenses covering about 1,070 square kilometers located about 130 kilometers (km) north of Port Augusta in central South Australia. Carrapateena is a copper and gold deposit hosted in a brecciated granite complex. The company planned to use the block caving mining method for Carrapateena. The resource delineation program had been completed in 2013 and the resource was estimated to be 800 Mt containing 0.8% copper, 3.3 g/t silver, 0.3 g/t gold, and 155 parts per million uranium. OZ Minerals planned to mine 12.4 Mt/yr of ore to produce copper-gold concentrates averaging 30% to 35% copper and 10 g/t gold. Average annual production of copper was projected to be 114,000 t and gold was 3.6 t for 24 years (OZ Minerals Ltd., 2013).

Stockman Project Pty Ltd. (a subsidiary of Independence Group NL) planned to recommission the existing Wilga underground mine and develop a new Currawong underground mine within State Forest, which is located about 19 km southeast of Benambra. The Wilga Mine, which was previously known as the Benambra Mine, was operated by Deneburst Ltd. from 1992 to 1996 when mining operations ceased and environmental rehabilitation began. The mine site was returned to the State of Victoria in 2004. Jabiru Metals Ltd. was awarded the project in 2007, and Independence Group then acquired Jabiru Metals. The Stockman project encompassed two copper-zinc-silver-gold deposits—Currawong and Wilga—

which had a total mineral resources of 13.97 Mt with an average grade of 4.3% zinc, 2.1% copper, 38 g/t silver, and 1 g/t gold. The company planned to install a concentrator, which would have a throughput rate of 1.0 Mt/yr to produce about 140,000 metric tons per year (t/yr) of concentrates grading 21% copper and 50% zinc for 10 years. The concentrate products would be exported to Asian countries (Independence Group NL, 2014, p. 5).

**Gold.**—Gold mine output in Australia ranked the country among the world's top three producers, together with China and the United States. In 2013, Australia's mined gold output increased slightly from that of 2012, and output of refined primary gold increased by about 8%. Australian gold miners were not immune to the decline of gold prices in 2013. Some Australian mines were placed on care-and-maintenance status. Many miners implemented cost-cutting initiatives throughout the year. The increase in production was attributed to a number of mines targeting higher ore grades. Also, the new Tropicana gold mine achieved full production in late 2013. Western Australia remained the leading gold-producing State, with a 68.9% share, followed by New South Wales, 12.1%; Queensland, 6.3%; and the Northern Territory, South Australia, Tasmania, and Victoria combined, the remaining 12.7% share. In 2013, Australia exported 281 t (compared with 282 t in 2012) of refined gold produced from domestic mines and 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 contributed to the decrease in refined gold exports. China replaced the United Kingdom as the leading destination for Australia's refined gold. China, India, and Thailand received 78.5% of Australia's total gold exports (Australian Bureau of Resources and Energy Economics, 2014, p. 190).

The Tropicana gold project was a joint venture between AngloGold Ashanti Australia Pty Ltd. (70%) and Independence Group NL (30%). In 2010, following a successful bankable feasibility study, the joint-venture partners decided to develop an open pit mine at the Tropicana and the Havana deposits and to install a treatment plant to process 5.5 Mt/yr of ore, which was projected to deliver about 11 t (350,000 troy ounces) of gold per year for 10 years. The two deposits had a combined total resource of 108.4 Mt with an average grade of 1.97 g/t gold (Tropicana Joint Venture, 2015).

Regis Resources Ltd. had operations at Duketon in the northeastern goldfield in Western Australia and the 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 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 Rosemont gold deposit was discovered in the 1980s and was partially mined by Aurora Gold Ltd. in the 1990s. 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. Phase 1 construction of the Rosemont gold mine was completed in October 2013, and commercial production was scheduled to begin in January 2014. The company planned to start phase 2 construction in 2014. The Rosemont Mine produced 257 kg (8,259 troy ounces) during the December 2013 quarter. 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 is located in the Bathurst region, from Alkane Resources Ltd. and Newmont Exploration Pty Ltd. in November 2012. The McPhillamys gold project, which was located about 30 km southeast of the town of Orange in New South Wales, had a total mineral resource of 73.3 Mt grading 0.94 g/t gold. The company planned to continue exploring in the region in 2013 (Regis Resources Ltd., 2014, p. 6–14).

**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 97.3% of the country's total iron ore production, followed by South Australia, 1.9%, and the Northern Territory and Tasmania, 0.4% each. Owing to its limited domestic demand and production capacities for iron and steel, Australia exported about 95% 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 2013, Australia's iron ore and pellet exports increased to 579 Mt from 493 Mt in 2012. 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 441 Mt in 2013 from 358 Mt in 2012. Australia's iron ore exports to Japan increased to 79 Mt from 75 Mt, whereas those to the Republic of Korea decreased to 45 Mt from 46 Mt (Australian Bureau of Resources and Energy Economics, 2014, p. 191).

