



# 2015 Minerals Yearbook

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**CANADA [ADVANCE RELEASE]**

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# THE MINERAL INDUSTRY OF CANADA

By James J. Barry

Canada has one of the largest economies in the world, ranking 10th based on nominal gross domestic product (GDP), and is a member of the Group of Seven (G7) nations. In 2015, the real GDP of Canada was \$1.3 trillion, which was a 1% increase compared with that of 2014. Canada is one of the leading mining nations in the world. It produces a wide array of industrial minerals, metals, and mineral fuels and has one of the largest mining supply sectors, with several thousand companies providing services to global mining operations. Vancouver, British Columbia, is the headquarters for the largest concentration of the world's mineral exploration companies, and Toronto, Ontario, is a global hub for mineral industry financing. The Toronto stock exchanges accounted for 53%, or almost \$5.5 billion,<sup>1</sup> of the world's mining equity capital in 2015. The Toronto Stock Exchange (TSE) and TSX Venture Exchange (TSX-V) listed between 50% and 60% of the world's publicly traded mining companies. Canadian mining companies operate in more than 100 countries, and the value of the country's assets abroad amounted to \$169.7 billion in 2014 (the most recent year for which data were available). Canadian companies were active in 33 nations in Africa and in every country in Latin America (Natural Resources Canada, 2016a; 2016d, p. 6; 2017a; Mining Association of Canada, 2017, p. 78, 84; World Bank Group, The 2017).

Canada was the world's leading producer of potash in 2015, accounting for 28% of world production. It was the second-ranked producer of niobium, accounting for 9% of world production. It was the third-ranked producer of aluminum, cobalt, gemstones, indium, nickel, and palladium, accounting for 5% of aluminum and cobalt, 17% of gemstones, 9% of indium, and 10% of nickel and of palladium. Canada was the fourth-ranked producer of ilmenite, salt, selenium, and sulfur, accounting for 10%, 5%, 7%, and 8%, respectively, of world production. Canada was the fifth-ranked producer of gold, accounting for 5% of the total, and it was the seventh-ranked producer of cadmium, accounting for 5% of the total. As reported by the Kimberley Process Certification Scheme, Canada was the third-ranked diamond producer, by value, and the third-ranked producer by weight. According to the World Nuclear Association, Canada was the second-ranked producer of uranium. Canada was also a leading natural gas- and crude petroleum-producing country, and, according to BP p.l.c., the country accounted for about 5% of the world total of both commodities in 2015 (BP p.l.c., 2016, p. 8, 22; Kimberley Process Certification Scheme, 2016; Anderson, 2017, p. 149; Apodaca, 2017, p. 164; Bedinger, 2017, p. 179; Bolin, 2017, p. 141; Bray, 2017, p. 23; George, 2017, p. 73; Jasinski, 2017, p. 129; Loferski, 2017, p. 127; Olson, 2017, p. 69; Papp, 2017, p. 117; Schnebele, 2017, p. 115;

Shedd, 2017, p. 53; Tolcin, 2017a, p. 43; 2017b, p. 81; World Nuclear Association, 2017).

## Minerals in the National Economy

In 2015, the mining, quarrying, and oil and gas extraction industries contributed \$105.7 billion to Canada's real GDP, which was a 3.5% decrease compared with that of 2014. The decrease was largely attributable to a nearly \$4 billion decrease in the value added by activities supporting the mining and oil and gas extraction sectors. Within the extraction industries, oil and gas extraction accounted for \$79 billion of real GDP, metal ore mining accounted for \$16.4 billion, nonmetallic mineral mining and quarrying accounted for \$3.6 billion, and coal mining accounted for \$1.2 billion (Statistics Canada, 2017a).

The mining industry employed 373,435 people in Canada in 2015. Primary metal manufacturing accounted for about 71,000 jobs and nonmetallic mineral product manufacturing for another 56,000 jobs. In 2015, 60,565 of the people who were directly employed in mining were involved in stage 1, or mineral extraction, activities, including about 36,000 people in metal mining, 18,000 in nonmetal mining, and 6,100 in coal mining. The number of people involved in stage 1 activities increased by 19% between 2007 and 2015. During the same period of time, the number of stage 2, or smelting and refining, jobs decreased by 13%. Employment in stage 2 activities decreased in 2009 and 2010 but rebounded in 2011 and 2012 before tapering off again. There were an estimated 22,000 jobs in oil-sands extraction and upgrading in 2015, not including indirect employees. More than 3,700 companies supplied goods and services to the mining industry. Support activities employed a reported 26,265 people in Canada in 2015, but this figure reflected only a fraction of those employed by mining support services (Mining Association of Canada, 2017, p. 26, 49–50, 56).

From 2011 through 2014, the cost of fuel and electricity consumed by mineral industry activities in Canada increased by an average annual rate of 7.6%; the cost of materials and supplies consumed by mineral industry activities increased by an average annual rate of 4%; and the cost of wages increased by an average annual rate of 9.3%. The value of Canada's mineral industry production decreased by an average annual rate of 4.6%, and the number of mineral industry establishments and workers increased by an average annual rate of 6% each. Between 2007 and 2015, employment in the mining and mineral manufacturing industries decreased by 27,675 to 373,435 employees. In 2015, however, employment specific to the mineral extraction stage increased to 60,565 compared with 50,925 in 2014. In 2014, international mineral commodity prices decreased steeply, and a projected trend of decreasing mineral commodity prices was expected to force a national economic adjustment towards growth in nonmineral sectors in Canada (Chamagne and others, 2016, p. 1; Mining Association of Canada, 2017, p. 56; Natural Resources Canada, 2017d).

<sup>1</sup>Where necessary values have been converted from Canadian dollars (CAD) to U.S. dollars (US\$) at an average annual exchange rate of CAD1.278=US\$1.00 for 2015 and CAD1.104=US\$1.00 for 2014.

At the Provincial and Territory level, since 2011, mining, quarrying, and oil and gas extraction accounted for the greatest share of the GDPs of Alberta, Newfoundland and Labrador, the Northwest Territories, Nunavut, Saskatchewan, and Yukon. British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, Prince Edward Island, and Quebec received the least share of their respective GDPs from mining, quarrying, and oil and gas extraction. Additionally, there was a significant gap in value between the high-earning and low-earning Provinces. Mining, quarrying, and oil and gas extraction contributed the greatest amount to the GDP of Newfoundland and Labrador through 2014, when the Northwest Territories took over the top spot. The share of mining as a part of the GDP in Newfoundland and Labrador decreased to 21% in 2015 from a high of 42% in 2011. In 2015, mining, quarrying, and oil and gas extraction accounted for 23% of the GDP in the Northwest Territories; in Saskatchewan, 21%; Alberta, 19%; Nunavut, 19%; Yukon, 10%; Manitoba, 3%; British Columbia, 2%; Nova Scotia, 1%; New Brunswick, 1%; Quebec, 1%; and Ontario, 1% (Statistics Canada, 2017b).

Conversely, Ontario was the leading Province in terms of exploration and deposit appraisal expenditures (\$344 million) followed by British Columbia (\$271 million), Quebec (\$203 million), Saskatchewan (\$201 million), Nunavut (\$168 million), Northwest Territories (\$79 million), Yukon (\$72 million), Newfoundland and Labrador (\$37 million), Manitoba (\$37 million), Alberta (\$14 million), Nova Scotia (\$8 million), and New Brunswick (\$7 million). Canada was the leading global destination for nonferrous metal exploration spending in 2015, but allocations decreased by 19% compared with that of 2014, marking the fourth consecutive year that Canada's share of international nonferrous metal exploration investment decreased. In 2015, current construction of major (undefined) projects accounted for about \$70 billion worth of investment in the mineral sector of Canada (Mining Association of Canada, 2017, p. 6; Natural Resources Canada, 2017b, c).

The value of Canada's domestic mining assets, which reportedly included 1,296 companies, increased by 8% in 2015 to about \$79 billion compared with that of 2014. In 2015, Canada's mining assets in the United States consisted of 291 companies that combined were valued at \$23 billion compared with \$21 billion in 2013. Assets of 159 Canadian companies operating in Mexico were valued at \$19 billion in 2015 compared with \$18 billion in 2014. Led by Argentina and Chile, the value of assets of the 217 Canadian companies operating in South America was \$49 billion in 2015 compared with \$51 billion in 2014. In Central America, Canadian mining assets consisted of 34 companies valued at a combined \$14 billion in 2015 compared with \$13 billion in 2014, and the value of assets of 70 companies in Europe was a combined \$11 billion in 2015 and \$10 billion in 2014. Canada's second largest mining destination, in terms of mining assets, was in Africa which consisted of 133 companies valued at \$25 billion in 2014 compared with \$23 billion in 2013. In the regions of Asia and Oceania, mining assets consisted of 108 companies valued at a combined \$13 billion in 2014 compared with \$14 billion in 2013 (Mining Association of Canada, 2017, p. 85).

Federal and Provincial or Territorial governments in Canada receive direct revenue from energy industries in the form of corporate income taxes; indirect taxes, including sales and payroll taxes; royalties to the Crown; and Crown land sales. Between 2010 and 2014, the average revenue received from energy industries included \$11.1 billion in royalties, \$4.4 billion in income tax, \$2.5 billion in land sales, and \$2 billion in indirect taxes (Natural Resources Canada, 2016c, p. 10).

## Government Policies and Programs

The Minerals and Metals Policy of the Government of Canada is the Federal policy that outlines and describes the Federal Government's role, objectives, and strategies for development of the country's mineral resources, but minerals are generally owned and managed by the government of the Province or Territory in which they occur, and each jurisdiction has its own mining, environmental, and occupational health and safety legislation. The three territories—Northwest Territories, Nunavut, and Yukon—have responsibilities for environmental assessment, land-use planning, and water resources, and generally operate under a system of co-management boards with representation from First Peoples groups (First Nations, Inuit, and Métis). In general, there are two types of First Peoples claims in Canada that are commonly referred to as land claims, including comprehensive claims and specific claims. In these areas, agreements are negotiated between the First Peoples group, the Government of Canada, and the Province or Territory (Government of Canada, 2017; Wacaster, 2017, p. 5.2).

New mines and some mine expansion projects are subject to Federal review and approval, in addition to Provincial or Territorial permitting requirements. Most major (undefined) mining projects in the country are subject to the Canadian Environmental Assessment Act of 2012 and may be subject to approvals under the Fisheries Act and the Navigation Protection Act. A Federal review of the Metal Mining Effluent Regulations was completed in 2015, and proposed amendments were expected in 2017 (Mining Association of Canada, 2016, p. 7–8; 2017, p. 8).

Mineral resources that underlie the continental shelf, Federal lands (including national parks), Indian Reserves, and offshore waters are owned by the Federal Government. Direct Federal regulation of mining operations is limited in scope, but includes those activities associated with the uranium fuel cycle from exploration to disposal of nuclear waste; activities related to Federal Crown corporations; and mining activities on Federal lands and offshore areas. The manufacture, sale, use, storage, and transportation of explosives used in exploration and mining in Canada are regulated under the Federal Explosives Act. The export, import, and transit across Canada of rough diamond are regulated under the Federal Export and Import of Rough Diamonds Act. Any written or oral mining disclosures made available to the public in Canada are governed by National Instrument 43–101 Standards for Disclosure in Mineral Projects (Kazaz and Fipke, 2012, p. 4; Natural Resources Canada, 2016e, p. 3).

