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IRON ORE [ADVANCE RELEASE]

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Iron Ore

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In 2014, the domestic iron ore market continued to focus on reducing costs and improving efficiencies as the global industry experienced rapid price declines. In the United States, the vertically integrated structure of iron and steel companies and long-term price contracting buffered iron ore and steel margins from falling global prices; however, low-cost steel imports increased competition in the steel industry and reduced demand for domestic iron ore. U.S. iron ore production increased by 6% to 56.1 million metric tons (Mt) of usable ore in 2014 from 52.8 Mt in 2013. The United States was the eighth-ranked world producer of iron ore by usable ore and iron content (fig. 1, table 9).

In the global market, increased supply from Australia and reduced consumption in China resulted in slight oversupply. Iron ore mines that contributed to global seaborne trade faced an especially competitive market as Australia and Brazil increased production, on a usable-ore basis, by 92 Mt and 25 Mt, respectively, in 2014. As a result, capacity was displaced as high-cost mines were idled. Global iron ore production was 2.33 billion metric tons (Gt), by usable ore, and 1.43 Gt, by iron content, each a 4.4% increase from that in 2013. Global iron ore production, on a usable-ore basis, was led by Australia (774 Mt), Brazil (411 Mt), China (410 Mt), India (129 Mt), and Russia (102 Mt), which together accounted for 78% of global production.

Iron ore is the basic raw material for producing steel, a metal critical to the economies of all industrialized nations. Two iron oxides—hematite (Fe_2O_3) and magnetite (Fe_3O_4)—are the primary ore minerals of iron found in the United States. The principal form of iron ore mined in the United States contains hematite and magnetite in varying proportions, averaging 25% to 30% iron content (Fe), and occurs in hard, fine-grained, banded iron formations also known as taconite. Magnetite is the main iron oxide recovered during concentration, although hematite tailings have become an alternative primary source of iron.

In the United States, low-grade iron ore is concentrated to reach, on average, the 62.5% Fe or greater benchmark required globally for steel production. The concentrates can then be agglomerated using binders to create iron ore pellets, which are more easily transported and melt more efficiently in blast furnaces. More than 98% of all domestic iron ore production is transformed into molten iron, also known as pig iron, in blast furnaces by removing residual oxygen. The pig iron can then be transferred to basic oxygen furnaces (BOFs) for the removal of residual carbon and conversion to steel.

Minimills use electric arc furnaces (EAFs) to produce steel from iron metallics and recycled steel scrap. Iron metallics—cold pig iron, direct-reduced iron (DRI), hot-briquetted iron (HBI), and iron nuggets—are intermediate iron products that have become increasingly cost effective as a supplement to lower grades of steel scrap when integrated into the EAF process. DRI, also known as sponge iron, is produced through solid-state reduction of iron ore to 90% to 94% Fe (about the same iron content as molten pig iron); however, DRI requires special handling owing to its high susceptibility to oxidation. HBI is a higher density, premium quality form of briquetted DRI with lower susceptibility to oxidation. Iron nuggets, also known as iron nodules, are the least reactive among iron metallics, and are a premium grade of pig iron, with an average 97% to 99% Fe and almost no gangue.

Iron ore may be used for nonsteel applications including ballast, cement clinker production, coal washing, crushed road base material, fertilizer, heavy media separation, iron oxide pigments, ferrite magnets, oil and gas well drilling, radiation shielding, water treatment, and other specialty applications. These applications represent a relatively small portion of iron ore consumption, estimated to be collectively around 1 Mt; some applications require costly beneficiation to create high-grade products. Data for these applications are not included in the U.S. Geological Survey's (USGS's) tables for iron ore domestic consumption, exports, imports, production, shipments, or stocks, unless otherwise noted. With the exception of iron oxides and cement clinker, USGS surveys do not include production or consumption of iron ore for miscellaneous, nonsteel end uses.

This report includes information from surveys of domestic producers, government agency reports, company reports, and public information. Trade data in this report are sourced from the U.S. Census Bureau. Labor statistics were based on data available from the Mine Safety and Health Administration. Percentages in the report were computed using unrounded data and are rounded to no more than three significant digits.