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 planned to expand 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 290 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 (Rio Tinto Ltd., 2013b; BHP Billiton Ltd., 2014a, p. 40; 2014b; Rio Tinto plc, 2014, p. 35).

Asia Iron Australia Pty Ltd., which was a joint venture of two Chinese companies—Chongqing Chonggang Minerals Development Ltd. (a state-owned company) (60%) and SINOM Investments Ltd. (40%)—received approval from the government of Western Australia to develop the Extension Hill

magnetite project. The project, which is located in the Mount Gibson Ranges, is about 280 km southeast of Geraldton; the Extension Hill deposit was discovered in 1962. Asia Iron planned to invest \$3 billion to build an open pit mine that could produce 10 Mt/yr of concentrate for 40 years. The company planned to start the construction of the mine in 2014; production would begin in 2017. The decline in iron ore prices might put the project on hold, however (Asia Iron Australia Pty Ltd., 2014).

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 24 Mt/yr of 67% iron in concentrates and 6 Mt/yr of pellets in 2011. The 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 not completed until 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. In December 2013, CITIC Pacific shipped its first bench of iron concentrates to its steel plant in Jiangsu Province, China (CITIC Pacific Mining Management Pty Ltd., 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 2013, Australian lead mine production increased but the output of zinc decreased slightly. Zinc production was expected to increase slightly because Xstrata planned to expand the Black Star Open Cut Deepes at the Mount Isa Mine and the Handle Bar Hill Mine and also to develop the Lady Loretta deposit. The increase would be offset slightly by the decreased output of MMG Ltd.'s Century zinc mine because it was expected to exhaust its resources in 2015. Queensland remained the leading lead- and zinc-producing State in Australia. In 2013, Australia exported 493,000 t of lead concentrates compared with 469,000 t in 2012. China remained the leading destination for Australia's lead concentrate exports and accounted for 36.0% of the total, which was the same as in 2012, followed by the Republic of Korea, 28.4%; Japan, 11.2%; and others, 24.4%. Australia exported 2.52 Mt of zinc concentrates in 2013. China remained the leading destination for Australia's zinc exports, accounting for 36.7% of the total, followed by the Republic of Korea, 19.1%; Japan, 12.2%; Belgium, 8.3%; the Netherlands, 6.9%; and other countries in the world, the remaining 16.8%. Australia also exported 201,000 t of refined lead, for which the Republic of Korea remained the leading destination, followed by India, Malaysia, Vietnam, and Thailand. In 2013, zinc metal exports decreased to 424,000 t from 455,000 t in 2012 and went to such destinations as, in descending order of the quantity exported, China, the United States, Hong Kong, Taiwan, and Malaysia. Australia's zinc production was expected to increase during

the next 2 years (Australian Bureau of Resources and Energy Economics, 2014, p. 192, 204).

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.; it operated the Century, the Golden Grove, and the Rosebery Mines in Australia. The Century lead and zinc open pit mine began production in 1999 and was scheduled to shut down in 2015. The average zinc grade of ore decreased to 8.9% in 2013 from 11.9% in 2012. Mined ore increased by 33% to offset the lower grade but zinc output nonetheless decreased by 5% in 2013 from that of 2012. In 2013, the mine produced 488,233 t of zinc in zinc concentrate and 54,163 t of lead in lead concentrate. The Golden Grove Mine comprised two underground mines and one open pit mine. The two underground mines produced concentrates of copper, precious metals, and zinc and the open pit mine produced copper concentrates. Concentrates were transported to the Port of Geraldton and exported to smelters in Asia and Europe. Concentrates from the Rosebery polymetallic (copper, lead, gold, and zinc) underground mine were shipped to smelters in Hobart and Port Pirie. Gold dore bars were sold to refineries in Australia. Mining and mill volumes from Rosebery were increased. As a result, outputs of zinc, lead, and copper increased by 26%, 23%, and 17%, respectively, in 2013 compared with those of 2012. The Dugald River exploration project was located about 65 km northwest of Cloncurry in Queensland. The deposit was being developed as an underground mine. Two exploration declines to 12,900 meters were completed in 2013. The deposit had mineral resources of 63 Mt grading 12% zinc, 1.8% lead, and 31 g/t silver. Ores from the Dugald River deposit were shipped to the Century processing plant for trial run testing. As a result, zinc concentrate containing 50.8% zinc and 1.8% lead was produced. The Dugald River operation was scheduled to start mining in 2015 (MMG Ltd., 2014, p. 22–39).

**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 Glencore Nickel Australia Pty Ltd. (a subsidiary of Glencore) and Mincor Resources NL. The decrease in mined nickel output was a result of the Cosmos and the Sinclair Mines being placed on care-and-maintenance status (Glencore plc, 2014, p. 57).

