



# 2012 Minerals Yearbook

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## LATIN AMERICA AND CANADA

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# THE MINERAL INDUSTRIES OF LATIN AMERICA AND CANADA

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The Latin America and Canada region (including the Caribbean) (LAC) that is covered in this volume includes about 50 countries and dependencies. These countries and dependencies have a combined population of approximately 684 million people and a land area of 30.5 million square kilometers (these figures do not include the population or the land area of the United States, although those figures are included in the totals for the Americas in table 1). According to the Economic Commission for Latin America and the Caribbean (ECLAC), in 2012, the contribution of mining and quarrying activities accounted for 16.6% of the gross domestic product (GDP) of the Caribbean region, 6.1% of the GDP of Latin America and the Caribbean combined, and 6.0% of the GDP of Latin America alone. The average percentage of the total employed population in the mineral sector in Latin America and the Caribbean was 2.4% and ranged from 0% to 11.9% in the countries for which data were available. Direct employment in the mineral industry accounted for about 2% of Canada's total employment (table 1; Statistics Canada, 2014).

In 2012, Brazil, Canada, and Chile maintained leading positions in the global mineral industry. Brazil was the world's leading producer of kaolin and niobium, the second-ranked producer of tantalum, the third-ranked producer of asbestos and iron ore (gross weight), and the regional leader in the production of bauxite, mined graphite, manganese, phosphate rock, silicon, crude steel, and vermiculite. Canada was the world's leading producer of potash, the second-ranked producer of niobium, the third-ranked producer of cobalt (was replaced by China as the second-ranked producer), the fourth-ranked producer of palladium (was replaced by the United States as the third-ranked producer), and the fourth-ranked producer of titanium minerals (ilmenite); it was the regional leader in the production of aluminum, indium (refined), nickel, platinum, tellurium, and tungsten. Chile was the world's leading producer of copper (mine output), iodine, lithium, and rhenium; the second-ranked producer of boron; and the third-ranked producer of molybdenum.

Argentina, Bolivia, Mexico, and Peru were also among the world's leading producers of base and precious metals and industrial minerals. Argentina was the world's second-ranked producer of boron, and Bolivia was the world's third-ranked producer of antimony. Mexico was the world's leading producer of silver, the second-ranked producer of bismuth, fluor spar, and wollastonite; the third-ranked producer of strontium; and the region's leading producer of barite and gypsum. Peru was the world's third-ranked producer of mined copper, silver, tin, and zinc and the region's leading producer of mined gold and lead (U.S. Geological Survey, 2014).

In the region in 2012, Colombia was the leading producer of coal and had the largest proven reserves of coal. Venezuela had the region's leading natural gas and petroleum reserves and was the fourth-ranked producer of natural gas. Mexico was the leading producer of crude petroleum, followed by Venezuela, Brazil, Colombia, Argentina, and Ecuador (BP p.l.c., 2013, p. 30).

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## General Economic Conditions

According to the International Monetary Fund (IMF), which made downward revisions to its GDP outlook data in its annual World Economic Outlook report for 2012, the year-on-year global real GDP decreased to 3.2% in 2012 from 3.9% in 2011. The downward trend is attributed to decreased economic growth in large emerging markets and relatively restrictive global financial conditions as a result of the decision by the U.S. Federal Reserve to begin tapering down bond purchases by the U.S. Department of the Treasury (International Monetary Fund, 2013b, c).

In response to the financial crisis that led to the global economic downturn of 2008–09, the central bank of some countries introduced measures in the form of quantitative easing, whereby the central bank buys assets, primarily Government bonds and mortgage bonds. As a result, the prices of Government bonds increase and bond yields decrease, which results in lower long-term borrowing costs for banks, households, and companies. A number of central banks, including those in Japan, the United Kingdom, and the United States, employed such quantitative easing, among other monetary policies, to stimulate their economies (Sveriges Riskbank, 2013, p. 40–44).

By 2011, as growth in the U.S. economy accelerated, and following an increase in employment in the United States, the Federal Reserve announced a plan to normalize its monetary policy, and the first step was to gradually reduce the number of bond purchases. Long-term U.S. interest rates increased sharply in response, and the prices of Government bonds, mortgage bonds, and corporate bonds fell internationally, as did share prices. International investors sought to reduce their holdings of high-risk assets in emerging markets at the same time that several of those markets were showing weak economic growth, which led to sharp decreases in the value of currency in several countries, including Brazil, which was the largest economy in the LAC. The downward trend in Brazil's currency valuation continued throughout 2012 and well into 2013 (Sveriges Riskbank, 2013, p. 40–44).

According to IMF estimates, the global GDP growth rate decreased to 2.9% in 2013 and was projected to increase to 3.6% in 2014; these rates were, respectively, 0.7% and 0.5% lower than the previous year's projections. Global economic growth was projected to hover closely around 4% each year through 2018. The economic growth in all LAC countries combined was estimated to have decreased to about 2.9% in 2012 from 4.6% in 2011 as a result of decreased external demand and some degree of supply-side constraints. Of countries for which data is reported in table 2, 67% had decreased GDP growth in 2012 compared with that of 2011. The country that had the greatest decrease in GDP growth in the LAC in 2012 compared with that of 2011 was Argentina, whose year-on-year GDP decreased to 1.9% from 8.9%. The decrease was owing in part to a series of foreign exchange controls implemented in 2012 that created a gap between the country's official exchange rate and the market exchange rate and resulted in a tax hike to the export sector as earnings were disbursed in local currency using the official exchange rate, which did not reflect the country's inflation (table 2; IHS Corp., 2012; International Monetary Fund, 2013b).

The Canadian economy, which went through a strong recovery in 2010 (reflected in a GDP growth rate of 3.4%), had relatively slower but still positive growth in 2011 and 2012 of 2.5% and 1.7%, respectively, owing in part to the high prices received for some mineral commodities. Decreased growth in 2012, however, was attributed to domestic fiscal policies that were designed to balance Federal and Provincial budgets through spending cuts, as well as from decreased domestic demand brought about in part by record-high household debt in the country. Canadian GDP growth was projected to remain below 2% in 2013 and to hover between about 2% and 2.5% through 2018 (International Monetary Fund, 2013a, p. 6–7).

Economic growth in the LAC remained sluggish into the first half of 2013. Decreased growth had been expected as a result of the original rebound and subsequent moderation of activity after the global economic downturn in 2008–09, and economic activity had moderated in most countries of the region. There was, however, a significant and unexpected decrease in economic activity in Mexico—brought on, in part, by an unexpected slowdown in construction, weak external demand, and lower public expenditures—and in Brazil, which was continuing to recover from its economic downturn that began in 2011. The region in general was considered to be somewhat resilient to external economic shocks owing to its relatively moderate levels of external debt, large official reserves, typically sound banking systems, and flexible exchange rates. South American commodity-exporting countries, however, were vulnerable to any greater than expected economic slowdown in large emerging markets, particularly China, which could cause a large drop in commodity prices (International Monetary Fund, 2013b).

In the first half of 2013, average export volumes increased by just 0.5%, and export prices decreased among the region's more financially integrated economies of Brazil, Chile, Colombia, Mexico, Peru, and Uruguay. Economic growth in those countries was projected to slow to about 3.5% in 2013 owing to a decrease in external and domestic demand. Economic growth in Brazil was projected to be about 2.5% in 2013. That growth was expected to come more from a rebound in investment than from increased private consumption because real wage growth had moderated, the number of new jobs had decreased, and supply constraints continued. Economic activity in Mexico was expected to normalize owing to a projected increase in demand from the United States and planned increases in public spending (International Monetary Fund, 2013b).

Argentina and Paraguay increased their agricultural outputs in 2012, and the GDPs of both countries were expected to increase in 2013 as a result. In Venezuela, economic activity was expected to decrease in 2013 as shortages of goods and supply bottlenecks were common and inflation had exceeded 45% in 2012. In Bolivia and Ecuador, economic activity was expected to remain strong owing to higher prices for crude oil and natural gas and to favorable economic policies (International Monetary Fund, 2013b).

In Central America and the Dominican Republic, economic growth was projected to decrease to less than 3% in 2013, as weak external demand related to the region's reliance on trade with the United States had negatively affected economic

activity. Panama, however, still had a high rate of growth owing to large capital spending on the Panama Canal expansion. Excluding Guatemala, current account deficits in excess of 5% of the GDP remained a threat to economic growth in these countries, all of which were petroleum importing countries. Those deficits had been financed by foreign direct investment (FDI) and other financial inflows in most countries, including through the Petrocaribe program by which Venezuela supplies crude oil to some Caribbean nations for a percentage down payment and low-interest financing agreements. Increased prices globally for petroleum imports or decreased assistance from Venezuela could have a strong negative effect on monetary policies (International Monetary Fund, 2013b).

In the commodity-exporting countries of Belize, Guyana, Suriname, and Trinidad and Tobago, economic growth was stronger than in the tourism-dependent countries of the Caribbean where tourism inflows and construction had decreased. Growth of economies in the Caribbean was projected to remain at about 3.5% in 2013 and 2014. Public debt ranged between 60% and 150% of the GDP in the tourism-dependent economies. External current-account deficits exceeded 10% of the GDP in most cases in 2012 and into 2013, which reflected the region's spending on energy imports (International Monetary Fund, 2013b).

### **Mineral Trade and the Economy**

According to the World Bank, the share of the value of mineral commodity exports (metals, mineral fuels, and other mineral ores and concentrates) in the total value of all merchandise exports of the low-income economies (defined as having per capita income in 2013 of less than \$1,045) and middle-income economies (defined as having per capita income in 2013 of greater than \$1,045 but less than \$12,746) of the LAC had increased to about 25% in 2012 from 23% in 2000. This percentage was less than that of the low- and middle-income countries in other regions of the world that depended more heavily on mineral fuel exports than those in the LAC, such as countries in the region of the Middle East and North Africa (where the value share had decreased to 67% in 2012 from 79% in 2000) and those in the region of Europe and central Asia (where the value share had increased to 22% in 2012 from a revised 20% in 2000), or where they depended more heavily on exports of all mineral commodities than in the LAC, such as in sub-Saharan Africa (where the value share had increased to 55% in 2012 from a revised 51% in 2000). The share of the value of mineral commodity exports in the total value of all merchandise exports, however, was greater for the LAC than for low- and middle-income economies in south Asia (where the value share had increased to 18% in 2012 from 5% in 2000) and in the region of east Asia and the Pacific (where the value share had decreased to 9% in 2012 from 8% in 2000). Consequently, the LAC economies were more vulnerable to external shocks affecting mineral commodities than were the economies of the Middle East, North Africa, and sub-Saharan Africa (World Bank, The, 2013).

There were substantial differences in the potential economic vulnerability to changes in mineral commodity prices among the countries of the LAC. In 2012, in Venezuela, the value of

mineral fuel exports accounted for 97% of the value of total merchandise exports; in Colombia, 70%; Trinidad and Tobago, 66%; Ecuador, 58%; Bolivia, 55%; Canada, 28%; Belize, 27%; Jamaica, 24%; Peru, 16%; Mexico, 14%; and Brazil, 11%. In Chile, exports of metals and other mineral ores and concentrates accounted for 61% of the value of total merchandise exports; in Peru, 49%; Bolivia, 25%; and Guyana, 21%. Mineral commodity exports accounted for significantly less of the value of total merchandise exports in some other important metal exporters in the region, however, such as Brazil (where mineral commodity exports accounted for 16% of total exports) and Jamaica (8%) (World Bank, The, 2013).