Legislation and Government Programs

The U.S. Environmental Protection Agency (EPA) issued Notices of Violation to the Empire, Tilden, and United Taconite Mines, operated by Cliffs Natural Resources Inc., in the first quarter of 2014. The notices pertained to alleged historical violations of the 2002 rule establishing national emission standards for hazardous air pollutants from taconite iron ore processing plants, pursuant to section 112(d) of the Clean Air Act, which requires facilities to meet emission standards using the maximum achievable control technology. After meetings between the EPA and Cliffs in the second quarter of 2014, the matter was referred to the U.S. Department of Justice for enforcement (Cliffs Natural Resources Inc., 2015, p. 46).

Actions required to mitigate environmental hazards have continued to affect the U.S. iron ore industry, including

the EPA's Federal Implementation Plan to monitor and set nitrogen oxide emission limits, which went into effect in 2014, and Minnesota's Mercury Total Maximum Daily Load Implementation Plan, which was designed to reduce airborne mercury emissions from taconite facilities by 75% by 2025. The Supreme Court reinstated the EPA's Cross State Air Pollution Rule in late 2014, with an effective date of January 1, 2015, affecting Minnesota electrical utility providers that service taconite operations (Cliffs Natural Resources Inc., 2015, p. 14–15). The State of Minnesota adopted the Minnesota Pollution Control Agency's Mercury Air Emissions Reporting and Reduction Rule in September 2014, which affected mercury emissions reporting and reduction rules for seven iron operations (Minnesota Pollution Control Agency, 2014, p. 1–2).

Production

The USGS developed the U.S. iron ore data shown in tables 1 and 2 through an annual "Iron Ore" survey, which was sent to 17 mines and facilities that produce iron ore and iron metallics for steel production. This information was supplemented by company reports, employment data, mine inspection reports, and tax data. Steel plant data were compiled by the American Iron and Steel Institute. Information on the capacity, production, and reserves of individual operations in the United States can be found in table 3.

Alabama.—Armco Metals Holdings, Inc. entered into an agreement to acquire 100% of Draco Resources, Inc. via a stock exchange valued at approximately $46 million. Draco Resources, a company involved in iron ore exploration and trading, owns exclusive rights of management, operation, distribution, and sale of a 5-Mt stockpile of iron ore fines in Alabama. Armco transported its first shipment, 55,000 metric tons (t) of iron ore, to China in March 2014 and planned to transfer the remaining stockpile by shipping one- to three-vessels-worth of iron ore monthly to China during over the next 4 years (Armco Metals Holdings, Inc., 2014).

Indiana.—Magnetation LLC's Reynolds Pellet Plant in Reynolds began operations in October using concentrates from Magnetation's iron ore reclamation operations in Minnesota. The plant's flux pellet capacity was expected to feed partner AK Steel's blast furnaces in Ohio and Kentucky (Magnetation LLC, 2014b).

Louisiana.—Nucor Steel Louisiana, LLC's 2.5-million-metric-ton-per-year (Mt/yr) DRI operation, which began production in St. James Parish in late December 2013, shut down in July and September to make adjustments to improve yield and conversion costs. The facility was idled in November following failure of the plant's process gas heater. The plant was expected to resume normal operations in the first quarter of 2015. Nucor planned on continued development of the facility as part of the first phase in its site development plan (Nucor Corp., 2015, p. 21).

Michigan.—In 2014, operations in Michigan reportedly produced 12.1 Mt of pellets, 15% greater than 10.5 Mt in 2013 (table 2). Cliffs announced that its Empire Mine would remain open until yearend 2016, owing to extension of supply and joint-operating agreements with ArcelorMittal USA Inc. Cliffs' operations in Michigan were planned to return to regulated electric utility service in February 2015, which would result in a $5 per megawatthour increase over average 2014 rates (Cliffs Natural Resources Inc., 2015, p. 69, 90).

Minnesota.—In 2014, operations in Minnesota produced 41.4 Mt of pellets, 6% greater than the 39.3 Mt produced in 2013. Overall production of iron products in the State increased by nearly 5% to 43.2 Mt in 2014, from 41.0 Mt in 2013 (table 2). Nonoperational deposits in Minnesota's Mesabi Range, including the former LTV Corp. mine and the Buhl, Kinney, McKinley, and Sherman Deposits, were estimated to contain approximately 1.5 Gt of high-grade iron ore. An additional 1 Gt of iron ore in tailings ponds and stockpiles was also considered economically recoverable (Minnesota Department of Natural Resources, 2013).