Nornickel was planning to sell off its operations in Australia. the company had shut down its nickel operations in 2009 and 2010, and most of its nickel operations remained closed in 2011. To make its operations more profitable, the company began

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 also 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 April 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. BHP Billiton's Nickel West operation was not a part of BHP Billiton's "four pillar" target business and the company was looking to sell the project, as well as its other nickel operations in Australia in 2014 (OJSC MMC Norilsk Nickel, 2014, p. 69).

**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 2013. In 2013, Australia imported 538 t of refined tin and exported 12,612 t of tin concentrates (Australian Bureau of Resources and Energy Economics, 2014, p. 201).

**Titanium and Zirconium.**—Australia's titanium and zircon were produced mainly from mineral sands. Iluka Resources 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. Iluka Resources operated two mineral-separation facilities—the Hamilton plant in Victoria and the Narngulu plant 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 in 2013, the Narngulu plant operated at about 45% of capacity and the Hamilton plant operated a total of about 6 months during the year. These kilns used ilmenite to produce various synthetic rutile products containing a titanium oxide content of between 85% and 95%. China's construction and housing sectors were significant sources of demand for Iluka's titanium dioxide and zircon. Because of the slowdown of China's economic growth, Iluka Resources reduced its production of synthetic rutile, operating only one synthetic rutile kiln in Australia in 2013 (Iluka Resources Ltd., 2014, p. 18–19).

**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 and started commercial production in November 2013. The Bamford Hill and Wolfram Camp Mines had estimated total combined resources of 3.8 Mt grading 0.4% tungsten trioxide for a 10-year operation. Deutsche Rohstoff was considering selling the Australian operations in 2014 (Deutsche Rohstoff AG, 2013, 2014).

### *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 production capacity was about 8 Mt/yr and cement production capacity was about 10 Mt/yr. The highly efficient dry precalciner technology accounted for 87% of Australia's cement production in 2013. 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. Owing to high production costs and the implementation of a carbon tax, Blue Circle Southern Cement planned to close its Waurin Point operation in 2013 and the Maldon clinker operation in 2014. Cockburn Cement Ltd. also planned to shut down its clinker operation. As a result, Australia's cement output capacity was expected to decrease to about 7.5 Mt/yr. The country would rely on imports to meet its needs (Global Cement, 2014).

**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 in Australia's economic demonstrated resources of lithium in 2011 from those of 2010 was a result of a large increase in the identified resources of the Greenbushes spodumene deposit. The lithium resource at the Mount Cattlin Mine was 12.8 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 July 2012, the company decided to halt production at Mount Cattlin and signed a 3-year purchase agreement with Talison Lithium to supply spodumene concentrate to its Jiangsu lithium plant. In 2013, Galaxy decided to sell its Jiangsu lithium plant to Tianqi Ltd. of China, which owned Talison Lithium (Galaxy Resources Ltd., 2014, p. 9).



## 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 2013, Australia mined 540 Mt of raw black (bituminous and anthracite) coal, of which 296 Mt was salable coal. Open pit coal mines accounted for about 78% of the total output. Coal from Queensland was mined mainly from the Bowen basin, which extends south from Collinsville to Blackwater and Moura, and from mines at Blair Athol and 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 358 Mt of coal (which included 170 Mt of metallurgical coal and 188 Mt of thermal coal) compared with 315 Mt in 2012. Japan received 24.5% of Australia's metallurgical coal exports followed by India, 19.5%; China, 14.8%; the Republic of Korea, 4.7%; and others, 41.2%. Japan was also the leading destination for Australia's thermal coal exports, receiving 43.8% of those exports followed by China, 22.6%; the Republic of Korea, 17.3%; Taiwan, 9.5%; and others, 6.8%. 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%. Metallurgical coal exports from Australia were expected to increase slightly during the next several years. The growth would be supported by new and expanded coal output from BHP Billiton Mitsubishi Alliance's Caval Ridge and Daunia projects (Australian Bureau of Resources and Energy Economics, 2014, p. 186).

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., 2014a, p. 37).

## 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 demand for mineral commodities from the Asia and the Pacific region,

Australia's 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 past 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 amount 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 about 7% 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. The carbon tax and the MRRT could affect Australian mineral investment significantly. Australia is expected to remain a major mineral and fuel exporting country.