The extractive industries in Latin America had received the greatest amount of capital investment from China. Because China had become the world's leading importer of copper concentrate and ore, iron ore, crude oil, and other commodities, changes in Chinese demand for those products had a significant effect on Latin America's terms of trade. An estimated 90% of China's FDI in Latin America went towards natural resources whereas most worldwide FDI in Latin America was directed towards the services sector (43%), followed by the manufacturing sector (31%) and the natural resources sector (25%).

State-owned Chinese petroleum companies had become heavily invested in Argentina, Brazil, Colombia, Ecuador, Peru, and Venezuela with an estimated cumulative investment of \$24.2 billion. Of that total, 93.1% had been invested since 2006, and 75.8% of that total had been invested since just 2010. In comparison, total FDI from China to Latin America in the two decades previous to 2010 was only about \$6 billion. Those early investments were directed toward oil and mining projects that were started in the 1990s. In 2010, FDI from China to Latin America totaled \$13 billion, 75% of which went towards large oil acquisitions in Argentina and Brazil. It was in 2010 that Chinese companies increased their presence in the automotive, power, and mining sectors. In 2012, total FDI from China to Latin American economies totaled \$9.2 billion, which was a 1.1% decrease from that of 2011 and a 32% decrease from that of 2010 (Economic Commission for Latin America and the Caribbean, 2013, p. 11).

### **Legislation**

On July 3, the Argentine Supreme Court of Justice lifted the injunction on provisions of National Law 26.639 for the Protection of Glaciers and Periglacial Environments (known as the Glacier Act) that had been in place since November 2010. The court rejected the plaintiff's arguments that provisions of the law, particularly those that would restrict open pit mining in protected glacial environments, was unconstitutional. Consequently, the entire Glacier Act entered into force, including the requirement that an inventory be taken of all glaciers and periglacial areas in the country. The Argentine Government also repealed Law 3981 of 2005 that had banned the use of cyanide to recover gold from ore (Kosich, 2012a; Latin American Press, 2012).

Bolivia passed legislation titled the "Law of Mother Earth," which redefined mineral deposits as blessings and assigned



11 new legal protections for nature (which includes natural ore deposits); the new regulations are likely to limit mining, infrastructure, and development projects that are determined to affect ecosystem balance and local habitats. In Brazil, the legislature passed legislation allowing the use of mercury in gold mining if a permit is obtained and documentation is provided attesting to the origin of the mercury within 30 days of the issuance of the environmental permit (Jamasmie, 2012b, c).

Much of Canada's legislation in 2011 and 2012 was aimed at stimulating the country's economy. The 2012 Federal Budget included provisions to extend the temporary 15% mineral exploration tax credit for another year to March 2013 and to set up a one project/one review system of reviewing major projects. The Canadian Government allocated funds for a 5-year period to renew the Targeted Geoscience Initiative, with two areas of focus—developing new methods for exploring deeper mineral deposits, and the 5-year Geo-Mapping for Energy and Minerals (GEM) program. The Canadian Northern Economic Development Agency planned to invest \$3.275 million during a 3-year period (2012 through 2014) to support geoscience research and data analysis in the Northwest Territories (Hill, 2012; Kosich, 2012b).

In Canada, the Pacific Gateway Transportation Strategy 2012–2020 was initiated by the government of the Province of British Columbia to improve trade with Asia by improving the transportation infrastructure in the Province. The 2012 budget for the Province of Nova Scotia set aside \$700,000 in grant money to promote mineral prospecting. The government of the Province of Ontario initiated rules requiring explorers to consult with aboriginal groups before initial exploration activities may proceed (Hill, 2012; Jamasmie, 2012d).

In Peru, which had an influx of mineral investment in recent years despite related social conflicts, a law enacted in 2011 was designed to reduce the number of protests by requiring mining and oil companies to consult with indigenous communities before developing a project. Unrest had reportedly contributed to delays or postponements in 15 large- to mid-size mining projects, and 135 more projects were held up by new environmental consultation requirements, causing permitting delays (Jamasmie, 2012a, 2013; Wilson, 2012).

## Exploration

Mineral exploration activity in Latin America increased in 2012 compared with that of 2011 in terms of the number of exploration sites, according to data compiled by the USGS and company exploration budgets as reported by SNL Metals Economics Group (SNL–MEG) (table 3). According to SNL–MEG, Latin America continued to lead in exploration activity among the countries and regions analyzed based on budget data, and the region was listed second after Canada in terms of the number of active exploration sites, according to data compiled by the USGS. SNL–MEG estimated that the 2012 exploration budget for Latin America increased by 24% to about \$5.2 billion from an estimated \$4.2 billion in 2011. Argentina, Brazil, Chile, Mexico, and Peru were ranked in SNL–MEG's top 10 country list for anticipated exploration spending in 2012. Approximately 60% of the deposits actively explored in 2012 in

Latin America contained gold or silver and 39% contained base metals, based on the sites considered in the USGS compilation (table 3; SNL Metals Economics Group, 2012).

The Latin American region has generally been able to maintain its global share of exploration sites among the regions analyzed for the past decade, suggesting that exploration companies have continued to favor this region even during lean economic conditions or when nationalization of resources or the threat of nationalization in some countries has led to increased risk associated with resource development. In 2012, increasing political and social pressure on exploration and mining activities in some Latin American countries, such as Argentina, Bolivia, Peru, and Venezuela, resulted in reduced exploration activity in these countries. In other Latin American countries, mineral exploration increased owing to promising geology, the perception of favorable mineral policy, and the region's generally successful historical record of mineral discoveries, development, and production. The estimated exploration budget for Latin America showed an overall increase in 2012 of about \$1 billion from the budget for 2011.

On the basis of data compiled by the USGS, Latin American countries with the greatest exploration activity were, in descending order by the number of active sites for which data were compiled, Mexico (28%), Peru (16%), Brazil (13%), Argentina and Chile (11% each), and Colombia (6%). The remaining 15% of activity took place in 19 other Latin American countries. Gold and silver attracted about 67% of total exploration activity in Latin America, interest in base metals accounted for 26%, and exploration for lithium and potash accounted for about 3% of the total exploration activity based on the number of sites compiled. Exploration for 14 other mineral commodities composed the remaining 4% of exploration activity in Latin America. Activity in 2012 was primarily used to define early-stage resources (72%), conduct exploration at a producing site (18%), conduct feasibility studies of promising discoveries (6%), and conduct further exploration at deposits under development (4%).

Mineral commodities receiving a sizable amount of exploration investment in Brazil from 2011 to 2015 included aluminum (from bauxite), copper, gold, iron ore, nickel, phosphate rock, and potash. The Chilean Government created a \$150 million exploration fund to encourage investment for selected exploration projects. A mining exploitation agreement was signed between the Government of Ecuador and Chinese-owned Ecuacorriente that set terms for the exploration and development of the El Mirador copper project (Keen, 2012; Instituto Brasileiro de Mineração, 2012; Tarbutt, 2012, p. 68).

Canada continued to be a focus of global mineral exploration. As of September 2012, exploration spending through the feasibility stage was CAD4.1 billion (US\$4.0 billion), which was a 3% decrease from expenditures of CAD4.2 billion (US\$4.1 billion) for 2011. According to SNL–MEG, 2012 budgeted exploration spending in Canada was CAD3.3 billion (US\$3.2 billion), or about 16% of the estimated overall worldwide exploration budget. Canadian Government statistics include planned exploration expenditures for a wider variety of minerals and materials than are included in the SNL–MEG estimates. Also, the total revised spending intentions for Canada,

as reported by Natural Resources Canada (a Department of the Government) as of September, was higher than its March 2012 estimate of CAD4.2 billion (US\$4.1 billion), although these adjusted figures may reflect increased exploration costs rather than a greater amount of exploration activity. In 2012, precious metals (gold and silver) accounted for CAD2.3 billion (US\$2.2 billion); base metals, CAD730 million (US\$700 million); uranium, CAD198 million (US\$190 million); and diamond, CAD92 million (US\$88 million) of the CAD4.2 billion exploration total. When the Government's exploration statistics are adjusted to make them comparable with SNL-MEG statistics, the reported exploration expenditures as of October 2011 by Natural Resources Canada would be US\$3.1 billion, which is essentially equivalent to the SNL-MEG estimate (Natural Resources Canada, 2012; SNL Metals Economics Group, 2012).

Company exploration spending for 2012 as reported by the Canadian Government as of January 2013 was greatest in Ontario (24% of the total exploration and deposit appraisal expenditures for Canada), Quebec (19%), British Columbia (18%), Nunavut Territory (10%), Saskatchewan (8%), and Yukon Territory (7%); other Canadian Provinces made up the remaining 14% of the expenditure. Canadian Provinces and Territories with a 15% or more increase in exploration activity in 2012 from 2011 based on reported expenditures were Newfoundland and Labrador (a 165% increase, primarily as a result of increased exploration for base and precious metals, iron ore, and rare-earth elements), Nova Scotia (a 55% increase, primarily as a result of exploration for gold and base metals), Northwest Territories (a 44% increase, primarily as a result of precious and base metals, diamond, and rare-earth element exploration), and British Columbia (a 17% increase, primarily as a result of exploration for base and precious metals). The budgeted exploration expenditure in Nunavut Territory in 2012 had decreased by 20% compared with that of 2011, although Ontario had the largest decrease in total exploration budget, to \$990 million in 2012 from \$1.1 billion in 2011. Junior exploration companies accounted for about 54% of total expenditures in 2012, which was down from 57% in 2011. In terms of mineral commodities sought countrywide, precious metals received the largest exploration expenditure (54%), followed by base metals (17%), uranium (5%), and diamond (2%) in 2012. Coal, iron ore, and other minerals composed the remaining 22% (Natural Resources Canada, 2012, 2013).

Canadian Provinces and Territories with the greatest exploration activity were, in descending order by number of sites in 2012 as compiled by the USGS, Quebec (22%), Ontario (21%), British Columbia (20%), Yukon Territory (9%), Saskatchewan (7%), Newfoundland and Labrador (5%), and Nunavut Territory and Manitoba (about 4% each). Based on the site data, 58% of the Canadian exploration sites targeted precious metals; 26%, base metals; 7%, iron ore; 4%, rare-earth elements; 3%, uranium; and 2%, graphite, lithium, or potash. Exploration for graphite, lithium, potash, and rare-earth elements increased in 2012. Approximately 87% of all reported exploration sites were considered early-stage sites.

Canada's mineral exploration budget in 2012 increased by about 10% from that of 2011, although the annual rate of

increase year to year was lower than in previous years. The lower growth rate in 2012 reflected a reduction in the number of junior companies conducting exploration in Canada, whereas explorers with more-advanced projects planned to increase spending in 2012. Canada has experienced little growth or a gradual decline in the percent of budgets allocated to exploration as well as a decrease in the number of active sites since 2003 (Ragsdale, 2012).

Although Nunavut Territory had received much interest from exploration companies in recent years, successfully developing a mineral resource into a viable mine had proven to be challenging. Nunavut's climate and lack of infrastructure result in higher costs for exploration and mining, and posed challenges to finding qualified personnel and developing efficient processing techniques. As a result of higher than expected costs, the mine plan for the newly opened Meadowbank gold mine was revised and development activities at the Hope Bay gold property were suspended (Gordon, 2012).