Although the Provinces and Territories own the majority of the mineral rights in Canada, mineral rights may also be held by the Federal Government, First Peoples groups, or private

entities. The Federal, Provincial, and Territorial governments have shared regulatory responsibilities that are similar across jurisdictions, but each jurisdiction maintains its own distinct regulatory regime in terms of mineral management. Responsibilities that are generally in the Provincial or Territorial regime include exploration and development of resources; resource ownership and management; land-use decision-making; mining royalties and Provincial income taxes; resource exploration and development regulations; operational matters, including licensing, permitting, and monitoring; Provincial statistics; generation and distribution of electricity; and Provincial geoscience data. Mineral processing and further beneficiation are generally subject to the same legislative regimes that apply to mineral exploration and extraction, as the same Provincial, Territorial, or Federal statutes regulate all stages of the mining process. Most jurisdictions do not require mineral processing to take place within the Province or Territory of extraction with the exception of New Brunswick, Newfoundland and Labrador, and Nova Scotia. Local or municipal governments administer bylaws dealing with land-use planning and issuance of permits for construction, water supply and distribution, and waste management. First Peoples governments exercise powers over reserve lands and other territories covered by specific agreements negotiated with the Federal and Provincial governments. Such governance on reserves affords them many of the same powers and responsibilities as local, municipal, or Provincial governments (Lawson Lundell LLP, 2016, p. 68; Natural Resources Canada, 2016e, p. 9–10).

More-extensive coverage of Government policies and programs of Canada, including provisions for each Province and Territory, can be found in the 2014 U.S. Geological Survey Minerals Yearbook, volume III, Area Reports—International—Canada.

With respect to energy development in Canada, Federal and Provincial governments share responsibility. The Provinces have jurisdiction over the development of crude petroleum within the Provincial boundaries. The Government of Canada shares responsibility with the Provinces for energy production, environmental protection, and trade. The National Energy Board (NEB) regulates construction, operation, and abandonment of pipelines; construction and operation of international power lines and designated interprovincial power lines; imports of natural gas and exports of crude petroleum, natural gas liquids, natural gas, refined petroleum products, and electricity; and oil and gas exploration and production activities in specified areas that are not regulated under joint Federal and Provincial accounts. The NEB's responsibilities are described in the National Energy Board Act, the Canada Oil and Gas Operations Act, and the Canada Petroleum Resources Act. For certain projects, an environmental assessment is required by such Federal laws as the Canadian Environmental Assessment Act, the Mackenzie Valley Resource Management Act, and the Inuvialuit Final Agreement or Nunavut Land Claims Agreement (National Energy Board, 2017b).

## Production

The top 10 nonfuel mineral commodities produced in Canada in 2015 were, by value, gold, potash, copper, iron ore, nickel, coal, diamond, sand and gravel, cement, and stone;

they had a combined value of about \$28 billion. Production of many reported metals decreased by more than 10% in 2015 compared with that of 2014, including antimony, mined bismuth and bismuth metal, mined cadmium, cobalt metal, pig iron, molybdenum, mined silver, titanium, and mined zinc. Production of some commodities, including antimony, bismuth, cadmium, cobalt, pig iron, silver, and zinc, had decreased for two or more consecutive years. For many of these commodities, the decreased production was a result of continuing depressed global prices. The decrease in silver and zinc mine production was attributable to decreasing reserves. Production of other metals increased significantly, mainly in the refining and smelting sector owing to the lower cost of feedstock, including secondary refined copper metal, ferrosilicon, selenium, and refined silver. Sulfur from metallurgical processes was the only industrial mineral that had a significant decrease in 2015. Industrial minerals with production increases of greater than 10% include gemstones, peat, talc (including pyrophyllite and soapstone), and wollastonite. Favorable weather was largely responsible for the increased peat production, and the larger production capacity resulted in increased talc production. There were a number of mineral fuel commodities with significantly decreased production in 2015, largely owing to depressed global prices, including coal, natural gas liquids, and aviation gasoline. Asphalt and uranium were the only mineral fuels that had increases in production that were greater than 10% in 2015. Data on mineral production are in table 1 (Mining Association of Canada, 2016, p. 30).

## Structure of the Mineral Industry

As one of the world's most active mining countries, Canada had numerous mineral exploration, mine development, and mining projects underway. Canada's mineral industry is characterized by free enterprise in which private companies are involved in exploration, mine development, mineral production, mineral processing, and marketing. In 2014, the Mining Association of Canada reported that there were 1,192 operating mines in Canada—1,120 nonmetal mines and 72 mines producing metallic commodities. According to Natural Resources Canada, the country has 7,000 sand and gravel pits and stone quarries. Canada also has about 50 nonferrous smelters, refineries, and steel mills. Table 2 is a list of major mineral industry facilities (Natural Resources Canada, 2016d, p. 6; Mining Association of Canada, 2017, p. 13).

## Mineral Trade

Canada is one of the most open countries in the world in terms of trade and investment in mining and has few barriers to foreign ownership. The Canada-European Union Comprehensive Economic and Trade Agreement negotiations concluded in September 2014, and were sent forward to the European Union member countries for approval. Ratification of the treaty would lift nearly all tariffs between the two entities, reducing the costs of goods traded. By the end of 2016, Canada expected to have trade agreements with 51 countries. Canada also had Foreign Investment Promotion and Protection agreements with 37 countries; the stated objective of these agreements

was to maintain transparency in foreign investments (Natural Resources Canada, 2016d, p. 7).

In 2015, the value of domestic exports of minerals and mineral products (not including crude petroleum and petroleum products) was about \$72 billion, of which metals and metallic minerals accounted for 79%; nonmetallic minerals and industrial materials, for 17%; and coal and coke, for 4%. The Mining Association of Canada reported that the country's leading trade partner in 2015, in terms of value of mineral commodity exports, was the United States, followed by the countries of the European Union (EU) as an aggregate sum, China, and Japan (Mining Association of Canada, 2017, p. 112–114).

In 2015, the United States accounted for 57% of the value of Canada's metallic mineral exports; 58% of nonmetal mineral exports; and 12% of the combined total of coal and coke exports. The combined total of aluminum and iron and steel exports accounted for 52% of the value of metals exported to the United States from Canada. The value of exports to the countries of the EU accounted for 23% of Canada's metals exports, 9% of nonmetal mineral exports, and 9% of coal and coke exports. The combined total of gold, iron ore, and nickel exports accounted for 80% of the metals exports to the EU from Canada. China accounted for 4% of Canada's metals mineral exports, 6% of nonmetal mineral exports, and 15% of coal and coke exports. Copper and iron ore accounted for 54% of metals exports to China. Japan accounted for 3% of Canada's metallic mineral exports, less than 1% of nonmetal mineral exports, and 25% of coal and coke exports (Mining Association of Canada, 2017, p. 112–114).

Among mineral and mineral-product exports in 2015 (excluding crude petroleum and petroleum products), gold was the leading metallic mineral export, by value, accounting for 24% of the value of metals exports and 19% of the total value of mineral and mineral-product exports. The EU accounted for 54% of the value of gold exports. Iron and steel combined was the second-ranked metallic mineral export, by value, accounting for 19% of metals exports and 15% of the value of total mineral and mineral-product exports. The United States accounted for 87% of the value of iron and steel exports from Canada. Potash and potassium compounds combined were the leading nonmetallic mineral export, by value, accounting for 44% of nonmetal exports and 7% of the value of total mineral and mineral-product exports. The United States accounted for 53% of the value of potash and potassium compound exports from Canada. Diamond was the second-ranked nonmetallic mineral export, by value, accounting for 15% of nonmetal exports and 3% of the value of total mineral and mineral-product exports from Canada in 2015 (Mining Association of Canada, 2017, p. 112–114).

## Commodity Review

### *Metals*

**Aluminum.**—The majority of aluminum smelters in Canada were wholly or partially owned by Rio Tinto Alcan Inc., which was headquartered in Montreal. Between 2010 and 2015, the year-on-year percentage change in the production of primary refined aluminum varied by less than 7% and the average annual percentage change for the period was -0.6%, indicating that there were no major capacity expansions. During the same time,

the average annual percentage change in the price per pound of aluminum was 1%, but the year-on-year percentage change in price varied by as much as 37%, and the fluctuations in production totals displayed a negative correlation with the price per pound each year. Variations in production totals, therefore, appeared to be a function of the variation in aluminum prices. Upon full implementation of the Comprehensive Economic and Trade Agreement between Canada and the EU, tariffs rates ranging from 6.3% to 10% for aluminum and aluminum products would be removed (as would tariffs on most other goods, mineral or otherwise) on exports to the EU. The total value of aluminum and aluminum-product exports from Canada in 2015 was about \$8.2 billion; that of imports was about \$5.2 billion (Mining Association of Canada, 2017, p. 34, 80, 112, 115; InfoMine.com, 2017).

In 2015, Rio Tinto's Alma [Quebec] smelter produced 466,000 metric tons (t) of primary aluminum. Rio Tinto planned to increase production and reduce operating costs at the Alma facility by converting the company's proprietary AP30 series smelting technology to its AP44 series. The conversion results in increased amperage to aluminum reduction cells during electrolysis. The \$10 million project was expected to be completed in the second half of 2016. The Alouette smelter in Sept-Îles, Quebec, produced 606,000 t of aluminum in 2015, of which 242,000 t was Rio Tinto's share and the remainder was shared among multiple partners. The Arvida smelter in Saguenay, Quebec, produced 173,000 t of aluminum plus another 59,000 t from the facility's AP60 Technology Center. Other aluminum production included 437,000 t from the Becancour [Quebec] smelter, of which 109,000 t was Alcoa's share; 221,000 t from the Grande-Baie [Quebec] smelter; 110,000 t from the Kitimat [British Columbia] smelter; and 244,000 t from the Laterrière [Quebec] smelter. The remainder of primary aluminum production in 2015 came from Alcoa's wholly owned Baie Comeau [Quebec] and Deschambault [Quebec] smelters (CNW Group Ltd., 2015; Rio Tinto plc, 2016).

**Bismuth and Cadmium.**—Mine output of bismuth decreased for the fifth straight year to just 2 t in 2015, which was a 33% decrease compared with that of 2014. Mine output of cadmium decreased for the sixth consecutive year to 80 t in 2015, which was a 47% decrease compared with that of 2014 and a 97% decrease compared with a high of 2,403 t in 2010. Bismuth and cadmium are primarily obtained as byproducts of the production of concentrates from lead- and zinc-bearing ores and are minor components of these ores. The largest decreases in annual cadmium production (those that were recorded in 2011 and 2012) preceded significant decreases in mine production of both lead and zinc in 2013 and 2014, whereas the largest decrease in bismuth production took place in 2014. Reserves of lead and zinc in proven and probable minable ores at operating mines had decreased steadily since 1984, with little or no new additions each year. The closure of the Belledune [New Brunswick] smelter as well as of several mines in recent years were contributing factors in the decrease in reserves and production of lead and zinc. Annual production of cadmium metal, however, varied by 9% or less since 2011. The value of cadmium exports and imports in 2015 was about \$2 million and \$16 million,

respectively, compared with about \$8.8 million and \$1.2 million in 2010, indicating that Canada was increasingly relying on imports of cadmium-containing materials (including chemical compounds and scrap metal) to maintain the production level of refined cadmium. A similar inference may be made for bismuth metal, as the value of bismuth imports in 2015 was about \$3.2 million compared with \$2.1 million in 2010 (table 1; Mining Association of Canada, 2011, p. 112, 115; 2017, p. 32, 112, 115; Natural Resources Canada, 2016b).