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TABLE 1  
AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2009	2010	2011	2012	2013	
<b>METALS</b>						
<b>Aluminum:</b>						
Bauxite, gross weight	thousand metric tons	65,231	68,414	69,976	76,282	81,109
Alumina	do.	19,948	19,956	19,399	21,357 <sup>r</sup>	21,528
Metal, primary	do.	1,943	1,928	1,945	1,864	1,778
Antimony, Sb content of ores and concentrates		1,000 <sup>e</sup>	1,106	1,577	2,481	3,275
<b>Cadmium:<sup>e</sup></b>						
Mine output, Cd content		460	--	--	--	--
Metal, smelter, refined		370	350	390	380	380
<b>Chromium:</b>						
Chromite, gross weight		119,314	180,000	323,800	452,300	400,000
Chromite content <sup>e</sup>		45,000	65,000 <sup>r</sup>	120,000 <sup>r</sup>	160,000 <sup>r</sup>	140,000
<b>Cobalt:</b>						
Co content in laterite ore, Ni concentrate, and Zn concentrate		4,345	3,852	3,848	5,882	6,400
Metal, refined		4,050	4,120	4,720	4,860	4,800 <sup>e</sup>
<b>Copper:</b>						
Mine output, Cu content	thousand metric tons	859	870	958	914	990
<b>Metal:</b>						
Smelter, primary and secondary	do.	422	410	441	422 <sup>r</sup>	441
Refined, primary	do.	446	417	477	460 <sup>r</sup>	475

See footnotes at end of table.

TABLE 1—Continued  
 AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2009	2010	2011	2012	2013
METALS—Continued					
Gold:					
Mine output, Au content	224	261	260	252 <sup>r</sup>	265
Metal, refined:					
Primary	256	280	271	263 <sup>r</sup>	283
Secondary	123	71	48	44	22
Iron and steel:					
Iron ore: <sup>c</sup>					
Gross weight					
thousand metric tons	394,000	433,000	488,000	521,000	609,000
Fe content	228,000	271,000	277,000	315,000	377,000
Metal:					
Pig iron	4,370	6,259	5,396	3,480 <sup>r</sup>	3,430
Ferroalloys: <sup>c</sup>					
Ferromanganese	87,000	138,000	146,000	106,000 <sup>r</sup>	144,000
Silicomanganese	74,000	131,000	130,000	51,000 <sup>r</sup>	110,000
Total	161,000	269,000	276,000	157,000 <sup>r</sup>	254,000
Steel, crude	5,135	7,408	6,538	4,904 <sup>r</sup>	4,640
Semimanufactured products <sup>c</sup>	7,530	9,100	9,750	8,300 <sup>r</sup>	7,600
Lead:					
Mine output, Pb content	566	625	621	622 <sup>r</sup>	711
Metal:					
Bullion	150	142	139	147	140 <sup>e</sup>
Refined:					
Primary	204	178	187	160	177
Secondary, excluding remelt	25	26	26	24	24
Manganese ore, metallurgical:					
Gross weight	4,451	6,474	6,963	7,172 <sup>r</sup>	7,448
Mn content	2,140	2,650	2,860	2,950 <sup>r</sup>	2,970
Nickel:					
Mine output, Ni content	165	170	215 <sup>r</sup>	244 <sup>r</sup>	234
Matte	28	54	57	66	70
Metal, smelter, refined Ni and Ni content of oxide	131	108	110	129	142
Platinum-group metals: <sup>c</sup>					
Palladium	800	650	350	550	610
Platinum	230	130	95	156	176
Total	1,030	780	445	706	786
Silver:					
Mine output, Ag content	1,702 <sup>r</sup>	1,879 <sup>r</sup>	1,725	1,727 <sup>r</sup>	1,840
Metal, refined	755 <sup>r</sup>	634 <sup>r</sup>	990 <sup>r</sup>	774 <sup>r</sup>	1,222
Tantalum, tantalite, Ta <sub>2</sub> O <sub>5</sub> equivalent	105	--	--	--	--
Tin:					
Mine output, Sn content <sup>2</sup>	13,268 <sup>r</sup>	18,263 <sup>r</sup>	14,014 <sup>r</sup>	6,158 <sup>r</sup>	6,472
Metal, refined:					
Primary	--	--	--	--	--
Secondary <sup>c</sup>	400	400	400	400	400
Titanium concentrates, gross weight:					
Ilmenite	1,449	1,492	1,277	1,344	1,200 <sup>e</sup>
Leucoxene <sup>c</sup>	162,000	159,000	224,000	228,000	220,000
Rutile	285,000	429,000	474,000	425,000 <sup>r</sup>	400,000 <sup>e</sup>
Tungsten, mine output, W content	33	18 <sup>r</sup>	15	290 <sup>r</sup>	320
Zinc:					
Mine output, Zn content	1,290	1,479	1,515	1,541	1,523
Metal, smelter, primary	525	499	507	498	498
Zirconium concentrates, gross weight	400	549	762	605	388
INDUSTRIAL MINERALS					
Abrasives, natural, garnet	275,560	196,839	200,000	200,000	200,000
Barite <sup>c</sup>	12,000	12,000	-- <sup>r</sup>	-- <sup>r</sup>	--
Cement, hydraulic <sup>c</sup>	9,200	8,300	8,600	8,500 <sup>r</sup>	8,400

See footnotes at end of table.