Cliffs increased production at its Northshore Mine by 1.4 Mt after restarting two furnaces that were idled in January 2013; however, one of the four furnaces was idled in January 2015. Production decreased by 260,000 t at the company's United Taconite Mine owing to extreme weather and unplanned maintenance outages. The company planned to initiate a pilot energy hedging program to manage price risk for energy commodities in early 2015 (Cliffs Natural Resources Inc., 2015, p. 69, 90).

Essar Steel Minnesota LLC concluded a financing agreement in October to complete construction on a 7-Mt/yr open pit iron mine, concentrating facility, and pelletizing plant. The facility was scheduled to start production by the second half of 2016 and would be the only U.S. facility capable of producing standard, fluxed, and direct-reduced grade pellets (Essar Steel Minnesota LLC, 2014). Magnetation LLC started production at their Plant #4 near Grand Rapids, MN, in December. The 2-Mt/yr concentrate plant began production three quarters ahead of the original project schedule and will supply the company's pellet plant in Indiana (Magnetation LLC, 2014a).

United States Steel Corp.'s Minntac Mine in Mountain Iron, MN, received State permits required to expand their mine pits by 5% and extend the mine life by 16 years. The Minnesota Pollution Control Agency also stated that water quality standards were not expected to be violated at the project. Agency officials stated that the mine was working to resolve compliance issues and expected a new discharge permit for the company by 2015. The Minnesota Department of Natural Resources determined a full environmental impact statement would not be necessary. However, the expansion would require a Federal permit from the U.S. Army Corps of Engineers and a decision was expected by spring 2015 (Associated Press, 2014; Myers, 2014). United States Steel Corp. announced it would not pursue the expansion of the Keewatin Taconite in Keewatin, MN (United States Steel Corp., 2015, p. 15). The company's planned expansion of the iron ore mine would have restarted an idled pelletizing line and increased production by 3.6 Mt.

Texas.—Construction began on voestalpine Texas LLC's DRI plant near Corpus Christi, TX. The $735 million facility was expected to produce 2 Mt/yr of HBI and DRI to supply voestalpine AG's steel mills in Austria (voestalpine AG, 2014).

Utah.—In October, CML Metals Corp. idled its 2-Mt/yr Comstock Mountain Lion Mine and concentrator in Cedar City,

UT, for an indefinite period. The mine exported the majority of its production to the Pacific region and was the only iron ore mine in the Western United States. The idling was the result of significant decreases in the price of seaborne iron ore exports (Palladon Ventures Ltd., 2014).

Wisconsin.—Six Wisconsin Indian tribes met with representatives of the EPA in August to request an environmental review of the Gogebic Taconite LLC iron ore development project in Ashland County, WI. The meeting was to address the tribes' ongoing concerns that mine development and operations might negatively affect local waterways (Conley, 2014). In September, Gogebic Taconite LLC considered restructuring the proposed mine to avoid operating in Ashland County, WI, following recent approval of a zoning ordinance requiring a special-use permit. The permit would require the company to pay $100,000 to Ashland County to defray expenses caused by the mine. The restructure would only reduce the area of the mine by 162 hectares, with about 1,300 hectares remaining in Iron County, and the mine life from 35 years to 30 years. No mining application was expected to be submitted until fall 2015, allowing for additional time to gather environmental data to assess the mine's potential effects on groundwater (Bergquist, 2014).

Consumption

Iron ore is primarily consumed in the steelmaking process. In 2014, domestic iron ore supply (production minus exports) was nearly abundant enough to meet U.S. steel demand based on reported consumption (tables 1, 4). In 2014, construction was the leading consumer use of steel (40%), followed by automotive (26%), machinery and equipment (10%), energy (10%), container (4%), appliances (4%), and national defense (3%) (American Iron and Steel Institute, 2015, p. 2, 79). It is estimated that producing 1 t of steel requires 0.4 t of coking coal, 0.3 t of steel scrap, and 1.3 t of iron ore pellets, as well as 6 million British thermal units of natural gas, using blast furnaces at normal operating conditions. In 2014, U.S. consumption of iron ore, gross weight, reported to the American Iron and Steel Institute, totaled 44.4 Mt, including 37.5 Mt of pellets; 5.5 Mt of sinter, briquettes, nodules, and other products; and 1.3 Mt of direct-shipping ore (table 4).