**Cobalt.**—In 2015, Vale S.A.'s Port Colborne refinery produced 1,448 t of cobalt metal. Cobalt production in 2015 included 849 t from Vale S.A.'s Voisey's Bay Mine, 751 t from its Ontario Division (Sudbury) Mine, and 365 t from the Manitoba Division (Thompson) Mine, as well as 800 t from Glencore's Sudbury operations. The total value of cobalt and cobalt product exports from Canada in 2015 was about \$259 million; that of imports was about \$42 million (Vale S.A., 2016, p. 48, 49; Glencore plc, 2017, p. 63; Mining Association of Canada, 2017, p. 112, 115).

**Copper.**—Production of mined copper increased by 4% in 2015 compared with that of 2014 to 697,104 t. Since at least 2011, mined copper production has increased at an average annual rate of 5.5%. Production at three mines accounted for 45% of the copper produced in Canada in 2015. Teck Resources Ltd.'s Highland Valley [British Columbia] Mine, which was the primary source of the country's overall production increase, produced 151,400 t of copper in concentrate compared with 121,500 t in 2014; Vale's Ontario Division accounted for 101,100 t in 2015 compared with 103,000 t in 2014; and Taseko Mines Ltd.'s Gibraltar [British Columbia] Mine produced 64,500 t of copper in 2015 compared with 61,915 t in 2014 (Vale S.A., 2014, p. 11; 2016, p. 42; Taseko Mines Ltd., 2016; Teck Resources Ltd., 2016, p. 15).

Casino Mining Corp.'s (a wholly owned subsidiary of Western Copper and Gold Corp.) Casino Mine project, located 300 kilometers (km) northwest of Whitehorse, Yukon, was an advanced stage project with an estimated annual production potential of 111,000 t of copper, making it one of the biggest copper-producing mines in Canada and the largest mining operation in Yukon Territory. In January 2013, a bankable feasibility study was released that gave the project a strong economic rating in spite of the current low prices of copper. Based on the study, Goldman Sachs listed the Casino Mine project as having the best economics of any new copper project worldwide. Following the 2013 feasibility study, Casino went into the permitting phase, submitting an application to the Yukon Environmental and Socio-economic Board (YESB). In December 2015, Casino Mining Corp. submitted a second, required supplemental information report to the YESB. Mine production was expected to commence about 2 years after the completion of permitting and secured project financing (table 1; Proactive Investors Stocktube, 2015; Western Copper and Gold Corp., 2015; Topf, 2016; Casino Mining Corp., 2017).

**Gold.**—Gold production increased by 5% to about 161,000 kilograms (kg) in 2015 compared with that of 2014. Exploration for precious metals continued to receive the largest share of exploration spending in Canada in 2015 accounting for 45% of the total. Investment in precious metal exploration,

however, had decreased by more than \$780 million since 2011 owing in part to fluctuations in the price of gold, which decreased by 26% per troy ounce in 2015 compared with that of 2011. The value of gold exports in 2015 was about \$13.8 billion compared with \$14 billion in 2014 and that of gold imports was \$7.6 billion in 2015 compared with \$7.8 billion in 2014 (tables 1, 2; Mining Association of Canada, 2016, p. 105, 107; 2017, p. 38, 42, 112, 115).

Fortune Minerals Ltd.'s (Fortune) wholly owned Nico project in the Northwest Territories is an iron-oxide-hosted deposit that, along with the Sue-Dianne deposit, is part of the Great Bear magmatic zone within the Proterozoic Bear structural province of the Canadian Shield. This class of deposit, often referred to as iron-oxide-copper-gold (IOCG), has a wide variety of characteristics; debate exists regarding the classification of IOCGs, but they often are enriched in a variety of economic minerals, and relatively numerous deposits similar to this type are found in Canada compared with other areas of the world. IOCGs have greater than 20% iron oxides and otherwise encompass a wide spectrum of magnetite and or hematite ore bodies of hydrothermal origin with polymetallic mineralization that may contain bismuth, cobalt, copper, gold, niobium, rare-earth elements, silver, tantalum, and uranium; are genetically associated with large-scale continental magmatism, carbonatite stocks, crustal-scale fault zones, and characteristic regional alteration; are found in shallow to midcrustal levels in such extensional continental settings as rifts, magmatic arcs, and backarc basins; represent ore bodies that may greatly exceed 2 billion metric tons (Gt); and may be Proterozoic in age. Geologic mapping of the Nico deposit led to the identification of bismuth, cobalt, copper, and gold mineralization in amphibole-biotite-magnetite-sulfide-rich ironstone and schist. The nearby Sue-Dianne deposit is a hematite-magnetite-iron-silicate-cemented diatreme complex enriched in copper, gold, silver, and uranium within a broad zone of epidote, iron, potassium, and quartz metasomatism (Goad and others, 2000; Corriveau, 2007).

Based on estimated reserves, the \$460 million Nico project has a 20-year mine life. Based on the 2014 feasibility study and an updated feasibility study yet to be released, the Nico project was projected to have the capacity to produce an average of 1,750 metric tons per year (t/yr) of bismuth, 1,615 t/yr of cobalt, 265 t/yr of copper, and 1,286 kilograms per year (kg/yr) of gold. Once operational, concentrates from Nico were to be transported to a proposed Saskatchewan metals-processing plant. Cobalt chemicals, including cobalt sulfate heptahydrate (used in the manufacturing of lithium ion and nickel-metal-hydride rechargeable batteries) were planned to be the high-value chemicals processed at the plant. In addition to proven and probable reserves of about 37,000 t of cobalt, the company also planned to rely on reserves of about 46,000 t of bismuth, 12,000 t of copper, and 34,000 kg of gold to hedge against losses from potential price volatility among the various mineral commodities. In June 2014, Fortune announced that it had received its final land-use permit and water license approvals for construction and operation of the Nico Mine. The permits were issued following review and input from the Tlicho Government, Aboriginal Affairs and Northern Development Canada, Environment Canada, and

the government of the Northwest Territories. Construction was to commence once project financing was secured (Fortune Minerals Ltd., 2014; 2017a; 2017b, p. 6; 2017c).

In January 2015, construction began at New Gold Inc.'s Rainy River project following the Government's acceptance of the site's environmental assessment; the project was located about 65 km northwest of Fort Frances, Ontario. By the end of the year, construction at Rainy River was 30% complete, and initial production of gold was expected in mid-2017. Once production commences, the mine was expected to produce about 10,000 kg/yr of gold. Rainy River had proven and probable reserves of more than 118,000 kg of gold and 292,000 kg of silver. Pretivm Resources Inc.'s Brucejack project in northwestern British Columbia began construction on September 5, 2015, and commissioning was expected to take place in the second quarter of 2017. Brucejack had proven and probable reserves of almost 252,000 kg of gold, and it was projected to produce 12,600 kg/yr during the 18-year life of the mine and 15,700 kg/yr during the first 8 years of production (Pretivm Resources Inc., 2015, 2017; New Gold Inc., 2016, p. 3, 14, 69).

**Lead and Zinc.**—Production of mined lead increased slightly, by 2% in 2015 to 3,699 t compared with that of 2014. Aside from the slight increase in 2015, lead production had been decreasing year-over-year since 2011 owing to a near depletion of lead in minable reserves. After decreasing steadily since 1980, the lead content of proven and probable minable ore at operating mines in Canada reached 116,000 t in 2013, which was a 99% decrease compared with that of 1980. Meanwhile the amount of primary refined lead produced remained relatively stable and decreased by 4% in 2015 compared with that of 2014, presumably owing to a continued reliance on imported lead-containing materials. The value of lead imports to Canada was \$315 million in 2015 (table 1; Mining Association of Canada; 2017, p. 102, 105, 115).

Production of mined zinc decreased by 22% in 2015 to 275,410 t compared with that of 2014. It marked the third consecutive year of declining production and the second year in a row of a double-digit decrease. The decrease in production was, like lead, attributable to a decrease of zinc in minable reserves. After decreasing steadily since 1980, the zinc content of proven and probable minable ore at operating mines in Canada reached 3,532 t in 2013, which was an 87% decrease compared with that of 1980. The amount of primary refined zinc produced, however, remained relatively stable in recent years and decreased by an estimated 5% in 2015 compared with that of 2014 owing to a continued reliance on imported zinc-containing materials. The value of zinc imports to Canada was \$659 million in 2015 (table 1; Mining Association of Canada, 2017, p. 105, 115).

**Nickel.**—In 2015, nickel production was 225,351 t compared with 228,867 t in 2014. Vale's operations in Ontario (Sudbury), Manitoba (Thompson), and Voisey's Bay accounted for 59% of total production of mined nickel in 2015. An additional 22% of total production of mined nickel (49,100 t) was produced by Glencore's Sudbury operations (Glencore plc, 2017, p. 63; Vale S.A., 2017, p. 13).

**Platinum-Group Metals.**—Production of platinum-group metals (PGMs) as a whole decreased by 3% in 2015 to about 33,000 kg compared with that of 2014. The decreased PGM production in 2015 was owing to lower prices and a 7-week shutdown of North American Palladium Ltd.'s mill at the Lac des Iles Mine. Vale produced 10,606 kg of palladium in 2015 and North American Palladium produced 5,194 kg. North American Palladium and Vale accounted for 97% of Canada's palladium production in 2015 (table 1; North American Palladium Ltd., 2016; Vale S.A., 2017, p. 18).

**Silver.**—In 2015, silver production was 371 t compared with 495 t in 2014. Like lead and zinc, the silver content of proven and probable minable ore at operating mines in Canada decreased steadily to 5,212 t in 2013 from 33,804 t in 1980, which was an 85% decrease. There were minor increases in reserve estimates between 2009 and 2011 that were related to targeted exploration for silver as a result of slightly increased prices for precious metals. Depletion of reserves was a concern in Canada in the past few years as some commodity prices appeared to again be in decline and junior exploration companies faced difficulty raising capital to finance their work (table 1; Mining Association of Canada, 2017, p. 35, 105).

### *Industrial Minerals*

**Diamond.**—Canada's diamond production in 2015 decreased by 5% compared with that of 2014 to 11.7 million carats, of which 55% was accounted for by production from Rio Tinto's Diavik Mine. There were hundreds of known diamond deposits in Canada, most of which were not actively mined in 2015 owing to decreased exploration spending in recent years. Stormoway Diamond Corp. of Montreal began construction at its Renard project in Quebec in 2014. As of September 2015, the total reserves and resource estimate at Renard was 48.2 million carats of rough diamond. Commercial production from the kimberlite at the Renard Mine was to begin in 2016; production capacity was expected to reach 1.6 million carats per year by 2017, with an initial projected mine life of 14 years (table 1; Stormoway Diamond Corp., 2015, p. 11, 13; 2017; Rio Tinto plc, 2016, p. 215; Mining Association of Canada, 2017, p. 40, 46).