TABLE 1—Continued  
 AUSTRALIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity	2009	2010	2011	2012	2013	
INDUSTRIAL MINERALS—Continued						
Diamond:						
Gem	thousand carats	220	100	86	65	106
Industrial	do.	10,575	9,900	7,500	11,895	11,376
Total	do.	10,795	10,000	7,586	11,960	11,482
Diatomite <sup>e</sup>		20,000	20,000	20,000	20,000	20,000
Feldspar, including nepheline syenite <sup>e</sup>		50,000	50,000	50,000	50,000	45,000
Gemstones, opal <sup>e</sup>	value, \$million	33	40	40	41	41
Gypsum	thousand metric tons	3,436	3,400 <sup>r</sup>	3,000 <sup>e</sup>	2,500 <sup>e</sup>	3,000 <sup>e</sup>
Kyanite <sup>e</sup>		1,000	1,000	1,000	1,000	1,000
Lime <sup>e</sup>		2,500,000	2,200,000	2,200,000	2,200,000	2,100,000
Lithium, spodumene		197,482	295,000	421,391	456,921	421,000
Magnesite		344,000	275,000	640,000 <sup>r</sup>	587,000 <sup>r</sup>	450,000 <sup>e</sup>
Perlite, crude <sup>e</sup>		6,500	7,000	7,000	7,000	7,000
Phosphate rock: <sup>e</sup>						
Gross weight		2,500,000	2,600,000	2,650,000	2,600,000	2,600,000
P <sub>2</sub> O <sub>5</sub> content		575,000	600,000	610,000	600,000	600,000
Rare earths, rare-earth oxide equivalent		--	--	2,188	3,222	2,000
Salt <sup>3</sup>	thousand metric tons	11,560 <sup>r</sup>	12,055 <sup>r</sup>	11,404 <sup>r</sup>	10,822 <sup>r</sup>	11,000 <sup>e</sup>
Soda ash <sup>e</sup>	do.	310	310	310	300	300
Stone and sand and gravel: <sup>e</sup>						
Construction sand	do.	34,000	21,000	24,000	25,000	25,000
Crushed and broken stone	do.	115,000	100,000	100,000	100,000	100,000
Dimension stone	do.	180	120	140	140	140
Gravel	do.	12,000	6,000	8,000	8,000	8,000
Limestone	do.	21,000 <sup>r</sup>	19,000 <sup>r</sup>	22,000 <sup>r</sup>	21,000 <sup>r</sup>	20,000
Silica in the form of quartz, quartzite, glass sand	do.	4,000	3,100	3,500	3,500	3,000
Sulfur, byproduct: <sup>e</sup>						
Metallurgy	do.	870	800	800	800	770
Petroleum	do.	60	60	60	60	60
Total	do.	930	860	860	860	830
Talc, chlorite, pyrophyllite, steatite <sup>e</sup>		90,000	100,000	120,000	120,000	120,000
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Mine output, bituminous and subbituminous	thousand metric tons	452,000	449,000	468,000	477,000	540,000
Salable:						
Bituminous and subbituminous	do.	348,000	356,000	348,000	365,000	296,000
Lignite <sup>e</sup>	do.	74,000	71,000	65,000	65,000	66,000
Total <sup>e</sup>	do.	422,000	427,000	413,000	430,000	362,000
Gas, natural, marketed	million cubic meters	42,345	51,868	51,253	55,970	61,217
Petroleum:						
Crude, includes condensate	thousand 42-gallon barrels	169,211	169,985	143,456	119,200	128,600
Refinery products	do.	241,233	235,971	239,618	234,734	219,370
Uranium, mine output, U <sub>3</sub> O <sub>8</sub> content		7,942	7,440	6,942	6,968	7,584

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. do. Ditto. -- Zero.

<sup>1</sup>Table includes data available through November 20, 2014.

<sup>2</sup>Does not include tin production from heavy-mineral sands in Western Australia.

<sup>3</sup>Does not include production from Northern Territory and Victoria.