## Commodity Overview

This section summarizes the supply and demand trends and potential mineral industry developments for the leading mineral commodities in LAC. The region's share of world production of selected mineral commodities is listed by commodity in table 4. In tables 5 through 20, estimates for production of major mineral commodities for 2015 and beyond have been based upon supply-side assumptions, such as announced plans for increased production or new capacity construction and bankable feasibility studies. The outlook tables in this summary chapter show historic and projected production trends; therefore, no indication is made about whether the data are estimated or reported and revisions are not identified. Data on individual mineral commodities in tables in the individual country chapters are labeled to indicate estimates and revisions. The outlook segments of the mineral commodity tables are based on projected trends that could affect current producing facilities and on planned new facilities that operating companies, consortia, or Governments have projected to come online within indicated timeframes. Forward-looking information, which includes estimates of future production, exploration and mine development, cost of capital projects, and timing of the start of operations, are subject to a variety of risks and uncertainties that could cause actual events or results to differ significantly from expected outcomes. Projects listed in the following section are presented as an indication of industry plans and are not a USGS prediction of what will take place.

## Metals

**Bauxite and Alumina and Aluminum.**—*Aluminum.*—In descending order of production volume, Canada, Brazil, Argentina, and Venezuela were the only producers of primary aluminum in the region in 2012. In Brazil, Alcoa Inc. of the United States planned to cut a combined 425,000 metric tons (t) of aluminum smelting capacity by 2015 at the Sao Luis smelter and the Pocos de Caldas smelter. The company also had another 460,000 t of smelting capacity under review so that the company

could potentially cut smelting capacity by 21% in Brazil. The reductions were in response to global market conditions for primary aluminum and the increased costs of production that made the two smelters uncompetitive (Alcoa Inc., 2014).

In Canada, production of primary aluminum was projected to increase by about 31% by 2015 compared with that of 2012. The increase was based in part on the startup of Rio Tinto Alcan's AP60 aluminum smelter in Quebec and a capacity expansion at the company's Kitimat smelter in British Columbia.

In South America, hydroelectric power supplied about 85% of the energy requirement for aluminum production in 2012 compared with 86% in 2011, and the share of natural gas remained the same (at about 14%) in 2012 as in 2011. Coal was not used as a power source for aluminum smelting in South America in either year (tables 4, 6; International Aluminium Institute, 2013; Alcoa Inc., 2014).

**Bauxite and Alumina.**—Alumina production in Brazil, which was by far the leading regional producer, decreased just slightly in 2012 to 10.2 million metric tons (Mt) after an increase in 2011 that had been brought on by capacity expansions in the country. South America and the Caribbean were estimated to have 21% of the world's bauxite resources. The combined production total of Brazil and Jamaica accounted for about 85% of the region's production. Production in the region is projected to increase gradually by about 8.5% through 2018, mostly owing to expected increases in bauxite production in Jamaica. In January 2013, the Jamaica Bauxite Institute had signed a memorandum of understanding with Nippon Light Metal Company Ltd. of Japan to establish a pilot project to extract rare-earth elements (possibly including scandium) from bauxite in Jamaica (tables 4, 5; Jamaica Information Service, 2013).

**Copper.**—**Ore.**—Chile's Corporación Nacional del Cobre (CODELCO) was the world's leading copper producer in 2012 with 10% of the global market share and \$14 billion in sales of copper in 2012. Of the amount sold by CODELCO, 83% was smelted and refined copper (cathodes, 77%, and anodes/blister, 6%), 41% was received by China (compared with 38% in 2011), and 19% was received by the rest of Asia (compared with 20% in 2011). The Andina Mine, the Chuquicamata Mine, the El Teniente Mine, and the Radomiro Tomic Mine were CODELCO's leading producing mines, and together they accounted for 82.5% of copper production capacity (Corporación Nacional del Cobre, 2013, p. 3–4, 10).

In 2012, the average copper ore grade mined by CODELCO at its existing mines was estimated to have decreased to 0.73% from 0.8% in 2011 and 0.84% in 2010, although production increased to about 1.8 Mt of copper in 2011 from 1.76 Mt in 2010 before decreasing to (again) about 1.76 Mt in 2012. The state-owned mining company planned to expand copper production from 2013 through at least 2021 by completing numerous projects, including the following: the construction phase of the Ministro Hales Mine in 2013, the second phase of sulfide processing at the Radomiro Tomic Mine in 2016 and 2017, and a new mine level at the El Teniente Mine by 2017, as well as completion of feasibility studies and engineering for underground operations at the Chuquicamata Mine and the second phase expansion at the Andina Mine. The estimated combined capital expenditure—not including that

for the Radomiro Tomic expansion, for which the total was unavailable—was \$17.6 billion (Corporación Nacional del Cobre, 2013, p. 11, 16).

Private mining companies in Chile also planned to increase copper production through 2018. In 2012, the new Esperanza Mine produced slightly less than 100,000 t of copper in 2011 and was expected possibly to ramp up to a production level of about 180,000 metric tons per year (t/yr) in 2013. Major expansions were also planned at the Escondida and Los Bronces Mines, and the country's total copper mine production capacity was expected to increase by more than 600,000 t/yr by 2018 (Farchy, 2013).

Copper production in Argentina was expected to increase sharply by 2016 owing to the projected startup of Glencore Xstrata plc's El Pachon Mine, which would have an estimated production capacity of 400,000 t/yr of copper during the first 5 years of full production. In Peru, some new deposits were expected to be developed between 2013 and 2015, including Las Bambas and Los Chancas deposits in the Department of Apurimac and the Toromocho deposit. The Rio Blanco copper project in the Department of Piura was expected to be developed by the end of 2018. During the period 2012 through 2018, however, it appeared that any additional copper production from new mines and expansions at existing mines in Peru could be mostly counteracted by decreasing production at existing mining operations in Peru (tables 4, 8).

**Refined Copper.**—In 2012, Chile was the world's leading producer of primary refined copper, and other significant producers in the region included Brazil, Canada, Mexico, and Peru. The Chilean Government agency Comisión Chilena del Cobre projected that production of refined copper by solvent extraction-electrowinning (SX-EW) processes could decrease by more than 200,000 t/yr by 2018 from its expected level of SX-EW production in 2012. At the end of 2009, Xstrata closed its Kidd Creek copper smelter and refinery in Canada, citing excess smelting capacity (given the increasing costs and the low copper concentrate treatment and refining charges at the time) as the reason for the closure. The total production capacity in Canada could exceed 370,000 t/yr of refined copper during the period 2014 through 2018, and the country could produce close to capacity during that period if international market conditions for the treatment and refining of copper concentrates warrant it (tables 4, 9; Edelstein, 2013).

**Gold.**—In 2012, Peru was the region's leading gold producer. The country produced about 161,300 kg of gold, which was a 2.9% decrease compared with that of 2011 and which accounted for 23.6% of the regional total. Gold production in Peru had decreased steadily for several years owing in part to a decision by the Peruvian Government to outlaw informal mining operations. The change cut reported artisanal gold production by one-half to about 11,400 kg in 2012 (tables 4, 10).

Canada was the second-ranked gold producer in the region, accounting for 105,000 kg of gold, or 15.4% of the regional total. There were hundreds of gold mines in Canada, but the leading gold-producing companies and operations included Goldcorp Inc.'s wholly owned Red Lake Mine in Ontario (which produced 15,789 kg in 2012), Osisko Mining Co.'s Canadian Malartic Mine in Quebec (12,081 kg),



Agnico Eagle Mines Ltd.'s Meadowbank River Mine in Nunavut Territory (11,383 kg), and Goldcorp's Porcupine Mine in Ontario (8,173 kg). The combined total production from those mines accounted for about 45% of the gold produced in Canada in 2012 (Agnico Eagle Mines Ltd., 2013, p. 19; Goldcorp Inc., 2013, p. 6; Osisko Mining Co., 2013).

Mexico was the region's third-ranked gold producer in 2012, by volume. It was projected to replace Canada as the second-ranked producer by 2015 owing to expected new production totaling about 15,700 kg from startup and (or) expansion projects at Agnico Eagle's La India Mine in Sonora, Argonaut Gold's San Antonio Mine in Baja California Sur, Fresnilo plc's San Juan Mine in Zacatecas, Southern Copper Corp.'s Buena Vista del Cobre Mine in Sonora, and Torex Gold Resources Inc.'s Morelos Norte Mine in Guerrero (Cámara Minera de México, 2013, p. 17).

The gold production from Canada, Mexico, and Peru accounted for 54% of the total for the region for the year. Other significant gold-producing countries in the region included Brazil, Colombia, and Argentina, which were the fourth-, fifth-, and sixth-ranked producers, respectively.

In Colombia, Mineros SA produced 3,683 kg of gold from its operations in Antioquia and Mina La Ye compared with about 3,760 kg in 2011. Gran Colombia of Canada's Segovia operations in Colombia produced about 2,460 kg of gold, and the company's Marmato operation produced 675 kg of gold and about 1,100 kg of silver. Total reported annual gold production from Colombia has ranged from about 34,300 kg in 2008 to greater than 66,000 kg in 2012. Known production from the operations run by Gran Colombia and Mineros, however, accounted for just 12% of the total gold produced in Colombia in 2012 whereas, according to Government estimates, informal and unlicensed gold operations accounted for almost 90% of the gold produced in the country. Production from the Antioquia Department accounted for 41% of the country's total reported production, and that from the Choco Department accounted for 37% (tables 4, 10; Goldcorp Inc., 2013; Gran Colombia Gold Corp., 2013; Sistema de Información Minero Colombiano, 2013; Willis and Smith, 2013).

Construction at Barrick Gold Corp. of Canada's Pascua Lama gold mine project (25% of which lies on the Argentina side of the border between Argentina and Chile) was about 45% complete at yearend, with total realized expenditures of \$4.8 billion and total projected costs of between \$8 billion and \$8.5 billion. As of late 2012, prestripping activities at the Pascua Lama Mine were halted by Barrick after inspectors from Chile's geology and mining agency visited the site in October and concluded that there was an excess of dust in the air owing to the prestripping and construction activities. The work stoppage, however, did not greatly affect activities on the Argentina side of the border where the majority of Pascua Lama's critical infrastructure was located (Barrick Gold Corp, 2012).

The country with the greatest increase in gold production was the Dominican Republic. The leading mining project in the Dominican Republic in 2012 was Pueblo Viejo Dominicana Corp.'s Pueblo Viejo gold and silver mine (Barrick Gold Corp., 60%, and Goldcorp Inc., 40%, both of Canada). In August 2012, Pueblo Viejo achieved its first gold

production. Further commissioning activities and ramping up to commercial production continued to mid-January 2013. In 2012, Pueblo Viejo produced about 3,480 kg of gold. As of February 2012, the proven and probable reserves at Pueblo Viejo included about 800,000 kg of contained gold, 5 million kilograms (Mkg) of contained silver, and 257,000 t of contained copper. The mine was expected to produce about 35,000 kilograms per year of gold in the first 5 years of a 25-year mine life from about 13 Mt of ore containing 175,500 kg of gold (table 10; Goldcorp Inc., 2012).