Raw steel production in the United States increased slightly to 88.2 Mt in 2014 from 86.9 Mt in 2013. Raw steel produced using BOF technology, which had decreased in 2009 to the lowest level in more than a decade, rebounded through 2012; however, levels continued to decrease slightly from 2012 through 2014, decreasing to 33.0 Mt in 2014 from 34.3 Mt in 2013. Raw steel produced using EAFs increased to 55.2 Mt in 2014 from 52.6 Mt in 2013. The United States imported 10.4 Mt of finished and semifinished iron (including pig iron, sponge iron, and cast iron) and ferroalloy products in 2014, an 11% increase from 9.4 Mt in 2013, and exported 468,000 t of iron and steel products in 2014, a 10% increase from 424,000 t in 2013. Integrated steel mills in the United States produced steel from iron ore, imported pig iron, and semifinished steel; minimills produced steel from DRI and scrap. In 2014, the minimill sector of the steel industry accounted for 62.6% of U.S. raw steel production, an increase from 60.6% in 2013 (American Iron and Steel Institute, 2015, p. 35, 47, 70).

Materials consumed for steel production included 6.4 Mt of fluxes (fluorspar, limestone, lime, and other fluxes) and 10.9 Mt of coke. Imported iron ore supplemented domestically produced iron ore in the production of pig iron, which was used along with imported pig iron and scrap to produce raw steel. Pig iron produced in the United States in 2014 decreased by 3.0% to 29.4 Mt in 2014 from 30.3 Mt in 2013 (American Iron and Steel Institute, 2015, p. 75, 77–78). Iron ore used in the production of clinker for cement was estimated to be 812,000 t in 2014, 21% higher than the 671,000 t used in 2013 (Hendrik van Oss, Mineral Commodity Specialist, U.S. Geological Survey National Minerals Information Center, unpub. data, December 2015). In 2014, U.S. imports for consumption of iron oxides, natural and synthetic, were 175,000 t, 6% greater than in 2013, and finished pigments sold, natural and synthetic, totaled 45,300 t, 4% less than in 2013 (Tanner, 2016).

Transportation

Iron ore is transported from mines to rail stations by heavy hauling trucks. From there, ore is typically transported by freighter across the Great Lakes or through the St. Lawrence Seaway or by rail to domestic and intercontinental destinations. In the United States, bulk iron ore products are typically transported by freighters across the Great Lakes owing to cost-effective transportation rates. International shipments then use the St. Lawrence Seaway to access the Atlantic Ocean. Cyclical fluctuations in shipments, production, sales, and stocks of iron ore in Minnesota and Michigan from December through April were attributed to the closing and reopening of the Soo Locks at Sault Ste. Marie, MI, as well as to frozen lake surfaces.

At yearend 2014, the Lake Carriers' Association called for the construction of a second heavy icebreaker to keep Great Lakes shipping lanes open as much as possible during the winter season. Record levels of ice cover on the Great Lakes reportedly cost the economy $705 million and 3,800 jobs during the 2013–14 winter season (Lake Carriers' Association, 2015).

Prices

In 2014, the average value of iron ore in the United States was $85.88 per metric ton, a decrease from $87.42 per metric ton in 2013 (table 1). The average value of exported iron ore was $109.25 per metric ton, a 19% decrease from $134.33 in 2013. The average unit value of exports totaling more than 1,000 t to any single country ranged from $60.65 to $119.33 per metric ton (table 5). The average value of imported iron ore was $131.40 per metric ton, essentially unchanged from $131.18 in 2013. The average unit value of imports totaling more than 1,000 t to any single country ranged from $64.64 to $138.34 per metric ton (table 6). The producer price index for iron ore rose from 140.0 in January 2014 to 152.9 in June before falling to 132.7 in December. The 2014 average index of 142.3 was 7% greater than the average of 133.4 in 2013 (U.S. Bureau of Labor Statistics, 2015).