TABLE 2  
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>
<b>Aluminum:</b>			
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 plc, 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 Alumina Ltd., 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 <sup>3</sup>	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. (Boral Ltd., 100%)	Berrima, NSW	1,200
Do.	do.	Maldon, NSW	700
Do.	do.	Waurm Ponds, VIC	250
Do.	Cement Australia Pty Ltd. (Hanson Ltd. and Holcim Australia Pty Ltd.)	Brisbane, QLD	1,200
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 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>
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 (Yancoal Australia Ltd., 90%; Itochu Corp., 10%)	14 km northwest of Singleton, NSW	4,000
Do.	Austar underground coal mine [Yancoal Australia Ltd., 100%] (Centennial Coal Co. Ltd., 100%)]	65 km west of Newcastle, NSW	2,000
Do.	Baal Bone coal mine [Oakbridge Pty. Ltd., 74.1% (Glencore plc, <sup>4</sup> 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 <sup>3</sup>	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.	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 Colliery mine (Cumnock No. 1 Colliery Pty Ltd., 100%)	28 km northwest of Singleton, NSW	3,000
Do.	Curragh open pit coal mine (Wesfarmers Ltd., 100%)	70 km east of Emerald, QLD	9,000
Do.	Dartbrook coal mine (Anglo Coal Holdings Australia Ltd., 77.3%)	70 km north of Singleton, NSW <sup>3</sup>	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 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>
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 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.	Integra coal complex (includes Camberwell and Glennies Creek [Vale SA, 61.2% (operator); Toyota Tsusho Corp.; 28%; JFE Holdings Inc., 3.6%; Nippon Steel & Sumitomo Metal Corp., 3.6%; POSCO, 3.6%])	10 km northwest of Singleton, NSW	4,000
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%; Sojtz Australia Ltd., 7%; Nippon Steel Australia Pty Ltd., 2%)	10 km south of Coppabella, QLD	3,400
Do.	Moranbah North longwall coal mine (Anglo American plc., 88%, and Nippon Steel Australia Pty. Ltd., 5%)	150 km southwest of Mackay, QLD	5,800
Do.	Mount Arthur open pit coal mine (BHP Billiton Ltd., 100%)	5 km southwest of Muswellbrook, NSW	15,000
Do.	Mount Owen open pit coal mine (Glencore plc, <sup>4</sup> 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 (Glencore plc, <sup>4</sup> 55%; Sumitomo Coal Australia Pty. Ltd., 25%; Itocho Corp., 20%)	300 km west-northwest of Rockhampton, QLD	9,500

See footnotes at end of table.

TABLE 2—Continued  
AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>
Coal—Continued	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
Do.	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) [Austral Coal Ltd (operator) Glencore plc, <sup>4</sup> 100%]	70 km southwest of Sydney, NSW	2,500
Do.	Tarong-Meandu open pit coal mine (Rio Tinto Ltd., 100%)	85 km north of Toowoomba, QLD	7,000
Do.	Ulan underground coal mine (Xstrata plc, 90%, and Mitsubishi Corp., 10%)	45 km northwest of Mudgee, NSW	5,000
Do.	United Collieries underground coal mine (Glencore plc, <sup>4</sup> 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
<b>Cobalt:</b>			
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 (First Quantum Minerals Ltd., 100%)	155 km west of Esperance, WA	1.4
Refinery	Palmer nickel-cobalt refinery (Nickel Consolidated Pty Ltd., Nickel House Pty, and Nickel Process Pty)	Townsville, QLD	3
<b>Copper:</b>			
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 (Glencore plc, <sup>4</sup> 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 <sup>3</sup>	10
Do.	Mount Gordon open pit copper (solvent extraction-electrowinning) mine (Aditya Birla Minerals Ltd., 100%)	120 km north of Mount Isa, QLD	50
Do.	Mount Isa underground copper-lead-zinc-silver mine (also includes Enterprise, George Fisher, and Hilton Mines) (Glencore plc, <sup>4</sup> 100%)	Mount Isa, QLD	190

See footnotes at end of table.



TABLE 2—Continued  
 AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>	
Copper—Continued:				
Mine, Cu content— Continued	Mount Lyell underground copper-gold mine [Sterlite Industries (India) Ltd., 100%]	2 km northeast of Queenstown, TAS	35	
Do.	Nifty open pit copper (solvent extraction-electrowinning) mine (Aditya Birla Minerals Ltd., 100%)	200 km southeast of Marble Bar, WA	25	
Do.	Northparkes open pit/underground copper-gold mine (China Molybdenum Co. Ltd., 80%; Sumitomo Metal Mining Oceania Pty. Ltd., 13.3%; SC Mineral Resources Pty. Ltd., 6.7%)	30 km northwest of Parkes, NSW	90	
Do.	Olympic Dam underground copper-silver-gold-uranium mine [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) (New Gold 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.	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 (Glencore plc, <sup>4</sup> 100%)	Mount Isa, QLD	250	
Do.	Olympic Dam copper smelter [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	Roxby Downs, 80 km north of Woomera, SA	70	
Refinery	Olympic Dam copper refinery [Olympic Dam Operations Pty. Ltd., operator (BHP Billiton Ltd., 100%)]	do.	235	
Do.	Townsville copper refinery (Glencore plc, <sup>4</sup> 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) (Kimberley Diamond Ltd., 100%)	130 east southeast of Derby, WA	700
Do.	do.	Ellendale 9 North Mine (Blna 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 2013

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>
<b>Gold:</b>				
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 (Glencore plc, <sup>4</sup> 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 (Unity Mining Ltd., 100%)	30 km north of Queenstown, TAS	3,700
Do.	do.	Hillgrove Mine (Straits Resources Ltd., 100%)	25 km east of Armidale, NSW	650
Do.	do.	Jundee-Nimary open pit/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%)]	Southeast corner of the Kalgoorlie Boulder Township, WA	25,000
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.	Moolart Well gold mine (Regis Resources Ltd., 100%)	100 km north of Laverton, 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) (Evolution Mining Ltd., 100%)	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.	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 2013