**Potash.**—In 2015, production of potash increased for the third consecutive year to 11.5 t from 11.3 t in 2014 and 10.2 million metric tons (Mt) in 2013. Potash Corporation of Saskatchewan Inc. operated the Allan, Cory, Lanigan, Patience Lake, Penobsquis, and Rocanville potash mines, the total combined production of which increased by 4% to 9.1 Mt, which accounted for 79% of the country's production in 2015. As of yearend 2015, construction at BHP Billiton Group's of Australia wholly owned Jansen potash project was 54% complete. Total reserves and resources estimates at Jansen as of June 30, 2015, included 6.59 Gt grading 25.6% potassium oxide (25.6% potassium oxide is equivalent to 40.5% potassium chloride) and 0.18% magnesium oxide. BHP Billiton held exploration permits and mining leases covering more than 16,000 square kilometers (km<sup>2</sup>) of mineral rights in Saskatchewan. The company was converting its exploration permits to long-term leases to allow for further evaluation and had secured 8,000 km<sup>2</sup> under long-term leases by yearend. The project was expected to ramp up to its nameplate

capacity of 10 million metric tons per year of agricultural-grade potassium chloride sometime after 2020, and it had an expected mine life of 50 years (BHP Billiton plc, 2014, p. 36; 2015, p. 79, 120; 2016, p. 9; Potash Corporation of Saskatchewan Inc., 2015, p. 38, 39, 120; 2017, p. 9).

### ***Mineral Fuels and Related Materials***

**Coal.**—Production of all types of coal decreased by 11% in 2015 compared with that of 2014, to about 62 Mt. Three companies were responsible for the majority of the coal production in Canada in 2015. Teck Resources Ltd. produced coal from six coal operations. Teck was the sole controlling company for four of those operations and was a joint-venture partner with Nittetsu Mining Co. of Japan and (or) POSCO Canada Ltd. (a subsidiary of POSCO of the Republic of Korea) for two of the operations. These operations, including the Cardinal River, Coal Mountain, Elkview, Fording River, Greenhills, and Line Creek Mines, accounted for an estimated 40% of Canada's coal production in 2015. Westmoreland Coal Co. of Englewood, Colorado, operated the Prairie operations, which consisted of the following eight mining complexes in Alberta and Saskatchewan: Bienfait, Boundary Dam, Coal Valley, Genesee, Obed Mountain, Paintearth, Poplar River, and Sheerness. Combined production from Westmoreland's Canadian operations was estimated to have accounted for 30% of the country's total production in 2015. Production from TransAlta Utilities Corp. of Alberta's Highvale Mine was estimated to have accounted for 15% of total production (tables 1, 2).

**Natural Gas.**—Natural gas in Canada was primarily sourced from the Western Canadian sedimentary basin in Alberta, British Columbia, and Saskatchewan. Natural gas from conventional sources has declined in recent years, whereas unconventional natural gas production using horizontal drilling and hydraulic fracturing have increased. The annual number of completed natural gas wells decreased to less than 2,000 wells in 2015 from nearly 16,000 in 2004, whereas the average annual number of meters drilled steadily increased to about 4,000 meters (m) from not quite 1,500 m during the same timeframe. Canada's technically recoverable resources of natural gas as of 2014 included between 8.5 and 8.6 trillion cubic meters of gas in conventional resources and between 16.4 and 35.5 trillion cubic meters in unconventional resources, including coal-bed methane, shale gas, and tight gas in other reservoir rocks. Canada's domestic natural gas supply exceeded consumption. Although Canada's natural gas markets were integrated with those in the United States, and Canada exported its surplus to the United States, there were no liquefied natural gas (LNG) production facilities in the country to facilitate overseas natural gas exports. There were several LNG projects in the country, but none were expected to be operational before 2020 (Natural Resources Canada, 2016c, p. 53, 55; National Energy Board, 2017a).

The Liard basin is a region that extends across the borders of British Columbia, the Northwest Territories, and Yukon, and it is part of the western Canada sedimentary basin. Conventional natural gas had been produced from the Liard basin since the late 1960s, and the Exshaw and Patry shales of this region could

contain 6 trillion cubic meters of marketable natural gas (that is, gas that is recoverable using existing technology and is in a condition to be used by the market, but has not yet subjected to an economic assessment) in unconventional reservoirs. Natural gas pipelines exist in the British Columbia, Northwest Territories, and Yukon jurisdictions, but despite the large size of the deposit, a variety of factors, including changing market conditions, regulatory processes, and opposition from First Nations and environmental organizations, may preclude development of these resources (Cattaneo, 2016; National Energy Board, 2016).

**Petroleum.**—In 2015, crude petroleum production was 1.43 billion barrels (Gbbbl), which was a 9% decrease compared with that of 2014. The country had 169.9 Gbbbl of proven crude petroleum reserves, of which 97% consisted of oil sands. In 2015, 99% of Canada's 1.1 Gbbbl of crude petroleum exports went to the United States, and the remainder went to Asia and Europe. Canada was the leading foreign supplier of crude petroleum to the United States, accounting for 43% of crude petroleum imports to the United States and 20% of its refinery crude petroleum intake. About 61% of Canada's oil production in 2015 was sourced from oil sands, and the remainder was from conventional, offshore, and tight oil production. About 92.6% of Canada's crude petroleum production came from two Provinces—Alberta (80%) and Saskatchewan (12.6%)—followed by Newfoundland and Labrador (4.4%), British Columbia (1.4%), Manitoba (1.2%), and others (0.4%) (table 1; Natural Resources Canada, 2016c, p. 28, 30, 31, 34).

### **Reserves and Resources**

Proven and probable reserves of some metals in Canada had been decreasing for several decades, particularly lead, silver, and zinc, which resulted in decreased production, whereas reserves of gold reached record highs and reserves of copper had rebounded. The long-term decrease in reserves of certain mineral commodities was the result of many factors, including trends of international mineral commodity prices and domestic and global economic trends, both of which can have a negative effect on the amount of capital available to junior mining companies that perform early stage exploration activities and rely on equity financing to do so. The total value of expenditures for exploration and deposit appraisal in Canada in 2015 was about \$1.3 billion, which was a 12% decrease compared with that of 2014. The Federal Government extended the Mineral Exploration Tax Credit and the super flow-through share provision (a financing tool available to Canadian resource companies that allows the companies to issue shares to investors at a higher price than it would normally receive) in the 2015 Federal budget. The reason for the extension was to assist financing and exploration efforts that were needed to address decreasing base-metal reserves. Proven and probable reserve estimates for some mineral commodities are listed in table 3 (Mining Association of Canada, 2016, p. 42; 2017, p. 35, 41, 46).

### **Outlook**

Canada is likely to maintain its position as a leading global mining country, and its mineral industry has the potential for continued expansions based on its mineral resource base and its



access to international markets. The expectation for decreased prices among metal commodities; uncertainty in terms of demand related to potentially slower global economic growth; potential excess global supply of certain mineral commodities, such as iron; and decreasing proven reserves of certain commodities, such as lead and zinc, however, are expected to temper the value of mining in 2016 and potentially beyond in the near term. Exploration activity is expected to continue to decrease into 2017 as both junior and senior mining exploration companies project decreases in exploration spending in the near term. Canada's mineral sector continues to be challenged by globalization of the industry, as many other countries are able to develop their mineral resources at lower costs than Canada. The governments of Federal, Provincial, and Territorial jurisdictions in Canada, however, were developing and expanding policies related to mining to meet the challenges for the medium- and long-term security of the sector while also addressing environmental and social demands.

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

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2011	2012	2013	2014	2015 <sup>P</sup>
<b>METALS</b>					
<b>Aluminum:</b>					
Alumina, aluminum oxide (Al <sub>2</sub> O <sub>3</sub> ), smelter grade	1,473,271 <sup>r</sup>	1,498,605 <sup>r</sup>	1,554,604 <sup>r</sup>	1,562,559 <sup>r</sup>	1,560,932
<b>Metal:</b>					
Primary	2,987,964	2,780,556	2,967,364 <sup>r</sup>	2,858,200	2,880,035
Secondary <sup>c</sup>	50,000	40,000	40,000	40,000	40,000
Total <sup>c</sup>	3,040,000	2,820,000	3,010,000	2,898,000 <sup>r</sup>	2,920,035
Antimony <sup>3</sup>	--	--	177 <sup>r</sup>	5	1
<b>Bismuth:</b>					
Mine output, Bi content <sup>3,4</sup>	136	110	103	3	2
Metal, refined <sup>c</sup>	150	145	100	100	55
<b>Cadmium:</b>					
Mine output, Cd content <sup>3</sup>	1,766 <sup>r</sup>	290 <sup>r</sup>	188 <sup>r</sup>	150 <sup>r</sup>	80
Metal, refined	1,240	1,286	1,313	1,187	1,159
<b>Cobalt:</b>					
Mine output, Co content <sup>3,5</sup>	6,836	6,676	7,168	6,907 <sup>r</sup>	6,904
Metal, refined	6,038	5,994	5,602 <sup>r</sup>	5,491 <sup>r</sup>	5,359
<b>Copper:</b>					
Mine output, Cu content <sup>3</sup>	568,779 <sup>r</sup>	580,082 <sup>r</sup>	652,595 <sup>r</sup>	672,729 <sup>r</sup>	697,104
<b>Metal:</b>					
<b>Smelter:</b>					
Primary, blister	304,724	287,051	254,509	288,699 <sup>r</sup>	281,416
Secondary	25,214	23,362	28,743	32,069 <sup>r</sup>	28,713
Total	329,938	310,413	283,252	320,768 <sup>r</sup>	310,129
<b>Refined:</b>					
Primary <sup>c</sup>	244,000	246,000	286,000	295,000	295,000
Secondary <sup>c</sup>	30,000	30,000	35,000	30,000	35,900
Total	274,000	276,000	321,000	325,000	330,900
Gold, mine output, Au content	102,624 <sup>r</sup>	107,486 <sup>r</sup>	133,636 <sup>r</sup>	152,460 <sup>r</sup>	160,751
Inidium, metal <sup>c</sup>	64,000	65,000	64,000	65,000	70,000
<b>Iron and steel:</b>					
<b>Iron ore and concentrate:</b>					
Gross weight	33,573	39,457	41,841	44,196	46,220
Fe content <sup>c</sup>	21,000	25,000	26,000	27,000	27,000
<b>Metal:</b>					
Pig iron <sup>6</sup>	7,323	7,654	6,100	6,718 <sup>r</sup>	5,851
Direct-reduced iron <sup>6</sup>	702	842	1,250	1,550	1,502
<b>Ferroalloys, electric arc furnace:<sup>c</sup></b>					
Ferrosilicon	31	32	39 <sup>r</sup>	32 <sup>r</sup>	38
Silicon metal	30	30	12 <sup>r</sup>	30	30
Ferroniobium	8 <sup>r</sup>	8 <sup>r</sup>	8	8	8
Ferrovandium	1	1	1	1	1
Total	70	71 <sup>r</sup>	60 <sup>r</sup>	71 <sup>r</sup>	77
Crude steel	12,891	13,507	12,417 <sup>r</sup>	12,703 <sup>r</sup>	12,475
<b>Lead:</b>					
Mine output, Pb content	67,505 <sup>r</sup>	64,116 <sup>r</sup>	20,678 <sup>r</sup>	3,617 <sup>r</sup>	3,699
<b>Metal, refined:</b>					
Primary	112,531	133,495	128,706	130,827 <sup>r</sup>	127,264
Secondary	170,059	145,655 <sup>r</sup>	153,075 <sup>r</sup>	150,629 <sup>r</sup>	141,600
Total	282,590	279,150 <sup>r</sup>	281,781 <sup>r</sup>	281,456 <sup>r</sup>	268,864