After nationalization of the Venezuelan gold mining industry was formalized in 2011, the only foreign gold mining company active in Venezuela was China International Trust and Investment Corp. (CITIC), which was contracted to explore and develop the Las Cristinas gold mine. Venezuela expropriated the Las Cristinas project from the Canadian company Crystallex International Corp. in February along with the mining assets of Rusoro Mining Ltd., which until recently had been the only foreign gold miner in Venezuela. Both Canadian companies had filed for arbitration with the World Bank, claiming that they were entitled to financial reimbursement for assets that were expropriated (Bamrud, 2012).

**Iron Ore and Iron and Steel.**—*Iron Ore.*—In terms of value, iron ore is the second most valuable global commodity after crude oil, although the annual value of iron ore trade is worth less than one-tenth that of crude oil. Between June 2012 and September 2012, spot prices for iron ore decreased to a 3-year low of about \$85 per metric ton from about \$140 per metric ton and a record high of greater than \$190 per metric ton, which was set in February 2011. By October 2012, prices had stabilized a bit at about \$100 per metric ton. For several decades prior to 2009, however, there was a 1-year benchmark-price system for iron ore, during which time prices had remained relatively stable. The benchmark system came about after World War II, before which time 10-year contracts were normally established. The 10-year contract period was shortened in 2009 when competition from Brazilian producers cut into the iron ore market, which had been predominantly controlled by Australia, especially in terms of supplies to Japan as it rebuilt from the war. In 2003, however, China replaced Japan as the world's leading iron ore importer. Prices began to rise sharply as the available supply failed to meet demand. Prices under the benchmark system had been arrived at through negotiations between the three largest iron ore mining companies (Rio Tinto plc, BHP Billiton plc, and Vale S.A.) and Japanese steel producers, but that system broke down as China's increasing consumption became a factor. In 2009, the benchmark system was abandoned by the big iron ore producers, and they began to sell their ore on short-term contracts at prices set on a nascent spot market. By 2012, China accounted for about 60% of global iron ore imports, and the price of iron ore has recently been identified as another indicator of China's economic strength or weakness. The slowing of China's economy in 2012 may have had an effect on global iron prices, but supply from the big three iron ore producers nonetheless increased by 7.4% in the first half of 2012 compared with the same period in 2011 (Economist, The, 2012).

In 2012, Vale was the world's leading iron ore producer, and Brazil continued to be the leading producer of iron ore



(Fe content) in the region, accounting for 80% of the regional total or 258 Mt. Vale's iron ore production decreased by about 0.8% in 2012 compared with that of 2011, primarily as a consequence of an abnormally high amount of rainfall in the Brazilian States of Minas Gerais, Rio de Janeiro, and Espírito Santo, which constrained mining and logistic activities. The southeastern system of mining centers in the State of Minas Gerais, including the Itabira, the Mariana, and the Minas Centrais mining sites, produced a total of about 115.6 Mt of iron ore in 2012, which was a 3.8% decrease from that of 2011 and accounted for about 36% of the company's total production. Production at the Carajás Mine in the State of Para decreased to about 106.8 Mt, or by 2.7%, which accounted for another 33% of Vale's production. That decrease was not caused by a higher than normal amount of rainfall, however, as rainfall in the fourth quarter decreased to its lowest level since 2008 (tables 4, 11).

Brazil produced 400.8 Mt of iron ore in 2012 compared with 398.1 Mt in 2011. Of that production, the leading iron ore producer was Vale (84.5%); other producers, such as Companhia Siderúrgica Nacional, Minerações Brasileiras Reunidas S.A., and Samarco Mineração S.A., contributed the remaining 15.5%. In 2012, Brazil exported about 275.4 Mt of iron ore valued at more than \$23.8 billion. The leading importers of Brazilian iron ore were China (50%), Japan (11%), Germany and the Republic of Korea (6% each), and the Netherlands (4%) (Departamento Nacional de Produção Mineral, 2013a, b).

Canada was the second-ranked iron ore producer in the region, accounting for about 7.7% of the regional total. The Iron Ore Co. (IOC) of Canada's IOC Mine (also known as Carol Lake) in Newfoundland and Labrador and the Mt. Wright Mine in Quebec (ArcelorMittal, 85%) were the leading producers in 2012. As of early 2011, four producing iron ore mines in various stages of expansion and four major projects in advanced stages of exploration and development were based on the iron-ore-rich Labrador Trough of western Labrador and northeastern Quebec. The Labrador Trough is a geologic structure that is 1,600 kilometers (km) long and 160 km wide and composed of early Proterozoic sedimentary and volcanic rocks and banded iron formations that had been mined since 1954 (table 11; Schiller, 2011).

In March 2012, Rio Tinto began commissioning of its expanded 22-million-metric-ton-per-year (Mt/yr) processing plant at the IOC Mine. IOC produced 4 Mt of concentrate and 10 Mt of pellets in 2012. A phase 2 expansion to 23.3 Mt/yr was underway and targeted for completion in 2013. Mt. Wright produced 8.9 Mt of concentrate and 9.1 Mt of pellets. In January 2013, ArcelorMittal arranged to sell a 15% interest in ArcelorMittal Mines Canada (which was the owner of Mt. Wright) to a consortium led by POSCO of the Republic of Korea and China Steel Corp. for \$1.1 billion. POSCO and China Steel would enter into long-term offtake agreements proportional to their joint-venture interests. The other companies in the POSCO-China Steel consortium were not reported nor were the ownership shares of POSCO and China Steel (Rio Tinto plc, 2012, p. 2; 2014, p. 2; ArcelorMittal, 2013).

**Steel.**—The World Steel Association (WSA) projected that total steel consumption in Canada, Mexico, and the

United States would increase to a revised 129 Mt in 2013 and could increase to a revised 134 Mt in 2014 and 139 Mt in 2015. The WSA also estimated that total steel consumption in the countries of Central America and South America increased to about 47 Mt in 2012 and forecast that it could increase to a revised 49 Mt in 2013 and a revised 53 Mt in 2014.

Crude steel production in the region was led by Brazil, followed by Mexico and Canada. Globally, however, Brazil was the eighth-ranked producer, and all crude steel producing countries were outpaced by production in China by an order of magnitude. Since 2008, global steelmaking capacity had exceeded apparent steel consumption, primarily owing to China's rapid economic growth and increased steelmaking capacity. That excess capacity and production resulted in an inflow of steel products into the United States and other steelmaking countries. Increased Chinese demand for iron ore and metallurgical coal necessary for producing crude steel led to sharply increased prices, which affected steelmaking companies worldwide. It was expected that global steelmaking capacity would continue to exceed steel demand growth, that steel prices would remain relatively stable, and that production costs would not decrease significantly. Production of crude steel was projected to increase slightly by 6.2% by 2019 (tables 4, 12; World Steel Association, 2013; U.S. Geological Survey, 2014, p. 79).

**Platinum-Group Metals.**—Canada and Colombia were the only countries to produce any platinum-group metals in the LAC in 2012. Canada, which was the only palladium producer in the region, produced 13,100 kg, of which 5,100 kg came from the Lac des Isles palladium and platinum mine (owned by North American Palladium Ltd. of Canada). The mine also produced about 7,500 t of platinum and accounted for 87% of regional platinum production. Colombia produced about 1,460 kg of platinum primarily from small-scale operations in Choco Department. In 2012, Condoto Platinum NL signed an exploration agreement covering about 40,000 hectares in Choco Department. The land belonged to the Novita Higher Community Council (Novita Council), which held the rights to mining concessions under the Colombian Constitution. Condoto reported that it was in discussions with local alluvial mining operators in the region aimed at coming up with an agreement in 2012 that would cover bulk sampling activities. In August, Condoto had signed a cooperation agreement to commence bulk sampling on the Martinez alluvial mining operation in Novita. The company was granted the right of sale to 100% of metal production except gold, for which the company would be entitled to 25% of sales, as part of the bulk sampling project. The agreement was established for a term of 5 years and could be extended by mutual consent. The objective of the bulk sampling project was to determine the head grade of metals at one of the alluvial operations in the Novita Council tenement area. By early to mid-2013, soil sampling had been completed at two target areas. Gold and silver anomalies were identified, along with arsenic and mercury, which are possible indicators of epithermal-style mineralization (tables 4, 14, 15; Condoto Platinum NL, 2012a, b; 2013; 2014).

**Tin.**—In 2012, Peru was the leading tin producer in the region in terms of volume, followed by Bolivia and Brazil.

Peru produced 26,105 t of tin in 2012 from the San Rafael Mine (wholly owned by Minsur S.A.). The San Rafael Mine had been in operation since the 1950s, and a refinery facility was constructed there in the 1990s. Mine production of tin in concentrate reached a maximum of 46,300 t in 2006 but had been declining since that time as reserves were being depleted. The company produced about 24,800 t of metal from the smelter and refinery operation in 2012 (tables 4, 16; Ministerio de Energia y Minas, 2013, p. 5, 10).

In 2012, Bolivia produced about 19,700 t of tin in concentrate. The Huanuni Mine—a vein lode deposit—produced about 10,000 t. The Government of Bolivia granted a contract to a Chinese engineering firm in 2011 for construction of a new processing plant near the mine that would have a 3,000-metric-ton-per-day ore processing capacity, which would increase annual production of tin in concentrate to about 13,000 t. Construction of the new plant was projected to be completed in 2014. Tin from the Huanuni Mine was being processed at the nearby Vinto smelter, and the country produced about 14,500 t of tin metal (Mining Technology, 2011).

Brazil produced about 13,700 t of tin in concentrates in 2012, primarily from the Pitinga Mine (a joint venture between Minsur and Mineração Taboaca S.A.). The Estanhos de Rondonia SA Mine and the Santa Barbara Mine (which was wholly owned by Companhia Siderúrgica Nacional) had a combined capacity of about 4,300 t/yr of tin (tables 4, 16; Topf, 2011).

Canada was not a tin-producing country, but there were tin exploration projects underway in the country in Nova Scotia and New Brunswick, including the East Kemptville project (wholly owned by BHP Billiton), which is a sedimentary exhalative (SEDEX) deposit, and the Mount Pleasant project (wholly owned by Adex Mining Inc. of Canada), which is a porphyry and stockwork deposit. Although both the East Kemptville and the Mount Pleasant projects achieved limited production in the 1980s, they were also in an early stage of reserves development in 2012 for potential production of multiple commodities besides tin, including indium, molybdenum, tungsten, and zinc.

### **Industrial Minerals**

**Diamond.**—Canada was the only significant diamond mine producer in the LAC in 2011. Other countries in the region that were minor producers included Brazil, Guyana, and Venezuela. Canada produced about 10 million carats of gem-quality diamond in 2012 and was the world's fifth-ranked producer in terms of volume after Congo (Brazzaville), Russia, Botswana, and Zimbabwe. Canada's diamond mine production was expected to vary between 2013 and 2020 owing to projected 5% per year decreases at the Diavik Mine, the Snap Lake Mine, and the Victor Mine and commencement of production at the Renard Mine in 2016. Canada's production was projected to decrease by about 4.3% by 2019, and for the region as a whole, production was projected to decrease by 4% by 2019 (tables 4, 18).

**Lithium.**—The leading tonnages of lithium and potassium in brines in the world are located in the Andes Mountains of Argentina, Bolivia, and Chile and in China. The evaporite brines, which are typically referred to as salars, are an economical and plentiful source of lithium in aqueous solution

that is pumped from aquifers, as well as being a source of commercially important boron and potassium. Recent developments in the automotive industry and other industries that use lithium in manufacturing led to an exploration boom with respect to the salars of the central Andes, primarily because the brine bodies in China have a more complex chemistry that makes recovery of the contained elements more difficult and less economical (table 19; Houston and others, 2011; Syrett, 2013).