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>
<b>Gold—Continued:</b>				
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.	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.	Trident gold mine (Alacer Gold Corp., 100%)	Higginsville, WA	5,000
Do.	do.	Tropicana gold mine (AngloGold Ashanti Australia Pty Ltd., 70%, and Independence Group NL 30%)	330 km northeast of Kalgoorlie, WA	1,400
Do.	do.	Wattle Dam gold mine (Tyechean Resources Ltd., 100%)	70 km south of Kalgoorlie, WA <sup>3</sup>	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, WA	900
<b>Iron and steel:</b>				
Iron ore		Channar open pit iron ore mine [Hammersley 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 Chicester 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 [Hammersley 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.		Hammersley Operations (includes Brockman No. 2, Marandoo, Mount Tom Price, Nammuldi, Paraburdoo, and Yandicoogina open pit iron ore mines) [Hammersley 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 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>
<b>Iron and steel—Continued:</b>			
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.	Sino-Iron iron ore mine (CITIC Pacific Ltd., 80%, and China Metallurgical Group Corp., 20%)	80 km south-southeast of Onslow, WA	24,000
Do.	Savage River open pit iron ore mine (Grange Resources Ltd., 100%)	100 km southwest of Burnie, TAS	2,400
Do.	Tallering Peak open pit iron ore mine (Mount Gibson Iron Ltd., 100%)	120 northeast of Geraldton, WA	3,000
Do.	Whyalla open pit iron ore mines (Arrium Steel Ltd., 100%)	270 km northwest of Adelaide, SA	2,600
Do.	Yandi open pit iron ore mine (BHP Billiton 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	Laverton Steel Mill (Arrium Steel Ltd., 100%)	Laverton, Melbourne, VIC	700
Do.	Port Kembla steelworks (Blue Scope Steel Ltd., 100%)	Port Kembla, NSW	2,600
Do.	Smorgon Steel Group Ltd.	Laverton, Melbourne, VIC	700
Do.	do.	Waratch, NSW	285
Do.	Sydney Steel Mill (Arrium Steel Ltd., 100%)	Sydney, NSW	600
Do.	Whyalla steelworks (Arrium Steel Ltd., 100%)	Whyalla, SA	1,200
Kaolin	Axedale Clays open pit kaolin mine (E Clay Pty Ltd., 100%)	18 km east of Bendigo, VIC	50
Do.	Pittong open pit kaolin mine (Imerys Minerals Australia Pty Ltd., 100%)	35 km southwest of Ballarat, VIC	110
Do.	Skardon River open pit kaolin mine (Queensland Kaolin Pty. Ltd., 96.6%, and private, 3.4%)	85 km north of Weipa, QLD	150
<b>Lead:</b>			
Mine, lead content	Angas zinc mine (Terramin Australia Ltd., 100%)	2 km from Strathalbyn, SA	10
Do.	Broken Hill underground silver-zinc-lead mine (Shenzhen Zhongjin Lingnan Nonfemet Co. Ltd., 50.1%, and Perilya Ltd., 49.9%)	Broken Hill, NSW	90
Do.	Cannington underground silver-lead-zinc mine (BHP Billiton Ltd., 100%)	85 km southwest of McKinlay, QLD	265
Do.	Century open pit zinc-silver-lead mine (MMG Ltd., 100%)	250 km north of Mount Isa, QLD	90
Do.	Endeavor underground zinc-silver-lead mine (CBH Resources Ltd., 100%)	40 km northwest of Cobar, NSW	24
Do.	Hellyer underground zinc-lead-copper-silver mine (Bass Metals Ltd., 100%)	80 km south-southwest of Burnie, TAS <sup>3</sup>	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 (Glencore plc, <sup>4</sup> 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 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>	
<b>Manganese:</b>				
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	
<b>Mineral sands</b>				
Do.	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, NSW	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
<b>Nickel:</b>				
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%) <sup>3</sup>	53 km northeast of Kalgoorlie, WA	10	
Do.	Camilya 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%) <sup>3</sup>	50 km northeast of Kalgoorlie, WA	9	
Do.	Cosmos open pit nickel mine (Glencore plc, <sup>4</sup> 100%) <sup>3</sup>	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%) <sup>3</sup>	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 <sup>3</sup>	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 Amorac) (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 2013

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>
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.	Geelong Refinery [Shell Refining (Australia) Pty. Ltd., 100%]	Geelong, VIC	110
Do.	do.	Kurnell Refinery (Caltex Australia Ltd., 100%)	Kurnell, NSW	114
Do.	do.	Kwinana Refinery [BP Amoco Refinery (Kwinana) Pty. Ltd., 100%]	Kwinana, WA	138
Do.	do.	Lytton Refinery (Caltex Australia Ltd., 100%)	Lytton, QLD	106
Phosphate rock		Phosphate Hill-Duchess open pit phosphate mine (Incitec Pivot Ltd., 100%)	140 km northwest of Mount Isa, QLD	2,200
Rare earths, rare-earth oxide		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 2013