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2011	2012	2013	2014	2015 <sup>P</sup>
METALS—Continued					
Molybdenum, mine output, Mo content	8,674	8,954	8,952 <sup>r</sup>	8,681 <sup>r</sup>	2,505
Nickel:					
Mine output, Ni content <sup>3</sup>	219,025	211,701	227,743 <sup>r</sup>	228,867 <sup>r</sup>	225,351
Refined <sup>7</sup>	142,445	146,850 <sup>r</sup>	152,728 <sup>r</sup>	149,486 <sup>r</sup>	146,233
Niobium (columbium) and tantalum:					
Pyrochlore concentrate:					
Gross weight <sup>c</sup>	13,800	14,000	16,000	16,000	16,000
Nb content of ferroniobium	4,632	4,707	5,236	5,600	5,385
Tantalite concentrate:					
Gross weight <sup>c</sup>	40	80	20	NA	NA
Ta content (Ta <sub>2</sub> O <sub>5</sub> ) kilograms	--	37,000	9,000	NA	--
Nb content do.	1,000	2,500	500	NA	NA
Platinum-group metals, mine output:					
Palladium <sup>c</sup> do.	14,300 <sup>r</sup>	14,200 <sup>r</sup>	16,800 <sup>r</sup>	21,000 <sup>r</sup>	20,400
Platinum <sup>c</sup> do.	8,000	8,500 <sup>r</sup>	9,300 <sup>r</sup>	11,700 <sup>r</sup>	11,600
Others (iridium, rhodium, ruthenium) <sup>c</sup> do.	800	800	1,400 <sup>r</sup>	1,700 <sup>r</sup>	1,200
Total do.	23,595 <sup>r</sup>	23,535 <sup>r</sup>	27,574 <sup>r</sup>	34,395 <sup>r</sup>	33,248
Selenium	128	145	138	142	156
Silver:					
Mine output, Ag content kilograms	661,089	685,255 <sup>r</sup>	640,362 <sup>r</sup>	495,403 <sup>r</sup>	371,000
Refined do.	1,555,855	1,675,998	1,745,638	1,525,135 <sup>r</sup>	1,891,692
Tellurium <sup>4,8</sup> do.	6,000	11,000	12,000	10,000	10,000
Titanium, Sorelslag <sup>c,9</sup>	878,000	900,000	900,000	900,000	700,000
Tungsten, mine output, W content <sup>4</sup>	1,966	2,194	2,128	2,344	2,289
Zinc:					
Mine output, Zn content	622,600	641,134	426,545 <sup>r</sup>	352,125 <sup>r</sup>	275,410
Metal, refined, primary	662,151	648,619 <sup>r</sup>	651,638 <sup>r</sup>	649,217 <sup>r</sup>	683,000 <sup>e</sup>
INDUSTRIAL MINERALS					
Cement thousand metric tons	12,001	12,465	11,611	11,879	12,331
Clinker do.	11,100	12,155	10,977	10,930	11,514
Diamond thousand carats	10,795	10,451	10,560	12,276	11,677
Gemstones, includes amethyst and jade	42	178	554	6,382	8,233
Gypsum and anhydrite thousand metric tons	2,449	1,832	1,837	1,811	1,726
Lime <sup>4</sup> do.	1,959	1,964	1,856	1,945	1,852
Nepheline syenite do.	610	592 <sup>e</sup>	674	670	614
Nitrogen, N content of ammonia do.	3,946	3,942	3,942	3,807 <sup>r</sup>	4,140
Peat do.	1,122	973	1,295	1,153	1,297
Potash, K <sub>2</sub> O equivalent do.	11,055	8,984	10,211	11,345	11,462
Salt do.	12,625	10,845	12,210	13,876	14,343
Sand and gravel:					
Construction do.	206,974	225,208	225,208	227,611	228,030
Industrial (silica, quartz) <sup>4</sup> do.	1,431	1,593	1,593	103,157	2,053
Stone do.	167,716	151,838	152,512	146,566	158,034
Sulfur, byproduct:					
Metallurgy do.	609	638	699	649	558
Natural gas and petroleum do.	5,914	5,545	5,666	5,265	5,187
Total do.	6,523	6,183	6,365	5,914	5,745
Talc, pyrophyllite, soapstone <sup>c</sup> do.	116	130	175	81	175
Wollastonite	--	--	--	3,005	5,521

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>	2011	2012	2013	2014	2015 <sup>P</sup>	
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Coal, run of mine:						
Bituminous and subbituminous <sup>c</sup>	thousand metric tons	57,100	57,000	59,000	59,100	51,700
Lignite <sup>c</sup>	do.	10,000	10,000	10,000	10,000 <sup>r</sup>	10,000
Total	do.	67,114 <sup>r</sup>	66,563 <sup>r</sup>	68,908 <sup>r</sup>	69,116 <sup>r</sup>	61,703
Natural gas:						
Gross	million cubic meters	188,849	185,000	185,000	194,000 <sup>c,r</sup>	196,000 <sup>c</sup>
Marketed	do.	145,285	141,274	141,396	147,151 <sup>r</sup>	149,111
Natural gas liquids:						
Gas plant production	thousand 42-gallon barrels	169,837	337,282	350,000 <sup>c</sup>	350,000 <sup>c</sup>	208,000 <sup>c</sup>
Refinery production	do.	16,240	32,325	35,000 <sup>c</sup>	35,000 <sup>c</sup>	23,000 <sup>c</sup>
Total	do.	186,077	369,607	385,000 <sup>c</sup>	385,000 <sup>c</sup>	231,000 <sup>c</sup>
Petroleum:						
Crude	do.	1,282,975	1,365,100	1,451,605	1,566,580	1,432,500
Refinery products:						
Liquefied petroleum gases	do.	20,266 <sup>r</sup>	18,140 <sup>r</sup>	10,705 <sup>r</sup>	7,334 <sup>r</sup>	9,718
Gasoline:						
Aviation <sup>10</sup>	do.	25,807 <sup>r</sup>	29,883 <sup>r</sup>	31,399 <sup>r</sup>	32,701 <sup>r</sup>	23,134
Motor	do.	244,636 <sup>r</sup>	251,504 <sup>r</sup>	246,428 <sup>r</sup>	242,390 <sup>r</sup>	258,159
Diesel fuel oil	do.	166,472 <sup>r</sup>	182,379 <sup>r</sup>	178,209 <sup>r</sup>	177,083 <sup>r</sup>	176,618
Heavy fuel oil	do.	43,752 <sup>r</sup>	48,130 <sup>r</sup>	42,223 <sup>r</sup>	34,160 <sup>r</sup>	31,267
Light fuel oil <sup>11</sup>	do.	57,979	51,092	42,972	34,481	35,210
Asphalt	do.	26,430 <sup>r</sup>	27,348 <sup>r</sup>	10,642 <sup>r</sup>	13,819	25,449
Other petroleum products <sup>12</sup>	do.	112,078 <sup>r</sup>	99,731 <sup>r</sup>	101,153 <sup>r</sup>	80,289 <sup>r</sup>	83,787
Total	do.	677,155 <sup>r</sup>	690,068 <sup>r</sup>	653,027 <sup>r</sup>	622,257 <sup>r</sup>	643,341
Uranium oxide, U content		9,145	8,998 <sup>r</sup>	9,331 <sup>r</sup>	9,101 <sup>r</sup>	13,279

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

<sup>1</sup>Table includes data available through October 4, 2016.

<sup>2</sup>In addition to the commodities listed, aluminum hydroxide Al(OH)<sub>3</sub> (hydrate), asbestos, barite, brucite, carbon black, cesium, coke, diatomite, dolomite, graphite, ilmenite, magnesite, mica, phosphate rock, pumice, silicon metal, sodium sulfate, spodumene, and zeolites were produced, but available information was inadequate to make reliable estimates of output.

<sup>3</sup>Metal content of concentrates produced.

<sup>4</sup>Producers' shipments and quantities used by producers.

<sup>5</sup>Cobalt content of all products derived from Canadian ores, which include cobalt oxide shipped to the United Kingdom for further processing and nickel-cobalt matte shipped to Norway for refining.

<sup>6</sup>Source of iron and steel data: World Steel Association (Worldsteel).

<sup>7</sup>Nickel contained in products of smelters and refineries in forms that were ready for use by consumers.

<sup>8</sup>Includes metal refined from imports and secondary sources; also includes metal content of exported concentrates.

<sup>9</sup>Refined Sorelslag® has been upgraded to 95% titanium oxide.

<sup>10</sup>Includes aviation gasoline and aviation turbo fuels.

<sup>11</sup>Includes stove oil, kerosene, and tractor fuel.

<sup>12</sup>Includes petrochemical feedstocks, naphtha specialties, petroleum coke, lubricating oils and greases, still gas, and other products.

TABLE 2  
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina		Rio Tinto Group, 100%	Vaudreuil refinery, Jonquiere, Quebec	1,559.
Do.		Axens IFP Group Technologies, 100%	Brockville refinery, Brockville, Ontario	18.
Aluminum		Alcoa Inc., 100%	Smelter in Baie-Comeau, Quebec	280.
Do.		Rio Tinto Alcan Inc., 40%; Aluminium Austria Metall Québec, 20%; Hydro Aluminum, 20%; Marubeni Financement Québec Inc., 13.33%; Société Générale de Financement du Québec, 6.67%	Alouette smelter in Sept-Iles, Quebec	606.
Do.		Alcoa Inc., 75%, and Rio Tinto Alcan Inc., 25%	Becancour smelter in Becancour, Quebec	446.
Do.		Alcoa Inc., 100%	Deschambault smelter in Deschambault, Quebec	260.
Do.		Rio Tinto Group, 100%	Alma smelter in Alma, Quebec	466.
Do.		do.	Arvida smelter in Arvida, Jonquiere, Quebec	236.
Do.		do.	Grande-Baie smelter in Grande-Baie, Quebec	225.
Do.		do.	Kitimat smelter in Kitimat, British Columbia	420.
Do.		do.	Laterrière smelter in Laterrière, Quebec	244.
Ammonium sulfate	metric tons	Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	NA.
Barite		MarFred Minerals Ltd.	Tracey Lake barite property, North Williams, Ontario	NA.
Do.		Fireside Minerals Ltd.	Fireside Mine, Fireside, British Columbia	NA.
Bentonite		Canadian Clay Products Inc.	Wilcox, Saskatchewan	NA.
Cadmium metal		Noranda Income Fund, 100%	Valleyfield refinery, Quebec	NA.
Do.		Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	100.
Cement		Ciment Québec Inc.	Saint-Basile, Quebec	1,571.
Do.		Colacem Canada Inc. (Colacem S.p.A.)	Grenville-sur-la-Rouge, Quebec	300.
Do.		ESSROC Canada Inc. (Italcementi Group)	Picton, Ontario	792.
Do.		Federal White Cement Ltd.	Woodstock, Ontario	544.
Do.		Holcim (Canada) Inc. (Holcim AG)	Joliette, Quebec	1,475.
Do.		do.	Mississauga, Ontario	2,000.
Do.		Lafarge Canada Inc. (Lafarge North America)	Bath, Ontario	1,176.
Do.		do.	Grinding plant, Stoney Creek, Ontario	814.
Do.		do.	Exshaw, Alberta	1,422.
Do.		do.	Kamloops, British Columbia	324.
Do.		do.	Richmond, British Columbia	1,319.
Do.		do.	St. Constant, Quebec	1,157.
Do.		do.	Brookfield, Nova Scotia	621.
Do.		Lehigh Inland Cement Ltd. (Heidelberg Cement Group)	Edmonton, Alberta	1,380.
Do.		do.	Delta, British Columbia	1,356.
Do.		St. Marys Cement (Canada) Inc. (Votorantim Cimentos S.A.)	Bowmanville, Ontario	1,800.
Do.		do.	St. Marys, Ontario	645.
Coal		Anglo American plc, 100%	Trend open pit mine, near Tumbler Ridge, British Columbia	2,000.
Do.		Up Energy Dev. Group Ltd., 85.31%, and Winsway Coking Coal Holdings Ltd., 14.69%	Grande Cache Mine, near Grande Cache, Alberta <sup>1</sup>	3,600.
Do.		Teck Resources Ltd., 100%	Fording River open pit mine, near Elkford, British Columbia	8,500.
Do.		do.	Cardinal River operations, near Hinton, Alberta	200.
Do.		do.	Coal Mountain open pit mine at Sparwood, British Columbia	2,700.
Do.		do.	Line Creek Mine, near Sparwood, British Columbia	3,500.
Do.		Teck Resources Ltd., 95%, Nittetsu Mining Co. Ltd., 2.5%; POSCO Canada Ltd., 2.5%	Elkview open pit mine, near Sparwood, British Columbia	7,000.