South America's lithium reserves are found in what is commonly referred to as the Lithium Triangle—an area that is within the Altiplano-Puna Plateau of the central Andes. The Lithium Triangle is spread across Argentina, Bolivia, and Chile and was estimated to contain more than 80% of the world's lithium brine resources. In 2012, Chile was the leading producer of lithium in the LAC and the world, and the country was followed in the region by Argentina and Brazil (table 19).

Chile's leading lithium producing company in 2012 was SQM Salar S.A., which was a subsidiary of the Sociedad Química y Minera Chile S.A. SQM operated two sites in Chile, including the brine production facility at the Salar de Atacama and the Antofogasta processing plant. The company had the capacity to produce 48,000 t/yr of lithium carbonate or about 9,000 t/yr of lithium. The other significant lithium-producing company was Sociedad Chilena del Litio Ltda. (SCL), a subsidiary of Chemetall GmbH (wholly owned by Rockwood Holdings Inc.). As of July 2011, SCL had the capacity to produce 30,000 t/yr of lithium carbonate equivalent, or about 5,600 t/yr of lithium. In 2012, Chemetall submitted an environmental impact assessment to the Government of Chile for a \$140 million project to increase its capacity in Chile by 20,000 t/yr with a new lithium carbonate plant near Antofogasta. Chile's production of lithium in 2012 was 13,226 t. Information was unavailable as to the expansion of the company's capacity, and lithium production from Chile was not projected to vary much through 2019 (table 19; Businesswire.com, 2012).

Argentina held an estimated 15% of the total global lithium reserves in 2012. Argentina's lithium resources, however, were expected to increase as numerous sites were under exploration and several were at or near feasibility stage. Minera del Altiplano (a subsidiary of FMC Lithium of the United States) was Argentina's leading producer of lithium. The company had operated on the Salar del Hombre Muerto since 1997 and was still expanding the operation in 2012. FMC had projected that production would reach its expanded design capacity of 24,000 t/yr of lithium carbonate equivalent by 2012. The production volume from the Salar del Hombre Muerto brine was not publicly available but was reported to have decreased in 2012 owing to first quarter production downtime associated with a capacity expansion at the operation. Other unspecified operational issues and a planned extended shutdown affected production through the third quarter of 2012. Despite the capacity increase that was completed in March 2012, heavier than usual rainfall in 2011 and into 2012, during which times brine concentrations became more dilute, resulted in poor evaporative conditions, higher manufacturing costs, and capacity constraints. The increased rains had been expected to affect operations through much of 2012 (Brown, 2011).

FMC operated three industrial plants in Catamarca Province, including an adsorption plant where lithium is extracted from the brine; a utilities plant that generates electricity, steam, and compressed air; and a lithium carbonate and lithium fluoride processing plant. The lithium chloride plant and a primary materials transfer station were located in Salta Province (Fundación ProSalta, 2014).

As of September 2011, Rincon Lithium Ltd. (a subsidiary of Sentient Group Ltd.) had completed its plant commissioning and was ramping up for production of small volumes of commercial shipments of lithium carbonate from the Salar de Rincon, which is located in Salta Province. In 2012, the project had been expected to produce about 1,200 t of lithium carbonate in a pilot plant at the site that had the capacity to produce about 1,500 t/yr of lithium carbonate equivalent (LCE) (Clarke, 2012).

The Salar del Rincon project was originally envisioned to have a 17,000-t/yr LCE plant that would have commenced commercial production in 2008, but Admiralty Resources (the previous owner) was forced to sell the project during the global financial crisis in 2008. The Sentient Group acquired the project, which had already been through 6 years of development work, for \$22.2 million. Within 2 years, Sentient was the first company to initiate lithium carbonate production outside of China since 1997, although on a small scale. In 2012, the project was run by ADY Resources as part of the newly created (February 2012) Enirgi Group, which was owned by Sentient Group Global Resource Fund (Clarke, 2012).

ADY Resources was completing a feasibility study for constructing a plant to produce 30,000 t/yr of lithium carbonate. By early 2013, representatives from the Ministry of Mining evaluated the project's evaporation ponds, the technical operations, and the environmental health and safety of the pilot operation. The team also monitored the groundwater level and collected samples of water, soil, and sludge (from processing) (Clarke, 2012).

Orocobre Ltd. of Australia entered into an agreement with Jujuy Energía y Minería Sociedad del Estado (JEMSE) whereby JEMSE was granted an 8.5% equity interest in the Olaroz project. JEMSE's share of the construction funding would be loaned by Orocobre and repayable out of 33.3% of the dividends received by JEMSE. JEMSE would provide key construction assistance services to the Olaroz project. JEMSE would acquire the interest only upon the completion of project financing by Mizuho Corporate Bank and Japanese Oil, Gas, and Metals National Corp. (JOGMEC). Orocobre was expected to begin commissioning of the first production wells and to start filling the first evaporation pond at Olaroz in the fall of 2013 (Clarke, 2012).

Lithium Americas Corp. and Rodinia Lithium Inc., both of Canada, and Galaxy Resources Ltd. of Australia, had feasibility-stage projects in 2012 that had been expected to start up in 2015, including the Cauchari-Olaroz, the Sal de Vida, and the Salar de Diablillos projects. The Cauchari-Olaroz project was expected to come online by 2015 whereas the Sal de Vida and the Salar de Diablillos projects were expected to remain in the pipeline beyond their original startup dates. The Cauchari-Olaroz project's design capacity was 20,000 t/yr of lithium carbonate, or about 3,800 t/yr of lithium. Argentina produced about 2,529 t of lithium from lithium carbonate and

lithium hydroxide in 2012. Production was projected to increase gradually by almost 300% by 2019.

In Canada, the Quebec Lithium Project was expected to begin operation by 2013 and to produce about 4,000 t/yr of lithium by 2014. At the Quebec Lithium Project, spodumene mineralization is associated with pegmatite dikes in Precambrian plutonic, volcanic, and sedimentary rocks. In October 2012, Canada Lithium completed an updated feasibility study on Quebec Lithium, which included a potential plan to produce an additional 2,000 t/yr of lithium hydroxide and 30,000 t/yr of sodium sulfate. The sodium sulfate production was to begin in 2015. The proposed processing plant included conventional crushing, grinding, and flotation. The flotation circuit would be followed by secondary pyrometallurgical and hydrometallurgical processes, including a rotary kiln, a leaching circuit, precipitation tanks, and washing and filtration circuits. Global lithium production was projected to increase gradually by 104% by 2019 (table 19; Canada Lithium Corp., 2012, p. 3).

### *Mineral Fuels and Related Materials*

**Coal.**—Colombia was the leading in coal producer in the LAC, accounting for 44.2% of total production, followed by Canada (33%), Mexico (14.8%), Venezuela (4.4%), Brazil (3.3%), Chile (0.4%), and Peru (0.1%). At yearend 2012, the total proven global reserves of coal were estimated to be 861 billion metric tons (Gt), of which the region composed of Central America and South America accounted for just 1.5%. Almost all the reserves in Central America and South America combined were anthracite and bituminous coal from Colombia estimated to be about 6.8 Gt, or 0.8% of the world total. Canada's coal reserves—about 6.6 Gt—also accounted for about 0.8% of the world's total coal reserves. Canada's coal reserves were composed of about equal amounts of (a) anthracite and bituminous coal and (b) subbituminous and lignite coal. Coal production had decreased, on average, by about 7% in Argentina since 2005 whereas coal production in Colombia had increased, on average, by 8% per year for the past 20 years. Coal production in Mexico had increased in the past few years, but production was expected to decrease as the availability, environmental impact, and price of natural gas were relatively preferential. In Chile, BHP Billiton had considered developing more coal production capacity on the Isla Riesgo; however, no progress had been reported, and coal production in Chile may decrease from current projections. Production in Canada was expected to increase gradually by about 33% as several new projects come online by 2019 (tables 4, 20; BP p.l.c., 2013, p. 30).

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TABLE 1  
THE AMERICAS: AREA AND POPULATION IN 2012

Region and country	Area <sup>1</sup> (square kilometers)	Estimated population <sup>2</sup> (thousands)
<b>North America:</b>		
Canada	9,984,670	34,880
Mexico	1,964,375	120,800
United States <sup>3</sup>	9,826,675	313,900
Total	21,775,720	469,580
<b>Central America and the Caribbean:</b>		
Antigua and Barbuda	443	89
Aruba	180	102
Bahamas, The	13,880	372
Barbados	430	283
Belize	22,966	324
Bermuda	54	65
Costa Rica	51,100	4,805
Cuba	110,860	11,270
Curacao <sup>4</sup>	444	152
Dominica	751	72
Dominican Republic	48,670	10,280
El Salvador	21,041	6,297
Grenada	344	105
Guadeloupe <sup>5</sup>	1,682	405
Guatemala	108,889	15,083
Haiti	27,750	10,174
Honduras	112,090	7,936
Jamaica	10,991	2,708
Martinique <sup>5</sup>	1,100	390
Montserrat	102	5 <sup>1</sup>
Nicaragua	130,370	5,992
Panama	75,420	3,802
Saint Kitts and Nevis	261	53
Saint Lucia	616	181
Saint Vincent and the Grenadines	389	109
Sint Maarten <sup>4</sup>	34	39,088
Trinidad and Tobago	5,128	1,337
Other <sup>6,7</sup>	17,420	3,934
Total	763,405	125,413
<b>South America:</b>		
Argentina	2,780,400	41,090
Bolivia	1,098,581	10,496
Brazil	8,514,877	198,656
Chile	756,102	17,465
Colombia	1,138,910	47,704
Ecuador	283,561	15,492
French Guiana <sup>5</sup>	84,000	244
Guyana	214,970	795
Paraguay	406,752	6,687
Peru	1,285,216	29,990
Suriname	163,820	534
Uruguay	176,215	3,395
Venezuela	912,050	29,955
Total	17,815,454	402,503
Americas total	40,354,579	997,496
World total <sup>8</sup>	510,072,000	7,046,368

See footnotes at end of table.

TABLE 1—Continued  
THE AMERICAS: AREA AND POPULATION IN 2012

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<sup>1</sup>Source: U.S. Central Intelligence Agency, The World Factbook 2014.

<sup>2</sup>Source: The World Bank, 2014 World Development Indicators Database.

<sup>3</sup>Excludes Puerto Rico and U.S. Virgin Islands.

<sup>4</sup>Netherlands Antilles was dissolved in October 2010. Curacao and Sint Maarten became autonomous territories of the Kingdom of the Netherlands.

<sup>5</sup>Source: L'Institut National de la Statistique et des Études Économiques, Estimation de population au 1er janvier, par région, sexe et grande classe d'âge.

<sup>6</sup>Includes Anguilla, Bonaire, British Virgin Islands, Cayman Islands, Puerto Rico, Saba, Sint Eustatius, Turks and Caicos Islands, and U.S. Virgin Islands.

<sup>7</sup>Source: Statistics Netherlands—The Caribbean, Netherlands in Figures 2012;

U.S. Central Intelligence Agency, The World Factbook 2014; and The World Bank, 2014 World Development Indicators Database.

<sup>8</sup>Source: The World Bank, 2013 World Development Indicators Database.