The average monthly spot price of imported iron ore fines, 62% Fe, at Tianjin port, China, fell from $128.12 per metric ton in January to $92.74 per metric ton in June, rose slightly to $95.97 per metric ton in July, and then steadily declined throughout the remainder of the year, ending the year at $68.80 per metric ton. In 2014, the lowest average monthly spot market price, $68.80 per metric ton in December, was 40% lower than the lowest average monthly spot price of 2013, $114.82 per metric ton in June. In 2014, the highest average monthly spot market price, $128.12 per metric ton in January, was 17% lower than the highest average monthly spot price of 2013, $154.64 per metric ton in February (Index Mundi, undated).

Foreign Trade

In 2014, U.S. exports were 12.1 Mt, a 10% increase from 11.0 Mt in 2013. U.S. iron ore pellet exports accounted for 79% (9.6 Mt) of total exports. Among U.S. exports, 71% was shipped to steel companies in Canada, 14% to China, and 13% to Mexico (tables 1, 5). Imports in 2014 were 5.1 Mt, a 58% increase from 3.2 Mt in 2013. Among U.S. imports, Canada accounted for 56% and Brazil accounted for 35%. Imports from the following countries increased year on year: Brazil, by 182%; Canada, 37%; Peru, 192%; and Sweden, 214%. Imports from the following countries decreased year on year: Argentina, by 28%; Chile, 54%; and South Africa, 69%. All other countries imported less than 1,000 t in 2014 or 2013 (table 6).

World Industry Structure

Production.—World iron ore production in 2014 was 2.33 Gt on a usable-ore basis, a 4.4% increase from 2.23 Gt in 2013, and 1.43 Gt by iron content, a 4.4% increase from 1.37 Gt in 2013. By iron content, Australia remained the leading iron ore producer (468 Mt), followed by Brazil (262 Mt), China (254 Mt), India (80 Mt), and Russia (62 Mt) (fig. 1, table 9).

International iron and steel companies expected 125 Mt of iron ore production capacity to be eliminated by yearend 2014, primarily in Australia, China, Indonesia, Iran, and South Africa. Consolidation may have influenced mine closures in small Provinces and regions in China, such as Chaoyang, where two-thirds of the mines were thought to have stopped production. Analysts estimate capacity-utilization rates at some iron ore mines in China fell to approximately 33% in 2014, and use of imported ore rose to 88% of consumption in September 2014 from 75% of consumption in January 2014. Mine closures and capacity reductions were attributed to sustained low prices driven by increased seaborne trade and weak iron ore demand (Stanway, 2014).

Consumption.—Production of iron metallics and steel is an indicator of iron ore consumption. World consumption of iron ore was estimated to have decreased slightly in 2014, as reflected by decreases in pig iron production (-2.0%) and DRI production (-0.4%), with only a slight increase in raw steel production (1.0%), compared with 2013. Global DRI production remained essentially unchanged at 74.6 Mt in 2014 from 74.9 Mt in 2013. The Middle East and North Africa region was the leading producer of DRI with 32.8 Mt, followed by the Asia and Oceania region (18.8 Mt), Latin America (including Mexico and the Caribbean) (12.7 Mt), the Commonwealth of Independent States (CIS) and Eastern Europe (5.35 Mt), North America (2.85 Mt), Sub-Saharan Africa (1.55 Mt), and Western Europe (0.57 Mt) (Midrex Technologies, Inc., 2015). World production of pig iron decreased to 1.18 Gt from 1.21 Gt in 2013. Asia was the leading regional producer of pig iron with 916 Mt, followed by Europe (106 Mt), CIS (80 Mt), North America (45 Mt), South America (34 Mt), Africa (5 Mt), Oceania (4 Mt), and the Middle East (3 Mt). Global raw steel production increased to 1.67 Gt from 1.65 Gt in 2013. In 2014, nine countries each produced more than 30 Mt of raw steel and, combined, accounted for 82% of world production. Of those countries, raw steel production increased the most in the Republic of Korea (by 5.4 Mt), followed by India (5.3 Mt), Russia (2.4 Mt), and the United States (1.3 Mt), whereas production in Ukraine decreased by 5.6 Mt (American Iron and Steel Institute, 2015, p. 115–120).