See footnotes at end of table.

TABLE 2—Continued  
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Coal:—Continued	Teck Resources Ltd., 80%, and POSCO Canada Ltd., 20%	Greenhills open pit mine, near Elkford, British Columbia	5,200.	
Do.	TransAlta Utilities Corp., 100%	Highvale open pit mine, near Seba Beach, Alberta	13,000.	
Do.	Walter Energy, Inc., 100%	Willow Creek Mine, Tumbler Ridge, British Columbia	1,500.	
Do.	do.	Brule Mine, Tumbler Ridge, British Columbia	2,000.	
Do.	do.	Wolverine Mine, Tumbler Ridge, British Columbia	2,000.	
Do.	Westmoreland Coal Co., 100%	Coal Valley Mine, near Edson, Alberta	5,200.	
Do.	do.	Obed Mountain Mine, Alberta	5,200.	
Do.	do.	Boundary Dam open pit mine, near Estevan, Saskatchewan	6,500.	
Do.	do.	Poplar River open pit mine, near Coronach, Saskatchewan	3,600.	
Do.	do.	Bienfait open pit mine, near Bienfait, Saskatchewan	2,800.	
Do.	do.	Genesee open pit mine, near Warburg, Alberta	5,600.	
Do.	do.	Sheerness open pit mine, near Hanna, Alberta	3,000.	
Do.	do.	Paintearth open pit mine, near Forestburg, Alberta	3,500.	
Cobalt	metric tons	Glencore plc, 100%	Raglan Mine in Ungave, Quebec	700.
Do.	do.	Vale S.A., 100%	Ontario Operations, Ontario	700.
Do.	do.	KGHM Polska Miedź S.A.	Sudbury Operations, Ontario	NA.
Do.	do.	Vale S.A., 100%	Copper Cliff refinery and smelter in Sudbury, Ontario	NA.
Do.	do.	do.	Port Colborne refinery, Ontario	NA.
Do.	do.	do.	Voisey's Bay, Newfoundland and Labrador	NA.
Do.	do.	Glencore plc, 100%	Sudbury smelter in Sudbury, Ontario	NA.
Do.	do.	Vale S.A., 100%	Long Harbour hydrometallurgy smelter, Newfoundland and Labrador	NA.
Do.	do.	Sherritt International Corp., 100%	Fort Saskatchewan, Alberta	4,000.
<b>Copper:</b>				
Ore, Cu content	Agnico-Eagle Mines Ltd., 100%	LaRonde Mine, about 650 kilometers northwest of Montreal, Quebec	5.	
Do.	Copper Mountain Mining Corp., 75%, and Mitsubishi Materials Corp., 25%	Copper Mountain Mine, British Columbia	48.	
Do.	Teck Resources Ltd., 97.5%, and Highmont Mining Co., 2.5%	Highland Valley Copper Mine, Kamloops, British Columbia	125.	
Do.	Imperial Metals Corp., 50%; Mitsubishi Materials Corp., 31.25%; Dowa Metals & Mining Co., Ltd., 6.25%; Furukawa Co., Ltd., 6.25%; Marubeni Corp., 6.25%	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	32.	
Do.	Imperial Metals Corp., 100%	Mount Polley Mine at Williams Lake, British Columbia	25.	
Do.	North American Palladium Ltd., 100%	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	2.	
Do.	Nyrstar N.V., 100%	Langlois Mine, 313 kilometers northeast of Val-d'Or, Quebec	39.	
Do.	do.	Myra Falls complex, British Columbia	4.	
Do.	KGHM Polska Miedź S.A., 100%	Sudbury operations, Ontario	30.	
Do.	Capstone Mining Corp., 100%	Minto Mine, Yukon	21.	
Do.	Taseko Mines Ltd., 75%; Lojitz Corp., 12.5%; Dowa Holdings Col Ltd., 6.25%; Furukawa Co. Ltd., 6.25%	Gibraltar Mine, British Columbia	63.	

See footnotes at end of table.

TABLE 2—Continued  
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Copper:—Continued				
Ore, Cu content—Continued	Teck Resources Ltd., 100%	Duck Pond Mine, about 100 kilometers southwest of Grand Falls-Windsor, Newfoundland and Labrador	19.	
Do.	Vale S.A., 100%	Ontario Division, Ontario	110.	
Do.	do.	Voisey's Bay Mine, Newfoundland and Labrador	55.	
Do.	First Nickel Inc., 100%	Lockerby Mine, <sup>2</sup> Sudbury district, Ontario	3.	
Do.	Glencore plc, 100%	Kidd Creek Mine, about 20 kilometers north of Timmins, Ontario	46.	
Do.	do.	Nickel Rim South Mine, Sudbury Division, Sudbury, Ontario	18.	
Do.	do.	Raglan Mine in Ungave, Quebec	7.	
Do.	Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	5.	
Smelter	Glencore plc, 100%	Horne smelter in Noranda, Quebec	194.	
Do.	Vale S.A., 100%	Copper Cliff smelter in Sudbury, Ontario	NA.	
Do.	Glencore plc, 100%	Sudbury smelter, Ontario	131.	
Do.	Vale S.A., 100%	Long Harbour hydrometallurgy smelter, Newfoundland and Labrador	NA.	
Refinery	Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	276.	
Do.	Taseko Mines Ltd., 75%; Lojitz Corp., 12.5%; Dowa Holdings Col Ltd., 6.25%; Furukawa Co. Ltd., 6.25%	Gibraltar solvent extraction-electrowinning (SX-EW) facility, British Columbia	1.	
Do.	Vale S.A., 100%	Copper Cliff refinery in Sudbury, Ontario	NA.	
Do.	Cobalt Refinery Co. Inc., 100%	Fort Saskatchewan refinery	NA.	
Do.	Noranda Income Fund, 100%	Valleyfield refinery, Quebec	NA.	
Do.	Vale S.A., 100%	Voisey Bay refinery, Newfoundland and Labrador	NA.	
Do.	Government, 100%	Royal Canadian Mint, Ottawa, Ontario	NA.	
Diamond	thousand carats	Rio Tinto plc, 60%, and Dominion Diamond Corp., 40%	Diavik open pit mine (includes the A154 North and the A154 South kimberlite pipes), northeast of Yellowknife region, Northwest Territories	10,000.
Do.	do.	Dominion Diamond Corp., 88.9%, and unnamed owner 11.1%	Ekati Mine (includes the Koala and the Panda underground mines and the Beartooth, Fox, Koala, and Misery open pit mines) in the Lac de Gras region, Northwest Territories	5,000.
Do.	do.	De Beers Group, 100%	Snap Lake underground mine, 220 kilometers northeast of Yellowknife, Northwest Territories	16,000.
Do.	do.	do.	Victor open pit mine, 90 kilometers west of Attawapiskat, Ontario	600.
Diatomite	Absorbent Products Ltd.	Red Lake deposit, British Columbia	NA.	
Dolomite and limestone	Atlantic Minerals Ltd. (Newfoundland Cement Co. Ltd., 100%)	Lower Cove, Newfoundland and Labrador	800.	
Do.	Nova Scotia Power Inc.	Glen Morrison quarry, Cape Breton, Nova Scotia	NA.	
Do.	Antigonish Limestone Ltd.	Southside Antigonish Harbour, Nova Scotia	NA.	
Do.	Mosher limestone Co. Ltd.	Upper Musquodoboit, Nova Scotia	NA.	
Do.	Lafarge Canada Inc.	Brookfield, Brookfield, Nova Scotia	NA.	
Do.	do.	Bath, Ontario	NA.	
Do.	do.	Woodstock, Ontario	NA.	
Do.	Graymont Inc.	Havelock quarry, Havelock, New Brunswick	NA.	
Do.	do.	Faulkner, Manitoba	NA.	
Do.	Holcim (Canada) Inc. (Holcim AG)	Joliette, Quebec	NA.	
Do.	do.	Ogden Point quarry, Victoria, British Columbia	NA.	
Do.	ESSROC Canada Inc	Picton, Ontario	NA.	

See footnotes at end of table.



TABLE 2—Continued  
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners		Location of main facilities	Annual capacity
Dolomite and limestone— Continued		St. Marys CBM (Canada) Inc.		Bowmanville, Ontario	NA.
Do.		do.		St. Marys, Ontario	NA.
Gold					
Ore, Au Content	kilograms	Agnico-Eagle Mines Ltd.		Goldex Mine, Val-d'Or, Quebec	5,000.
Do.	do.	do.		Lapa Mine, about 60 kilometers west of Val-d'Or, Quebec	4,000.
Do.	do.	do.		LaRonde Mine, about 60 kilometers west of Val-d'Or, Quebec	9,300.
Do.	do.	do.		Meadowbank Mine, about 70 kilometers north of Baker Lake, Nunavut Territory	10,000.
Do.	do.	QMX Gold Corp.		Lac Herbin Mine, Quebec	1,000.
Do.	do.	Anaconda Mining Inc.		Pine Cove Mine, near Baie Verte, Newfoundland and Labrador	500.
Do.	do.	Aurizon Mines Ltd.		Casa Berardi Mine, about 95 kilometers north of La Sarre, Quebec	5,000.
Do.	do.	Aurico Gold Inc.		Young-Davidson Mine, Larder-Cadillac Break, 487 kilometers northwest of Toronto, Ontario	5,400.
Do.	do.	Barkerville Gold Mines Ltd.		QR Mine, British Columbia	400.
Do.	do.	Barrick Gold Inc.		Hemlo operation, includes David Bell underground mine and Williams open pit and underground mine, about 350 kilometers east of Thunder Bay, Ontario	7,100.
Do.	do.	Brigus Gold Corp.		Black Fox Mine, about 75 kilometers east of Timmins, Ontario	2,800.
Do.	do.	Capstone Mining Corp.		Minto Mine, about 240 kilometers northwest of Whitehorse, Yukon Territory	600.
Do.	do.	Claude Resources Inc.		Seabee operations (includes the Seabee Deep and the Santoy 8 Mines), Laonil Lake, Saskatchewan	1,500.
Do.	do.	Detour Gold Corp.		Detour Lake Mine, 208 kilometers northeast of Timmins, Cochrane District, Ontario	20,400.
Do.	do.	Goldcorp Inc.		Hoyle Pond Mine, 20 kilometers northeast of Timmins, Eastern Ontario District, Ontario	2,300.
Do.	do.	do.		Musselwhite Mine, 480 kilometers north of Thunder Bay, Ontario	8,100.
Do.	do.	do.		Porcupine Mine, Timmins, Ontario	10,000.
Do.	do.	do.		Red Lake Mine (includes Red Lake and the Campbell complexes), 180 kilometers north of Dryden, Ontario.	26,000.
Do.	do.	Golden Band Resources Inc.		EP Mine and Roy Lloyd Mine, Saskatchewan	1,500.
Do.	do.	Imperial Metals Corp., 50%; Mitsubishi Materials Corp., 31.25%; Dowa Metals & Mining Co., Ltd., 6.25%; Furukawa Co., Ltd., 6.25%; Marubeni Corp., 6.25%		Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	110.
Do.	do.	IAMGOLD Corp., 100%		Westwood Mine, 40 kilometers east of Rouyn-Noranda, Quebec	4,200.
Do.	do.	Kirkland Lake Gold Inc., 100%		South Mine complex (Macassa Mine, Ontario)	2,400.
Do.	do.	Tahoe Resources Inc., 100%		Bell Creek Mine, northeast of Timmins, Ontario, and Timmins West Mine, 18 kilometers west of Timmins, Ontario	1,500.
Do.	do.	Metanor Resources Inc., 100%		Bachelor Lake Mine and mill, about 225 kilometers northeast of Val-d'Or, Quebec	1,200.