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>e</sup>
Silver—Continued:				
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 <sub>2</sub> O <sub>5</sub> 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 <sup>3</sup>	100
Do.	do.	Wodgina open pit tantalite mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA <sup>3</sup>	250
Tin:				
Mine, Sn content	do.	Collingwood underground tin mine (Metals X Ltd., 100%)	35 km south of Cooktown, QLD <sup>3</sup>	3,000
Do.	do.	Greenbushes open pit/underground tantalite-spodumene mine (Global Advanced Metals Ltd., 100%)	70 km southeast of Bunbury, WA <sup>3</sup>	1,000
Do.	do.	Mount Bischoff open pit mine (Metals X Ltd., 50%, and L'sea Resources International Holdings Ltd. and YT Parksong Australia Holdings Pty Ltd., 50%)	55 km southwest of Burnie, TSA <sup>3</sup>	6,000
Do.	do.	Renison Bell underground tin mine (Metals X Ltd., 50%, and 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 <sup>3</sup>	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 <sub>3</sub> O <sub>8</sub> 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 <sub>2</sub> O <sub>5</sub> content	do.	Windimurra open pit mine vanadium (Precious Metals Australia Ltd., 90%, and Noble Group Ltd., 10%)	100 km east-southeast of Mount Magnet, WA <sup>3</sup>	8

See footnotes at end of table.

TABLE 2—Continued  
 AUSTRALIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2013

(Thousand metric tons unless otherwise specified)

Commodity	Facilities, major operating companies, and major equity owners	Location of main facilities <sup>1,2</sup>	Annual capacity <sup>c</sup>
<b>Zinc:</b>			
Mine, Zn content	Angas zinc mine (Terramin Australia Ltd., 100%)	2 km from Strathalbyn, SA	24
Do.	Broken Hill underground silver-zinc-lead mine (Shenzhen Zhongjin Lingnan Nonfemet Co. Ltd., 50.1%, and Perilya Ltd., 49.9%)	Broken Hill, NSW	360
Do.	Cannington underground silver-lead-zinc mine (BHP Billiton Ltd., 100%)	85 km southwest of McKinlay, QLD	100
Do.	Century open pit zinc-silver-lead mine [(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 <sup>3</sup>	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) (New Gold Inc., 100%)	8 km south of Cobar, NSW	8
Do.	Rosebery underground zinc-lead-silver-copper-gold mine [Minerals and Metals Group Australia Ltd., operator (China Minmetals Nonferrous Metals Co. Ltd., 100%)]	35 km north of Queenstown, TAS	100
Smelter	Port Pirie smelter (Nyrstar 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

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

<sup>1</sup>Abbreviations used for States and Territories in this table include the following: NSW—New South Wales; NT—Northern Territory; QLD—Queensland; SA—South Australia; TAS—Tasmania; VIC—Victoria; WA—Western Australia.

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

<sup>3</sup>On care-and-maintenance status; expansion project development decision pending.

<sup>4</sup>Formerly Glencore Xstrata plc.



TABLE 3  
AUSTRALIA: RESERVES OF MAJOR MINERAL COMMODITIES IN 2013

Commodity		Reserves <sup>1</sup>
Antimony, Sb content	thousand metric tons	135
Bauxite	million metric tons	6,460
Coal:		
Black, recoverable	billion metric tons	55
Brown, recoverable	do.	34
Cobalt, Co content	thousand metric tons	1,060
Copper, Cu content	million metric tons	93
Diamond	million carats	250
Gold, Au content	metric tons	9,770
Iron ore	billion metric tons	52
Lead, Pb content	million metric tons	35
Lithium, Li content	thousand metric tons	1,540
Magnesite, MgCO <sub>3</sub> content	million metric tons	318
Manganese ore	do.	228
Mineral sands:		
Ilmenite	do.	170
Rutile	do.	28
Zircon	do.	51
Molybdenum, Mo content	thousand metric tons	203
Nickel, Ni content	million metric tons	19
Niobium (columbium) and tantalum:		
Niobium (columbium), Nb content	thousand metric tons	205
Tantalum, Ta content	do.	67
Platinum-group metals (Pd, Pt)	metric tons	1
Rare earths (REO plus Y <sub>2</sub> O <sub>3</sub> )	thousand metric tons	3,190
Silver, Ag content	do.	85
Tin, Sn content	do.	366
Tungsten, W content	do.	162
Uranium, U content	do.	1,100
Vanadium, V content	do.	1,850
Zinc, Zn content	million metric tons	62

do. Ditto.

<sup>1</sup>Accessible economic demonstrated resources. Data are rounded to no more than three significant digits.

Source: Geoscience Australia, 2014, Australia's identified mineral resources—December 2013: Canberra, Australian Capital Territory, Australia, Geoscience Australia.