Trade.—Global iron ore imports rose to 1.36 Gt in 2014, a 10% increase from 1.24 Gt in 2013. This continued the trend of year-over-year increases in imports during the past 12 years. Since 2002, China, Germany, Japan, and the Republic of Korea have accounted for more than two-thirds of global imports, with their combined share increasing to 87% in 2014 from 62% in 2002. China's share more than tripled during this 12-year period to 68% from 21%. Global iron ore exports rose to 1.41 Gt in 2014, a 9.0% increase from 1.30 Gt in 2013. Australia was the leading country of origin of iron ore exports (53%), followed by Brazil (24%), South Africa (4.7%), Ukraine (2.9%), and Canada (2.8%) (United Nations Commodity Trade Statistics Database, undated).

Exploration.—Companies continued to expand current mines and facilities, to develop mines, and to investigate new deposits; however, reductions in price and increases in iron ore supplied to the seaborne market were expected to drastically reduce expenditures into developing properties not already under construction. Iron ore expenditures, as a percentage of total exploration expenditures, were highest in Australia (40%), followed by Africa (9%), Asia (9%), Europe (6%), Canada (5%), and the CIS (3%) (Wilburn and others, 2015). The United Nations Conference on Trade and Development reported new production capacity could be operational between 2013 and 2015, with 360 Mt classified as "certain," 231 Mt as "probable," and 306 Mt as "possible," of which 32% would be located in Australia with the remainder in South America (29%), Africa (13%), Europe (11%), Asia (11%), and North America (4%) (Mojarov, 2013).

World Review

Australia.—Production of iron ore in Australia was 774 Mt, on a usable-ore basis, in 2014, 13% greater than the 683 Mt produced in 2013 and 39% greater than production in 2012. On a year-over-year basis, iron ore production in Australia increased by 92 Mt in 2014, 127 Mt in 2013, 68 Mt in 2012, and 55 Mt in 2011. Australia's increase in iron ore production over the past 5-year period, 341 Mt from 2010 through 2014, accounted

for 60% of increases in global production (table 9). Australia's reported Economic Demonstrated Resources increased by yearend 2014 to 54.4 Gt with 24.6 Gt of contained iron; however, the estimated resource life decreased to 75 years from the 85 years estimated in 2013 (Britt and others, 2015, p. 5, 14).

The three leading miners in Australia—BHP Billiton Ltd., Fortescue Metals Group Ltd., and Rio Tinto Group—were three of the four leading iron ore mining companies in the world and accounted for over 70% of production in Australia in 2014. Operations in Australia were affected by seasonal cyclone activity in January and February, which resulted in temporarily suspended operations. All three mining companies focused on adding capacity while reducing production costs, which ranged from less than $20 per metric ton to around $35 per metric ton for iron ore mined in situ.

BHP Billiton's share of production among Australian operations in FY 2014 rose to 193 Mt, a 21% increase from 159 Mt in FY 2013. Production was expected to increase to 211 Mt in FY 2015 as part of optimizing operations and expansion projects aimed at increasing production capacity to 290 Mt/yr. Production was suspended at the Yarrie Mine in February 2014, owing to improved productivity at the company's other mines, and operations began at the Jimblebar Mine in April. The Jimblebar Mine produced 9 Mt in FY 2014 and was expected to produce 35 Mt in FY 2015 (BHP Billiton Ltd., 2015, p. 82–83, 102).

Fortescue's production in FY 2014 increased to 140 Mt, a 48% increase over the 94.6 Mt produced in FY 2013. In June, the company reached a 160-Mt/yr production operating rate as part of ongoing production and shipping capacity expansion projects, including additional berths, construction of ore processing facilities, expanded railway, pipeline extension, and reduction of strip ratios. Exploration led to an additional 1.16 Gt of resources added to the Greater Solomon mineral resource (Fortescue Metals Group Ltd., 2014, p. 11, 14–15, 83).