See footnotes at end of table.

TABLE 2—Continued  
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold—Continued				
Ore, Au content—				
Continued	kilograms	KGHM Polska Miedz S.A. GK, 100%	Sudbury operations, Ontario	NA.
Do.	do.	Imperial Metals Corp., 100%	Mt. Polley Mine, 8 kilometers southwest of Likely, British Columbia	1,200.
Do.	do.	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	400.
Do.	do.	Nyrstar N.V., 100%	Myra Falls complex, British Columbia	300.
Do.	do.	Agnico Eagle Mines Ltd., 50%, and Yamana Gold Inc., 50%	Canadian Malartic Mine, about 20 kilometers west of Val d'Or, Quebec	17,000.
Do.	do.	Richmont Mines Inc., 100%	Beaufor Mine, about 21 kilometers northeast of Val-d'Or, Quebec	800.
Do.	do.	Richmont Mines Inc., 100%	Island Gold Mine, near Dubreuilville, Ontario	1,200.
Do.	do.	Klondex Mines Ltd., 100%	Rice Lake Mine, Manitoba	2,500.
Do.	do.	Stroud Resources Ltd., 100%	Hislop Mine, Ontario	600.
Do.	do.	Kirkland Lake Gold Inc., 100%	Holloway Mine, Ontario	700.
Do.	do.	do.	Holt Mine, Ontario	2,700.
Do.	do.	Vale S.A., 100%	Manitoba division (includes the Birchtree Mine and the Thompson Mine), Thompson, Manitoba	NA.
Do.	do.	do.	Ontario division, Ontario	2,500.
Do.	do.	Wesdome Gold Mines Ltd., 100%	Eagle River Mine, about 50 kilometers west of Wawa, Ontario	1,900.
Do.	do.	do.	Kiena Mine, about 10 kilometers west of Val-d'Or, Quebec	1,300.
Do.	do.	Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	628.
Refinery		Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	300.
Do.		Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	NA.
Do.		Government, 100%	Royal Canadian Mint, Ottawa, Ontario	NA.
Graphite		Imerys Graphite and Carbon	Saint Aime du Lac des Iles, Quebec	NA.
Gypsum		Mosher Limestone Co. Ltd.	Upper Musquodoboit, Nova Scotia	NA.
Do.		National Gypsum (Canada) Ltd.	East Milford quarry, Milford, Nova Scotia	3,100.
Do.		CertainTeed Gypsum Canada, Inc.	Amaranth Mine, Harcus, Manitoba	NA.
Do.		CGC Inc.	Hagersville Mine, Hagersville, Ontario	NA.
Ilmenite (titanium production)		QIT Fer Et Titane Inc., 100%	Lac Tio Mine, Havre Saint Pierre, Quebec	600.
Indium	metric tons	do.	do.	70.
Iron and steel:				
Iron ore:				
Ore		ArcelorMittal Inc., 85%, and POSCO-China Steel Consortium, 15%	Fire Lake and Mont-Wright open pit mines, Quebec	24,000.
Do.		Rio Tinto Ltd., 58.72%; Mitsubishi Corp., 26.18%; Labrador Iron Ore Royalty Income Fund, 15.1%	Carol Lake (IOC) open pit mine, Labrador City, Newfoundland and Labrador	23,000.
Pellets		ArcelorMittal Mines Canada Inc. (ArcelorMittal)	Pelleting plant, Port Cartier, Quebec	9,000.
Do.		Cliffs Natural Resources Inc.	Pelleting plant, Pointe Noire, Quebec	5,200.
Do.		Iron Ore Company of Canada (Rio Tinto Ltd., 58.72%; Mitsubishi Corp., 26.18%; Labrador Iron Ore Royalty Income Fund, 15.1%)	Pelleting plant, Labrador City, Newfoundland and Labrador	13,000.
Steel, crude		AltaSteel Ltd. (Arrium Ltd.)	Edmonton, Alberta	320.
Do.		ArcelorMittal Dofasco Inc. (ArcelorMittal SA)	Hamilton, Ontario	4,100.
Do.		ArcelorMittal Montreal Inc. (ArcelorMittal SA)	Contrecoeur East and Contrecoeur West plants, Quebec	2,500.
Do.		Essar Steel Algoma Inc. (Essar Global Ltd.)	Sault Ste. Marie, Ontario	2,800.

See footnotes at end of table.

TABLE 2—Continued  
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Iron and steel:—Continued				
Steel, crude— Continued	Gerdau Steel North America Inc. (Gerdau S.A.)	Whitby, Ontario	790.	
Do.	do.	Selkirk, Manitoba	430.	
Do.	do.	Cambridge, Ontario	380.	
Do.	Hamilton Speciality Bar (2007) Inc.	Hamilton, Ontario	360.	
Do.	Ivaco Rolling Mills Inc.	L'Orignal, Ontario	450.	
Do.	MMFX Steel of Canada Inc. (MMFX Technologies Corp.)	Welland, Ontario	120.	
Do.	QIT-Fer et Titane Inc. (Rio Tinto Iron and Titanium Inc.)	Sorel, Quebec	500.	
Do.	SSAB Svenskt Stål AB—IPSCO Division	Regina, Saskatchewan	1,500.	
Do.	U.S. Steel Canada Inc. (United States Steel Corp.)	Lake Erie Works, Nanticoke, Ontario	2,400.	
Lead:	Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	6.	
Refinery	Teck Resources Ltd., 100%	Trail Operations, Trail, British Columbia	NA.	
Smelter	do.	do.	100.	
Secondary, includes alloys	NovaPb Inc. (Newalta Corp.)	Ville Sainte Catherine, Quebec	100.	
Do.	Tonolli Canada Ltd.	Mississauga, Ontario	35.	
Do.	Metalex Products Ltd.	Richmond, British Columbia	8.	
Lime	Graymont Inc.	Havelock, New Brunswick	110.	
Do.	do.	Bedford, Bedford, Quebec	400.	
Do.	do.	Faulkner, Manitoba	117.	
Do.	Brookville Manufacturing Co.	Brookville, Saint John, New Brunswick	NA.	
Do.	E.C. King Contracting Ltd	Owen Sound, Ontario	NA.	
Magnesite	Baymag Inc.	Mount Brussilof Mine, British Columbia	NA.	
Molybdenum	metric tons	Teck Resources Ltd., 97.5%, and Highmont Mining Co., 2.5%	Highland Valley copper mine, Kamloops, British Columbia	5,000.
Do.	do.	Imperial Metals Corp., 50%; Mitsubishi Materials Corp., 31.25%; Dowa Metals & Mining Co., Ltd., 6.25%; Furukawa Co., Ltd., 50%; Marubeni Corp., 6.25%	Huckleberry Mine, 123 kilometers southwest of Houston, British Columbia	140.
Do.	do.	Taseko Mines Ltd., 75%; Sojitz Corp., 12.5%; Dowa Holdings Co. Ltd., 6.25%; Furukawa Co. Ltd., 6.25%	Gibraltar Mine, British Columbia	1,200.
Do.	do.	Thompson Creek Metals Company Inc., 75%, and Sojitz Moly Resources, Inc., 25%	Endako Mine, near Fraser Lake, about 160 kilometers northwest of Prince George, British Columbia	5,200.
Mica (phlogopite)	Imerys Mica Suzorite, Inc	Mauricie, Quebec, Canada	NA.	
Nepheline syenite	Unimin Canada Ltd.	Blue Mountain quarry, Methuen Township, Ontario	NA.	
Do.	do.	Nephton quarry, Methuen Township, Ontario	NA.	
Nickel:				
Ore, Ni content	First Nickel Inc., 100%	Lockerby Mine, <sup>2</sup> Sudbury district, Ontario	5.	
Do.	KGHM Polska Miedź S.A., 100%	Morrison (Levac) Mine, Sudbury, Ontario	6.	
Do.	Vale Canada Ltd. (Vale S.A.)	Ontario Operations, Ontario	85.	
Do.	do.	Manitoba division (includes the Birchtree Mine and the Thompson Mine), Thompson, Manitoba	45.	
Do.	Vale Newfoundland & Labrador Ltd. (Vale S.A.)	Voisey Bay Mines (includes the Ovoid Mine), Newfoundland and Labrador	80.	
Do.	Glencore plc, 100%	Raglan Mine in Ungave, Quebec	29.	
Do.	do.	Fraser Mine and Nickel Rim South Mine in the Sudbury district, Ontario	20.	
Do.	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	800.	

See footnotes at end of table.