TABLE 2  
THE AMERICAS: GROSS DOMESTIC PRODUCT<sup>1,2</sup>

Region and country	Gross domestic product in 2012 based on purchasing power parity		Real gross domestic product growth rate (percent)		
	Gross value (million dollars)	Per capita (dollars)	2010	2011	2012
<b>North America:</b>					
Canada	1,473,758	42,316	3.4	2.5	1.7
Mexico	1,798	15,363	5.1	4.0	3.6
United States	16,244,575	51,703	2.5	1.8	2.8
Total	17,720,131	XX	XX	XX	XX
<b>Central America and the Caribbean:</b>					
Antigua and Barbuda	1,562	17,833	-8.5	-3.0	1.6
Bahamas, The	11,035	31,324	1.0	1.6	1.8
Barbados	6,961	25,043	0.2	0.7	0.0
Belize	2,967	8,659	2.7	1.9	5.3
Costa Rica	58,547	12,544	4.9	4.4	5.1
Dominica	1,000	13,993	1.2	1.0	-1.7
Dominican Republic	97,684	9,547	7.7	4.5	3.9
El Salvador	46,091	7,316	1.4	2.2	1.9
Grenada	1,427	13,549	-0.3	1.0	-0.8
Guatemala	77,840	5,153	3.0	4.2	2.9
Haiti	12,802	1,229	-5.4	5.6	2.8
Honduras	37,644	4,743	3.7	3.8	3.9
Jamaica	24,687	8,915	-1.4	1.4	-0.5
Nicaragua	26,379	4,352	3.6	5.4	5.2
Panama	56,464	15,448	7.4	10.8	10.7
Saint Kitts and Nevis	921	16,066	0.0	-1.8	-0.9
Saint Lucia	2,181	1,299	-0.1	1.8	-0.9
Saint Vincent and the Grenadines	1,291	11,767	-2.3	0.4	1.5
Trinidad and Tobago	26,351	19,826	0.2	-2.6	0.2
Other <sup>3</sup>	NA	XX	XX	XX	XX
Total	493,834	XX	XX	XX	XX
<b>South America:</b>					
Argentina	735,125	17,917	9.2	8.9	1.9
Bolivia	54,601	5,041	4.1	5.2	5.2
Brazil	2,330,216	11,747	7.5	2.7	0.9
Chile	316,923	18,211	5.7	5.8	5.6
Colombia	497,255	10,671	4.0	6.6	4.0
Ecuador	149,484	10,214	2.9	7.8	5.1
French Guiana	NA	NA	NA	NA	NA
Guyana	6,175	7,964	4.4	5.4	4.8
Paraguay	40,429	6,053	13.1	4.3	-1.2
Peru	322,904	10,596	8.8	6.9	6.3
Suriname	6,709	12,299	4.1	4.7	4.8
Uruguay	53,631	15,865	8.9	6.5	3.9
Venezuela	397,890	13,481	1.5	4.2	5.6
Total	4,911,342	XX	XX	XX	XX
Americas total	23,125,307	XX	XX	XX	XX
World total	83,193,418	XX	XX	XX	XX

NA Not available. XX Not applicable.

<sup>1</sup>Source: International Monetary Fund, World Economic Outlook Database, October 2013.

<sup>2</sup>Gross domestic product listed may differ from that reported in individual country chapters owing to differences in source or date of reporting.

<sup>3</sup>Includes Anguilla, Aruba, Bermuda, Bonaire, British Virgin Islands, Cayman Islands, Cuba, Curacao, Guadeloupe, Martinique, Montserrat, Puerto Rico, Saba, Sint Eustatius, Sint Maarten, Turks and Caicos Islands, and U.S. Virgin Islands. Netherlands Antilles was dissolved in October 2010. Curacao and Sint Maarten became autonomous territories of the Kingdom of the Netherlands.



TABLE 3  
SELECTED SIGNIFICANT LATIN AMERICA AND CANADA EXPLORATION ACTIVITY IN 2012<sup>1</sup>

Location	Type <sup>2</sup>	Site	Commodity	Company	Resource <sup>3</sup>
Argentina	E	Altar	Cu, Au	Stillwater Mining Co.	3.4 Mt Cu, 1.5 Moz Au (D).
Do.	P	San Jose	Ag, Au	Hochschild Mining plc.	26.8 Moz Ag, 367,000 oz Au (R).
Do.	E	Taca Taca	Cu, Au, Mo	Lumina Copper Corp.	9.5 Mt Cu, 7.7 Moz Au, 281,000 t Mo (ID).
Brazil	E	Volta Grande	Au	Belo Sun Mining Corp.	2.8 Moz Au (R).
Canada	E	Akasaba	Au	Alexandria Minerals Corp.	254,000 oz Au (ID).
Do.	F	Aley	Nb	Taseko Mines Ltd.	1 Mt Nb <sub>2</sub> O <sub>5</sub> (D).
Do.	E	Angilak	U <sub>3</sub> O <sub>8</sub> , Ag, Cu, Mo	Kivalliq Energy Corp.	12,000 t U <sub>3</sub> O <sub>8</sub> , 932,000 oz Ag, 4,400 t Cu, 2,800 t Mo (IF).
Do.	E	Back River	Au	Sabina Gold & Silver Corp.	4.65 Moz Au (ID).
Do.	P	Black Fox/Grey Fox	Au	Brigus Gold Corp.	840,000 oz Au (R).
Do.	F	Blackwater-Davidson	Au, Ag	New Gold Inc.	8.1 Moz Au, 56 Moz Ag (ID).
Do.	E	Block 103	Fe	Cap-Ex Iron Ore Ltd.	2,100 Mt Fe (IF).
Do.	E	Brewery Creek	Au	Americas Bullion Royalty Corp.	583,000 oz Au (ID).
Do.	E	Brucejack	Au, Ag	Pretium Resources Inc.	9.4 Moz Au, 49 Moz Ag (D).
Do.	E	Coffee	Au	Kaminak Gold Corp.	3.2 Moz Au (IF).
Do.	E	Comtois	Au	Maudore Minerals Ltd.	544,000 oz Au (ID).
Do.	E	Cote Lake	Au	IAMGOLD Corp.	7.6 Moz Au (ID).
Do.	E	Duncan Lake	Fe	Century Iron Mines Corp.	256 Mt Fe (D).
Do.	E	Galore Creek	Cu, Au, Ag	Novagold Resources Inc.	3.1 Mt Cu, 5.4 Moz Au, 102 Moz Ag (R).
Do.	E	Golden Bear	Au	Northern Gold Mining Inc.	1.3 Moz Au (D).
Do.	E	Joanna	Au	Hecla Mining Co.	1.7 Moz Au (R).
Do.	P	Keno Hill/Bellekeno	Ag, Zn, Pb, Au	Alexco Resource Corp.	57 Moz Ag, 209,000 t Zn, 102,000 t Pb, 41,000 oz Au (ID).
Do.	E	Kerr-Sulphurets-Mitchell (KSM)	Au, Cu, Ag, Mo	Seabridge Gold Inc.	38 Moz Au, 4.5 Mt Cu, 191 Moz Ag, 97,000 t Mo (D).
Do.	E	Magino	Au	Argonaut Gold Inc.	6.2 Moz Au (ID).
Do.	F	Meladine East/West	Au	Agnico-Eagle Mines Ltd.	3 Moz Au (R).
Do.	E	Ootsa/Seel	Cu, Au, Mo, Ag	Gold Reach Resources Ltd.	142,000 t Cu, 370,000 oz Au, 10,000 t Mo, 4.4 Moz Ag (ID).
Do.	E	Phoenix	Au	Rubicon Minerals Corp.	480,000 oz Au (ID).
Do.	E	Premier	Au, Ag	Ascot Resources Ltd.	2.2 Moz Au, 15 Moz Ag (ID).
Do.	F	Rainy River	Au, Ag	New Gold Inc.	6.2 Moz Au, 14 Moz Ag (ID).
Do.	P	Rice Lake	Au	San Gold Corp.	253,000 oz Au (R).
Do.	P	Seabee	Au	Claude Resources Inc.	356,000 oz Au (R).
Do.	E	Spanish Mountain	Au, Ag	Spanish Mountain Gold Ltd.	3.2 Moz Au, 4.7 Moz Ag (D).
Do.	E	Springpole	Au, Ag	Gold Canyon Resources Inc.	4.4 Moz Au, 23 Moz Ag (ID).
Do.	P	Thunder Creek	Au	Lake Shore Gold Corp.	418,000 oz Au (PR).
Do.	E	Upper Beaver	Au, Cu	Osisko Mining Corp.	1.5 Moz Au, 25,000 t Cu (ID).
Do.	E	Valentine Lake	Au	Marathon Gold Corp.	681,000 oz Au (D).
Do.	E	Waterbury Lake	U <sub>3</sub> O <sub>8</sub>	Denison Mines Corp.	4,700 t U <sub>3</sub> O <sub>8</sub> (ID).
Do.	E	Wheeler River	U <sub>3</sub> O <sub>8</sub>	Denison Mines Corp.	24,000 t U <sub>3</sub> O <sub>8</sub> (ID).
Do.	E	Windfall Lake	Au	Eagle Hill Exploration Corp.	538,000 oz Au (ID).
Do.	E	Woodjam	Cu, Au	Gold Fields Ltd.	483,000 t Cu, 283,000 oz Au (IF).
Do.	F	Zeus/Kipawa	REE, Zr	Matamec Explorations Inc.	77,000 t REO, 160,000 t ZrO <sub>2</sub> (ID).

See footnotes at end of table.

TABLE 3—Continued  
SELECTED SIGNIFICANT LATIN AMERICA AND CANADA EXPLORATION IN 2012<sup>1</sup>

Location	Type <sup>2</sup>	Site	Commodity	Company	Resource <sup>3</sup>
Chile	P	Mariacunga	Au	Kinross Gold Corp.	4.3 Moz Au (R).
Do.	P	El Peñon	Au, Ag	Yamana Gold Inc.	2.3 Moz Au, 73 Moz Ag (R).
Do.	E	Los Helados	Cu, Au	NGEx Resources Inc.	4.7 Mt Cu, 6.8 Moz Au (ID).
Colombia	E	Berlin	U <sub>3</sub> O <sub>8</sub> , V, Ni, Mo, P <sub>2</sub> O <sub>5</sub> , REE	U <sub>3</sub> O <sub>8</sub> Corp.	660 t U <sub>3</sub> O <sub>8</sub> , 2,400 t V <sub>2</sub> O <sub>5</sub> , 1,200 t Ni, 340 t Mo, 350 t REO (ID).
Do.	E	Buritica	Au, Ag, Zn	Continental Gold Ltd.	1.6 Moz Au, 4.6 Moz Ag, 26,000 t Zn (D).
Guyana	E	Mathews Ridge	Mn	Reunion Mining Corp.	4.1 Mt Mn (D).
Mexico	P	La Colorada	Ag, Au	Argonaut Gold Inc.	64 Moz Ag, 66,000 oz Au (R).
Do.	D	La India	Au	Agnico-Eagle Mines Ltd.	774,000 oz Au (PR).
Do.	P	Mulatos	Au	Alamos Gold Inc.	2.4 Moz Au (R).
Do.	E	San Antonio	Au	Argonaut Gold Inc.	1.7 Moz Au (D).
Do.	P	San Francisco	Au, Ag, Zn	Timmins Gold Corp.	1.3 Moz Au (R).
Do.	E	San Miguel	Au, Ag	Paramount Gold & Silver Corp.	638,000 oz Au, 54 Moz Ag (ID).
Do.	E	Tuligtic	Au, Ag	Almaden Minerals Ltd.	953,000 oz Au, 55 Moz Ag (ID).
Panama	E	Cerro Quema	Au, Cu	Pershimco Resources Inc.	569,000 oz Au, 6,600 t Cu (D).
Peru	F	Azuca	Ag, Au	Hochschild Mining plc.	43 Moz Ag, 174,000 oz Au (D).