TABLE 2—Continued  
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners		Location of main facilities	Annual capacity
Nickel:—Continued				
Smelter	Vale S.A., 100%		Copper Cliff Smelter in Sudbury, Ontario	NA.
Do.	do.		Smelter in Thompson, Manitoba	82 (Ni anode).
Do.	Glencore plc, 100%		Sudbury smelter in Sudbury, Ontario	131 (Cu-Ni matte).
Do.	Vale S.A., 100%		Long Harbour hydrometallurgy smelter, Newfoundland and Labrador	50.
Refinery	The Cobalt Refinery Company Inc. (Moa joint venture of General Nickel S.A., 50%, and Sherritt International Corp., 50%)		Fort Saskatchewan refinery, Fort Saskatchewan, Alberta	35 (Ni briquets and powder); 4 (Co briquets and powder).
Do.	Vale S.A., 100%		Copper Cliff refinery in Sudbury, Ontario	NA.
Do.	do.		Thompson refinery in Thompson, Manitoba	NA.
Do.	Glencore plc, 100%		CCR refinery in Montreal-Est, Quebec	NA.
Do.	do.		Port Colborne refinery, Ontario	NA.
Do.	Vale S.A., 100%		Voisey Bay refinery, Newfoundland and Labrador	NA.
Petroleum, refinery products	barrels per day	Chevron Canada Ltd. (Chevron Corp., 100%)	Burnaby refinery, Burnaby, British Columbia	55,000.
Do.	do.	Consumers' Co-operative Refineries Ltd. (Federated Co-operatives Ltd., 100%)	Regina, Saskatchewan	100,000.
Do.	do.	Husky Energy Inc.	Prince George refinery, Prince George, British Columbia	10,000.
Do.	do.	do.	Lloydminster asphalt refinery, Lloydminster, Alberta	25,000.
Do.	do.	Imperial Oil Ltd. (Exxon Mobil Corp., 69.6%)	Dartmouth refinery, Halifax, Nova Scotia	82,000.
Do.	do.	do.	Nanticoke refinery, 40 kilometers southwest of Hamilton, Ontario	112,000.
Do.	do.	do.	Sarnia refinery, Sarnia, Ontario	121,000.
Do.	do.	do.	Strathcona refinery, Edmonton, Alberta	187,000.
Do.	do.	Irving Oil Ltd.	Irving refinery, Saint John, New Brunswick	250,000.
Do.	do.	Moose Jaw Refinery (Gibson Energy ULC)	Moose Jaw asphalt refinery, Moose Jaw, Saskatchewan	4,100.
Do.	do.	North Atlantic Refining Ltd. (Harvest Operations Corp.)	North Atlantic refinery, Come by Chance, Newfoundland and Labrador	115,000.
Do.	do.	Nova Chemicals Corp.	Corunna petrochemical and refinery complex, Corunna, Ontario	80,000.
Do.	do.	Shell Canada Ltd. (Royal Dutch Shell plc, 100%)	Scotford refinery, 40 kilometers northeast of Edmonton, Alberta	100,000.
Do.	do.	do.	Sarnia manufacturing center (Corunna refinery), Sarnia, Ontario	72,000.
Do.	do.	Suncor Energy Inc.	Edmonton refinery, Edmonton, Alberta	135,000.
Do.	do.	do.	Montreal refinery, Montreal East, Quebec	129,800.
Do.	do.	Ultramar Ltd. (Valero Energy Corp., 100%)	Jean Gaulin refinery, Levis, Quebec	265,000.
Platinum	kilograms	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	4,800.
Do.	do.	Vale S.A., 100%	Ontario Operations, Ontario	5,000.
Do.	do.	KGHM Polska Miedz S.A., 100%	Sudbury Operations, Ontario	NA.
Smelter	do.	Vale S.A., 100%	Copper Cliff smelter in Sudbury, Ontario	NA.
Refinery	do.	Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	NA.
Do.	do.	Vale S.A., 100%	Copper Cliff refinery in Sudbury, Ontario	NA.
Do.	do.	do.	Port Colborne refinery, Ontario	NA.
Palladium	kilograms	North American Palladium Ltd.	Lac des Iles Mine, about 85 kilometers northwest of Thunder Bay, Ontario	4,800.
Do.	do.	KGHM Polska Miedz S.A., 100%	Sudbury Operations, Ontario	NA.
Do.	kilograms	Vale S.A., 100%	Ontario Operations, Ontario	6,000.

See footnotes at end of table.

TABLE 2—Continued  
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Palladium—Continued				
Refinery	Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	NA.	
Do.	Vale S.A., 100%	Port Colborne refinery, Ontario	NA.	
Do.	do.	Copper Cliff refinery in Sudbury, Ontario	NA.	
Smelter	do.	Copper Cliff smelter in Sudbury, Ontario	NA.	
Do.	do.	Copper Cliff refinery in Sudbury, Ontario	NA.	
Perlite	Le Groupe Berger Ltée	Saint-Modeste quarry, Saint-Modeste, Quebec	NA.	
Do.	do.	Sarnia refinery, Sarnia, Ontario	85,000.	
Potash (K <sub>2</sub> O equivalent)	Agrium Products Inc.	Vanscoy, Saskatchewan	3,000.	
Do.	The Mosaic Co.	Colonsay, Saskatchewan	2,100.	
Do.	do.	Esterhazy, southeast Saskatchewan	5,300.	
Do.	do.	Belle Plaine, Saskatchewan	2,800.	
Do.	Potash Corp. of Saskatchewan Inc. (Potash Corp.)	Lanigan, near Lanigan, Saskatchewan	3,800.	
Do.	do.	Rocanville, southeast Saskatchewan	3,000.	
Do.	do.	Allan Division, Allan, Saskatchewan	4,000.	
Do.	do.	Cory, near Saskatoon, Saskatchewan	3,000.	
Do.	do.	Penobsquis Mine, New Brunswick	300.	
Do.	do.	Patience Lake, near Saskatoon, Saskatchewan	NA.	
Salt	Canadian Salt Co. Ltd.	Rock salt mine at Ojibway, Ontario	2,600.	
Do.	do.	Pugwash, Nova Scotia	1,400.	
Do.	Potash Corp. of Saskatchewan Inc. (Potash Corp.)	Sussex, New Brunswick	700.	
Do.	Sifco Canada Inc. (Compass Minerals Group Inc.)	Goderich Harbour, Ontario	6,500.	
Do.	Seleine Mines Division of Canadian Salt Co. Ltd.	Iles-de-la-Magdalen, Quebec	1,625.	
Do.	Mosaic Potash Esterhazy Limited Partnership Ltd. [The Mosaic Co., 75%, and Potash Corp. of Saskatchewan Inc. (Potash Corp.), 25%]	Esterhazy, southeast Saskatchewan	NA.	
Do.	NSC Minerals Inc.	Salt recovery from potash tailings at Rocanville and Vanscoy, Saskatchewan	NA.	
Do.	Nexen Inc. and Albchem Industries Ltd.	Plant near Bruderheim, Alberta	NA.	
Do.	Dow Chemical Canada Inc.	Fort Saskatchewan, Alberta	NA.	
Do.	Junex Solnat (Junex Inc.)	Becancour, Quebec	NA.	
Do.	Saskatoon Chemicals Holdings, Inc.	Plant near Saskatoon, Saskatchewan	NA.	
Do.	Sifco Canada Inc. (Compass Minerals Group Inc.)	Amherst, Nova Scotia	NA.	
Do.	do.	Plant near Unity, Saskatchewan	NA.	
Do.	Canadian Salt Co. Ltd.	Belle Plaine, Saskatchewan	NA.	
Do.	do.	Lindberg, Alberta	NA.	
Silicon, metal	Québec Silicon Ltd. (Globe Speciality Metals Inc., 51%, and Dow Corning Corp., 49%)	Plant at Becancour, Quebec	47.	
Silver:				
Ore, Ag content	kilograms	Imperial Metals Corp., 100%	Mount Polley Mine at Williams Lake, British Columbia	13,000.
Do.	do.	Glencore plc, 100%	Kidd Creek underground mine, 25 kilometers north of Timmins, Ontario	115,000.
Do.	do.	Teck Resources Ltd., 100%	Duck Pond Mine, about 100 kilometers southwest of Grand Falls-Windsor, Newfoundland and Labrador	13,300.
Do.	do.	Capstone Mining Corp., 100%	Minto Mine, about 240 kilometers northwest of Whitehorse, Yukon Territory	7,600.
Do.	do.	KGHM Polska Miedź S.A., 100%	Sudbury Operations, Ontario	NA.
Do.	do.	Nyrstar N.V., 100%	Myra Falls complex, British Columbia	17,000.
Do.	do.	do.	Langlois Mine, 313 kilometers northeast of Val-d'Or, Quebec	11,500.

See footnotes at end of table.

TABLE 2—Continued  
CANADA: STRUCTURE OF THE MINERAL INDUSTRY IN 2015

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Silver:—Continued				
Ore, Ag content— Continued	kilograms	Agnico Eagle Mines Ltd., 50%, and Yamana Gold Inc., 50%	Canadian Malartic Mine, about 20 kilometers west of Val d'Or, Quebec	18,500.
Do.	do.	Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	153,000.
Refinery		Glencore plc, 100%	CCR refinery in Montreal-Est, Quebec	NA.
Do.		Teck Resources Ltd., 100%	Trail refinery, Trail, British Columbia	NA.
Do.		Government, 100%	Royal Canadian Mint, Ottawa, Ontario	NA.
Smelter		Glencore plc, 100%	Belledune smelter, New Brunswick	NA.
Talc		IMERYS Talc	Penhorwood Mine, Ontario, Canada	NA.
Titanium, TiO <sub>2</sub> slag		Fer et Titane, Inc., 100%	Sorel-Tracy, Quebec	1,100 (Sorelslag <sup>®</sup> ); 250 (UGS <sup>™</sup> slag); NA (RTCS <sup>™</sup> slag).
Tungsten, WO <sub>3</sub> content		North American Tungsten Corporation Ltd., 100%	Cantung Mine, Northwest Territories	3,500.
Uranium:				
Oxide	metric tons	Cameco Corp., 69.81%, and Areva S.A., 30.19%	McArthur River Mine, Saskatchewan	9,300.
Dioxide		Cameco Corp., 100%	Port Hope conversion facility, Port Hope, Ontario	NA.
Trioxide		do.	Blind River refinery, Ontario	NA.
Hexafluoride		do.	Port Hope conversion facility, Port Hope, Ontario	NA.
Vermiculite		Le Groupe Berger Ltée	Saint-Modeste quarry, Saint-Modeste, Quebec	NA.
Wollastonite		Canadian Wollastonite (2005948 Ontario Ltd.)	St. Lawrence Mine, City of Kingston and the municipality of Leeds and the Thousand Islands, Ontario	NA.
Zeolites		HCA Mountain Minerals (Lethbridge) Ltd. (Heemskirk Canada Ltd.)	Processing plant at Lethbridge, Alberta	NA.
Do.		Heemskirk Canada Ltd. (Heemskirk Consolidated Ltd.)	Bromley Creek (Princeton) Mine, near Copper Mountain, British Columbia	NA.
Do.		do.	Z1 (Ranchlands) quarry, near Cache Creek, British Columbia	NA.
Do.		Industrial Mineral Processors Ltd.	Z2 quarry, near Cache Creek, British Columbia	NA.
Do.		do.	Processing plant at Ashcroft, British Columbia	NA.
Do.		Absorbent Products Ltd.	Red Lake deposit, British Columbia	NA.
Zinc:				
Lead-zinc ore		Agnico-Eagle Mines Ltd., 100%	LaRonde Mine, 60 kilometers west of Val-d'Or, Quebec	55.
Do.		Yukon Zinc Corp., 100%	Wolverine Mine, Yukon	53.
Zinc ore		Nyrstar N.V., 100%	Langlois Mine, 313 kilometers northeast of Val-d'Or, Quebec	39.
Do.		do.	Myra Falls complex, British Columbia	35.
Do.		Teck Resources Ltd.	Duck Pond Mine, 90 kilometers south of Buchans, Newfoundland and Labrador	34,200.
Do.		Glencore plc, 100%	Kidd Creek underground mine, 25 kilometers north of Timmins, Ontario	80.
Refined		Noranda Income Fund, 100%	Valleyfield refinery, Quebec	290.
Do.		Hudson Bay Mining and Smelting Co., Ltd. (HudBay Minerals Inc., 100%)	Zinc plant (pressure leach and electrowinning) at Flin Flon, Manitoba	115.
Do.		Teck Resources Ltd.	Trail Operations, Trail, British Columbia	295.
Do.		do.	CEZ refinery, Quebec	NA.

Do., do. Ditto. NA Not available.

<sup>1</sup>Closed December 2015.

<sup>2</sup>Closed August 2015.

TABLE 3  
CANADA: RESERVES OF MAJOR MINERALS IN 2015

(Thousand metric tons unless otherwise specified)

Commodity		Reserves
Coal (anthracite, bituminous, subbituminous, and lignite)	million tons	6,582 <sup>1</sup>
Copper		11,198
Gold	metric tons	2,158
Lead		116
Molybdenum		145
Natural gas	billion cubic meters	2,000 <sup>1</sup>
Nickel		2,673
Petroleum, crude	million barrels	172.2 <sup>1</sup>
Silver	metric tons	5,212
Zinc		3,532

<sup>1</sup>Source: BP p.l.c.

Source: Mining Association of Canada unless otherwise specified.