<sup>1</sup> Abbreviations used in this table for commodities are as follows: Ag, silver; Au, gold; Cu, copper; Fe, iron ore; Mn, manganese; Mo, molybdenum; Ni, nickel; Nb, niobium; Nb<sub>2</sub>O<sub>5</sub>, niobium pentoxide; P<sub>2</sub>O<sub>5</sub>, phosphate; Pb, lead; REE, rare earth elements; REO, rare earth oxides; U<sub>3</sub>O<sub>8</sub>, uranium; V, vanadium; V<sub>2</sub>O<sub>5</sub>, vanadium oxide; Zn, zinc; Zr, zirconium; ZrO<sub>2</sub>, zirconium oxide. Abbreviations used in this table for units of measurement are as follows: Moz, million troy ounces; Mt, million metric tons; oz, troy ounces; t, metric tons.

<sup>2</sup> D, approved for development; E, active exploration; F, feasibility work ongoing/completed; P, exploration at producing site.

<sup>3</sup> Quantity expressed as contained metal or element in ore based on 2012 data reported from various sources; D, measured + indicated; ID, indicated; IF, inferred; R, proven + probable. Data not verified by U.S. Geological Survey.

TABLE 4  
LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2012<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Country	Metals											
	Aluminum		Copper,		Gold,		Iron and steel		Lead, mine	Nickel,	Silver,	Tin, mine
	Bauxite	Metal, primary	Cu content	Au content (kilograms)	Iron ore, gross weight	Steel, crude	Pb content	Ni content	Ag content (metric tons)	Sn content (metric tons)	mine output, Ag content (metric tons)	mine output, Sn content (metric tons)
Argentina	--	413	136	59,700 <sup>e</sup>	--	4,996	25 <sup>e</sup>	--	700 <sup>e</sup>	--	--	--
Bolivia	--	--	9	6,973	--	--	79	--	1,214	--	19,702	--
Brazil <sup>p</sup>	33,260	1,436	223	66,773	400,822	34,682	17	139	72	43,667	--	--
Chile	--	--	5,434	49,936	17,330	1,683	(2)	--	1,195	--	--	--
Colombia <sup>p</sup>	--	--	1	66,178	173	1,324	--	70 <sup>e</sup>	19	--	--	--
Costa Rica	--	--	--	400	--	--	--	--	--	--	--	--
Cuba <sup>p</sup>	--	--	--	--	--	277	--	54	--	--	--	--
Dominican Republic	--	--	12	4,106	--	--	--	1,302	27	--	--	--
Ecuador	--	--	--	4,000	--	536	--	--	1	--	--	--
El Salvador <sup>e</sup>	--	--	--	--	--	102	--	--	--	--	--	--
French Guiana <sup>e</sup>	--	--	--	1,300	--	--	--	--	--	--	--	--
Guatemala	--	--	--	6,473	1,000 <sup>e</sup>	334	--	--	250 <sup>e</sup>	--	--	--
Guyana	2,210	--	--	13,643	--	--	--	--	--	--	--	--
Honduras	--	--	--	1,858	--	--	12	--	51	--	--	--
Jamaica <sup>p</sup>	9,291	--	--	--	--	--	--	--	--	--	--	--
Mexico	96	--	440	102,802	14,915	18,095	238	--	5,358	--	--	--
Nicaragua	--	--	--	6,981	--	--	--	--	10	--	--	--
Panama	--	--	--	2,115	--	--	--	--	--	--	--	--
Paraguay <sup>e</sup>	--	--	--	--	--	44	--	--	--	--	--	--
Peru <sup>p</sup>	--	--	1,198	161,325	10,132	981 <sup>e</sup>	249	--	3,479	26,105	--	--
Suriname	3,400	--	--	11,882	--	--	--	--	--	--	--	--
Trinidad and Tobago <sup>p</sup>	--	--	--	--	--	608 <sup>e</sup>	--	--	--	--	--	--
Uruguay	--	--	--	1,725	NA	139 <sup>e</sup>	--	--	--	--	--	--
Venezuela <sup>e</sup>	2,000	380	--	12,000	27,000	2,555 <sup>3</sup>	--	10	--	--	--	--
Other <sup>4</sup>	--	--	--	--	--	--	--	--	--	--	--	--
Total	50,300	2,230	7,450	580,000	471,000	66,400	621	1,580	12,400	89,500	--	--
Share of world total	20%	5%	44%	21%	15%	4%	12%	47%	13%	33%	--	--
Canada <sup>p</sup>	--	2,781	579	105,000	39,457	13,507	61	204	705	--	--	--
Share of world total	--	6%	3%	4%	1%	1%	1%	6%	1%	1%	--	--
United States	NA	2,070	1,170	235,000	54,200	88,700	345	--	1,060	--	--	--
Share of world total	NA	4%	7%	9%	2%	6%	7%	--	1%	--	--	--
Total Western Hemisphere	50,300	7,080	9,200	920,000	565,000	169,000	1,030	1,780	14,100	89,500	--	--
Share of world total	20%	15%	55%	34%	18%	11%	20%	53%	15%	33%	--	--
World total	256,000	46,800	16,800	2,700,000	2,980,000	1,560,000	5,200	3,360	97,200	273,000	--	--

See footnotes at end of table.

TABLE 4—Continued  
LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2012<sup>1</sup>

(Thousand metric tons unless otherwise specified)

Country	Mineral fuels and related materials													
	Metals—Continued			Industrial minerals				Natural gas				Crude, including condensate		Refinery products (thousand 42-gallon barrels)
	Zinc, mine output, Zn content (metric tons)	Cement, hydraulic	Gypsum	Phosphate rock, P <sub>2</sub> O <sub>5</sub> content	Salt	Coal, all grades	Dry (million cubic meters)	Plant liquids (thousand 42-gallon barrels)	including condensate (thousand 42-gallon barrels)					
Argentina <sup>e</sup>	34,000	10,716 <sup>3</sup>	1,500	--	17,000	160	44,123 <sup>3</sup>	10,000	207,878 <sup>3</sup>	288,390 <sup>3</sup>				
Bolivia	389,911	2,714	1	--	45 <sup>e</sup>	--	18,475	3,700	15,086	12,800 <sup>e</sup>				
Brazil <sup>p</sup>	164,158	68,787	3,750	2,388	7,482	6,635	25,415	9,850	762,582	800,200				
Chile	26,762	4,722	799	3 <sup>e</sup>	8,057	712	1,207	--	2,267	67,766				
Colombia	--	10,925	--	--	307 <sup>e</sup>	89,024	10,900	--	343,700	97,900 <sup>e</sup>				
Costa Rica	--	1,500 <sup>e</sup>	--	--	--	--	--	--	--	9,000 <sup>e</sup>				
Cuba <sup>p</sup>	--	1,833	131	--	216	--	1,020	--	19,000	86,235				
Dominican Republic	--	4,130	90	--	--	--	--	--	--	NA				
Ecuador	--	6,025	--	--	--	--	600 <sup>e</sup>	267	184,315	71,649				
El Salvador	--	1,200 <sup>e</sup>	--	--	--	--	--	--	--	--				
French Guiana	--	62 <sup>e</sup>	--	--	--	--	--	--	--	--				
Guatemala <sup>e</sup>	--	1,700	NA	--	60	--	(2)	--	4,000	1,000				
Guyana	--	--	--	--	--	--	--	--	--	--				
Honduras	26,000 <sup>e</sup>	1,700	--	--	--	--	--	--	--	--				
Jamaica	--	760	100 <sup>e</sup>	--	--	--	--	--	--	8,510 <sup>e</sup>				
Mexico	660,349	36,184	4,693	517	8,730	29,932	34,000 <sup>e</sup>	148,190	930,020	407,900				
Nicaragua	--	--	35	--	--	--	--	--	--	--				
Panama	--	881 <sup>e</sup>	--	--	17	--	--	--	--	--				
Paraguay <sup>e</sup>	--	650	5	--	--	--	--	--	--	2,660				
Peru <sup>p</sup>	1,280,975	8,100 <sup>e</sup>	345 <sup>e</sup>	3	1,200	226	3,678	31,596	24,396	71,550				
Suriname	--	65 <sup>e</sup>	--	--	--	--	--	--	5,940	2,310				
Trinidad and Tobago <sup>e</sup>	--	800	--	--	--	--	38,025 <sup>3</sup>	12,900	27,369 <sup>3</sup>	44,900				
Uruguay <sup>e</sup>	--	620	--	--	--	--	--	--	--	15,300				
Venezuela <sup>e</sup>	--	7,700	7	115	350	8,792 <sup>3</sup>	26,100	78,500	900,945 <sup>3</sup>	434,000				
Other <sup>4</sup>	--	--	--	--	--	--	--	--	1,030 <sup>e</sup>	--				
Total	2,580,000	172,000	11,454	3,030	43,500	135,000	204,000	295,000	3,430,000	2,420,000				
Share of world total	19%	5%	8%	5%	16%	2%	6%	11%	12%	9%				
Canada <sup>p</sup>	641,000	12,500	2,550 <sup>e</sup>	200 <sup>e</sup>	10,845	66,563	141,274	220,000 <sup>e</sup>	1,190,000 <sup>e</sup>	681,000 <sup>e</sup>				
Share of world total	5%	(2)	2%	(2)	4%	1%	4%	8%	4%	3%				
United States	738,000	74,900	15,800	8,590	37,200	922,000	717,000	879,000	2,370,000	1,640,000				
Share of world total	6%	2%	NA	13%	3%	12%	21%	33%	8%	6%				
Total Western Hemisphere	3,960,000	253,000	29,800	11,800	91,500	1,120,000	1,060,000	1,390,000	6,980,000	4,740,000				
Share of world total	30%	7%	22%	18%	32%	15%	31%	52%	24%	19%				
World total	13,300,000	3,810,000	137,000	65,200	270,000	7,740,000	3,420,000	2,690,000	28,600,000	25,600,000				

See footnotes at end of table.



TABLE 4—Continued  
 LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2012<sup>1</sup>

<sup>8</sup>Estimated; estimated data, U.S. data, and world totals are rounded to no more than three significant digits. <sup>P</sup>Preliminary. NA Not available. -- Zero or zero percent.

<sup>1</sup>Totals may not add due to independent rounding. Percentages are calculated on unrounded data. Includes data available as of May 7, 2014.

<sup>2</sup>Less than 1/2 unit.

<sup>3</sup>Reported figure.

<sup>4</sup>Includes Aruba, Barbados, Belize, Curacao, Guade loupe, Haiti, Martinique, Saba, Sint Eustatius, and Sint Maarten.

TABLE 5  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED BAUXITE MINE PRODUCTION, 2005–2019<sup>1</sup>

(Thousand metric tons)

Country	2005	2010	2012	2015 <sup>c</sup>	2017 <sup>c</sup>	2019 <sup>c</sup>
Brazil	22,034	29,000	33,260	34,800	35,200	36,500
Dominican Republic	535	9	--	--	10	100
Guyana	1,694	1,083	2,210	2,250	2,300	2,400
Jamaica	14,116	8,540	9,339	10,000	10,000	10,000
Suriname	4,757	3,104	3,400	3,450	3,500	3,500
Venezuela	5,900	2,500	2,000	2,000	2,000	2,000
Total	49,000	44,200	50,200	52,500	53,000	54,500

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are their rounded to no more than three significant digits; may not add to totals shown.

TABLE 6  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED  
PRIMARY AND SECONDARY ALUMINUM METAL PRODUCTION, 2005–2019<sup>1</sup>

(Thousand metric tons)

Country	2005	2010	2012	2015 <sup>c</sup>	2017 <sup>c</sup>	2019 <sup>c</sup>
Argentina	270	413	413	425	425	425
Brazil	1,749	1,788	1,666	1,400	1,400	1,400
Canada	3,070 <sup>2</sup>	3,000	2,820	3,700	3,700	3,700
Venezuela	615	335	380	380	380	380
Total	5,700	5,540	5,280	5,900	5,900	5,900

<sup>c</sup>Estimated.

<sup>1</sup>Estimated data and their totals are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes secondary aluminum production.

TABLE 7  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED COBALT MINE PRODUCTION, 2005–2019<sup>1</sup>

(Metric tons)

Country	2005	2010	2012	2015 <sup>c</sup>	2017 <sup>c</sup>	2019 <sup>c</sup>
Brazil	1,500	3,139	2,900	3,100	3,150	3,200
Canada	5,767	4,568	6,625	7,100	7,200	7,200
Cuba	5,277	4,850	4,600	4,400	4,400	4,400
Total	12,500	12,600	14,100	14,600	14,800	14,800

<sup>c</sup>Estimated.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 8  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 2005–2019<sup>1</sup>

(Metal content in thousand metric tons)

Country	2005	2010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Argentina	187	140	136	100	200	200
Bolivia	(2)	2	9	10	10	10
Brazil	133	214	223	225	230	235
Canada	595	522	579	730	740	700
Chile	5,321	5,419	5,434	5,800	6,000	6,200
Colombia	2	4	1	2	4	4
Dominican Republic	--	10	12	12	15	15
Ecuador	--	--	--	--	30,000	60,000
Mexico	429	238	440	536	545	578
Peru	1,010	1,094	1,198	1,200	1,210	1,250
Total	7,680	7,640	8,030	8,600	39,000	69,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and their totals are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Less than 1/2 unit.

TABLE 9  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED REFINED COPPER METAL PRODUCTION, 2005–2019<sup>1</sup>

(Thousand metric tons)

Country	2005	2010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Argentina <sup>2</sup>	16	16	15	15	15	15
Bolivia	--	1	2	2	2	2
Brazil	224	253	217	225	250	265
Canada	515	320	276	300	300	300
Chile <sup>3</sup>	2,824	3,244	2,902	2,700	2,600	2,500
Mexico	416	278	370	380	400	400
Peru <sup>3</sup>	512	394	311	350	410	480
Total	4,510	4,510	4,090	4,000	4,000	4,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Secondary only.

<sup>3</sup>Primary only.

TABLE 10  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 2005–2019<sup>1</sup>

(Au content in kilograms)

Country	2005	2010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Argentina	27,904	63,138	59,700	58,000	58,000	58,000
Belize	(2)	--	--	--	--	--
Bolivia	8,801	6,394	6,973	7,000	7,000	7,000
Brazil	38,293	62,047	66,773	66,900	67,100	67,500
Canada	120,541	102,693	105,270	106,000	110,000	110,000
Chile	40,447	39,494	49,936	60,000	70,000	85,000
Colombia	35,783	53,600	66,178	39,000	39,000	39,000
Costa Rica	424	--	400	200	200	200
Cuba	--	--	--	--	--	--
Dominican Republic	--	500	4,106	35,000	35,000	35,000
Ecuador	5,338	4,600	4,000	5,000	7,000	9,000
French Guiana	1,955	1,140	1,300	1,400	1,500	1,600
Guatemala	741	9,213	6,473	7,000	7,500	8,000
Guyana	8,325	9,594	13,643	13,800	13,900	13,900
Honduras	4,438	2,197	1,858	2,000	2,000	2,000
Mexico	30,356	72,600	102,802	119,000	125,000	127,000
Nicaragua	3,674	4,900	6,981	5,000	5,000	5,000
Panama	--	870	2,115	2,000	5,000	8,000
Peru	208,002	164,084	161,325	166,000	168,500	171,000
Suriname	10,619	10,886	11,882	12,000	12,000	12,500
Uruguay	3,151	1,740	1,725	1,750	1,780	2,000
Venezuela	10,480	12,000	12,000	12,500	12,600	12,800
Total	559,000	622,000	685,000	720,000	748,000	775,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Less than 1/2 unit.

TABLE 11  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED BENEFICIATED IRON ORE PRODUCTION, 2005–2019<sup>1</sup>

(Fe content in thousand metric tons)

Country	Iron content	2005	2010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Argentina	68%	--	--	--	--	--	--
Bolivia	65%	--	(2)	(2)	10	10	10
Brazil	66%	186,891	247,772	258,129	259,000	259,000	260,000
Canada <sup>3</sup>	64%	19,333	23,300	25,000	38,000	48,000	57,000
Chile	61%	4,707	5,852	9,429	13,000	16,000	18,000
Colombia	60%	325	77	173	200	200	200
Cuba	45%	9	--	--	--	--	--
Guatemala	65%	7	(2)	1	1	1	1
Mexico	60%	7,012	7,931	8,047	8,500	9,000	9,200
Peru	68%	4,565	6,140	6,792	6,800	6,850	7,000
Uruguay	50%	12	16	16	16	16	16
Venezuela	65%	13,000	14,000	17,000	17,500	18,000	18,500
Total	XX	236,000	305,000	325,000	343,000	357,000	370,000

<sup>e</sup>Estimated. XX Not applicable. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Less than 1/2 unit.

<sup>3</sup>Includes beneficiated and direct-shipping ore.

TABLE 12  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED CRUDE STEEL PRODUCTION, 2005–2019<sup>1</sup>

(Thousand metric tons)

Country	2005	2010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Argentina	5,386	5,138	4,996	5,000	5,000	5,000
Brazil	31,631	32,928	34,682	34,800	35,200	35,500
Canada	15,327	13,003	13,507	16,000	16,000	16,000
Chile	1,537	1,011	1,683	1,650	1,650	1,650
Colombia	1,007	1,213	1,324	1,300	1,400	1,400
Cuba	245	278	277	275	275	275
Dominican Republic	242	193	300	300	300	300
Ecuador	389	372	536	500	500	500
El Salvador	48	64	102	120	120	120
Guatemala	207	274	334	350	370	400
Jamaica	--	--	--	--	--	--
Mexico	16,202	16,710	18,095	18,500	19,000	19,500
Paraguay	101	59	44	50	60	70
Peru	750	880	981	985	925	950
Trinidad and Tobago	711	572	608	620	650	650
Uruguay	64	65	139	145	150	155
Venezuela	4,907	2,207	2,555	2,600	2,650	2,800
Total	78,800	75,000	80,200	83,200	84,000	85,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 13  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED NICKEL MINE PRODUCTION, 2005–2019<sup>1</sup>

(Metric tons)

Country	2005	2010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Brazil	4,845,695	11,128,385	14,749,112	14,800,000	15,000,000	15,000,000
Canada	199,932	160,063	204,461	220,000	225,000	225,000
Colombia	89,000	70,200	50,000	50,000	50,000	50,000
Cuba	73,753	58,000	54,000	58,000	79,000	79,000
Dominican Republic	53,124	--	15,186	--	--	--
Venezuela	20,000	10,400	10,400	10,400	10,400	10,400
Total	5,280,000	11,400,000	15,100,000	15,100,000	15,000,000	15,000,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 14  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PALLADIUM MINE PRODUCTION, 2005–2019

(Pd content in kilograms)

Country	2005	2010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Canada	10,400	6,200	13,100	19,000	19,000	19,000

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits.



TABLE 15  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PLATINUM MINE PRODUCTION, 2005–2019<sup>1</sup>

(Pt content in kilograms)

Country	2005	2,010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Canada	6,075	3,500	7,500	8,000	8,000	8,000
Colombia	1,082	997	1,460	1,500	1,600	1,600
Total	7,160	4,500	8,960	9,500	9,600	9,600

<sup>e</sup>Estimated.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 16  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN MINE PRODUCTION, 2005–2019<sup>1</sup>

(Sn content in metric tons)

Country	2005	2010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Argentina	1	--	--	--	--	--
Bolivia	18,433	20,190	19,702	19,000	22,000	22,000
Brazil	11,739	10,400	13,667	14,700	16,000	16,000
Peru	42,145	33,848	26,105	30,000	32,000	33,500
Total	72,300	64,400	59,500	64,000	70,000	72,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 17  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN METAL PRODUCTION, 2005–2019<sup>1</sup>

(Metric tons)

Country	2005	2010	2011	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Brazil	9,236	9,098 <sup>†</sup>	11,955	13,000	13,100	14,000
Bolivia	13,941	15,003	14,517	15,000	22,000	22,000
Mexico	17	--	--	--	--	--
Peru	36,733	36,451	24,811	32,300	33,500	35,000
Total	59,900	60,600	51,300	60,000	69,000	71,000

<sup>e</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 18  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED DIAMOND PRODUCTION, 2005–2019<sup>1</sup>

(Thousand carats)

Country	2005	2010	2012	2015 <sup>e</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Brazil	208	25	46	50	55	60
Canada	12,314	11,773	10,451	9,000	11,000	10,000
Guyana	357	50	41	45	50	55
Venezuela	115	15	15	15	15	15
Total	13,000	11,900	10,600	9,110	11,100	10,100

<sup>e</sup>Estimated.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 19  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED LITHIUM PRODUCTION, 2005–2019<sup>1</sup>

(Li content in metric tons)

Country	2005	2010	2012	2015 <sup>c</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Argentina	2,800	3,213	2,529	5,000	7,000	10,000
Bolivia	--	--	--	5	8	8
Brazil	210	489	390	425	450	475
Canada	670	--	--	3,800	3,800	3,800
Chile	8,290	9,722	13,226	13,500	13,500	13,500
Total	12,000	13,400	13,600	23,000	24,800	28,800

<sup>c</sup>Estimated. -- Negligible or no production.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

TABLE 20  
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED SALABLE COAL PRODUCTION, 2005–2019<sup>1</sup>

(Thousand metric tons)

Country	2005	2010	2012	2015 <sup>c</sup>	2017 <sup>e</sup>	2019 <sup>e</sup>
Argentina	320	140	160	140	120	100
Brazil	6,480	5,743	6,635	6,750	7,000	7,000
Canada <sup>2</sup>	67,555	67,876	66,563	70,000	80,000	90,000
Chile	732	619	712	700	700	700
Colombia	59,064	74,350	89,024	99,700	108,000	130,000
Mexico <sup>2</sup>	11,750	27,565	29,932	29,000	28,000	28,000
Peru <sup>2</sup>	22	121	226	250	275	310
Venezuela	7,195	2,000	1,297	1,350	1,000	2,000
Total	153,000	178,000	195,000	208,000	225,000	258,000

<sup>c</sup>Estimated.

<sup>1</sup>Estimated data and totals are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Run of mine.