Rio Tinto's share of production among Australian operations in 2014 was 225 Mt, a 12% increase compared with the 200 Mt produced in 2013. Rio Tinto completed its first-phase expansion at Pilbara to reach a 290-Mt/yr capacity and run rate in May, with a second-phase expansion planned to reach 330 Mt/yr in 2015 and 350 Mt/yr in 2017. The company continued investing in automated technologies to lower costs and improve efficiencies, which included converting four drills to an autonomous drilling system, expanding automated haulage systems, and testing autonomous heavy-haul rail system (Rio Tinto Group, 2015, p. 36–37, 197).

Brazil.—Production of iron ore in Brazil was 411 Mt, on a usable-ore basis, in 2014, 6% greater than the 386 Mt produced in 2013. Brazil's iron ore production increased by 39 Mt between 2010 and 2014, accounting for 7% of the rise in global production during that 5-year period (table 9).

Vale S.A.'s production in 2014, including Vale's share of production at the Samarco Mine, was 332 Mt, 7% greater than the 311 Mt produced in 2013. Of the total ore produced, pellets accounted for 55.1 Mt in 2014, an increase from 49.6 Mt in 2013. The Samarco Mine began operations at a fourth pellet plant, increasing capacity by 8.3 Mt/yr to 30.5 Mt/yr (Vale S.A., 2015, p. 25–33). Anglo American plc completed the Minas-Rio project, with the first ore shipped in October, and was projected to complete rampup during the second quarter of 2016. The Minas-Rio Mine, an open pit mine and processing facility, was expected to produce 11 to 14 Mt (wet basis) at 67% Fe in 2015 and 24 to 26.5 Mt in 2016 (Anglo American plc, 2015, p. 48–50).

Cameroon.—Noble Group Ltd. signed a 10-year contract, pending financier approvals, to purchase all iron ore produced at Sundance Resources Ltd.'s Mbalam-Nabeba project in Cameroon and the Republic of Congo [Congo (Brazzaville)] that is not allocated to project equity participants. The project has reserves containing an estimated 436 Mt of iron ore at 62.6% Fe, and will have a planned 35-Mt/yr production capacity (Sundance Resources Ltd., 2014).

Canada.—Production of iron ore in Canada was 44.2 Mt, on a usable-ore basis, in 2014, 5% greater than the 42.1 Mt produced in 2013 (table 9). The Mary River Mine began shipping iron ore to its port site for stockpiling in preparation for exporting in the summer of 2015, when the weather is favorable (CBC News, 2014). Rio Tinto's subsidiary, Iron Ore Co. of Canada, completed the second stage of its concentrate expansion plan by installing new equipment and upgrading infrastructure, enabling an additional 1.3 Mt of concentrate capacity (Rio Tinto Group, 2015, p. 37). ArcelorMittal Mines Canada completed the transition of the Fire Lake Mine to year-round operations, increasing production to 6.26 Mt of crude ore from 2.5 Mt in 2013, which was shipped to the Mont-Wright Mine for concentrating (ArcelorMittal S.A., 2015, p. 213).

Cliffs Natural Resources Inc. idled its Wabush Scully Mine in Newfoundland and Labrador in March and began closure of the mine in October owing to the operation's high cost structure. Wabush Scully Mine, a 5.6-Mt/yr-capacity facility, produced concentrates for pelletizing at the company's Pointe Noire plant in Quebec, which had been idled in the second quarter of 2013. In November, the company also began pursuing exit options for the Bloom Lake Mine, a 7.2-Mt/yr-capacity concentrate facility, owing to unfeasibility of the Phase 1 expansion and the mine's unprofitability. In December, the mine was idled and its owners entered restructuring proceedings under Canada's Companies' Creditors Arrangement Act in January 2015 (Cliffs Natural Resources Inc., 2015, p. 4–5, 39).

China.—Production in China was 410 Mt in 2014, slightly less than 417 Mt reported in 2013. Historically, iron ore production in China was reported in terms of crude ore, ranging from 10% to 30% iron content, as opposed to usable ore, with averages ranging from 58% to 65% iron content. In this and future USGS publications, data were adjusted to also reflect the reported figures for usable ore produced in China and incorporate them into the world total, removing crude ore, to provide a uniform basis for comparison and global iron ore production. China's iron ore production increased by 39 Mt on a usable-ore basis over the 5-year period from 2010 through 2014.

In January 2014, stockpiles of iron ore in China surpassed 100 Mt for the first time since July 2012. Traders reportedly increased stockpiles of iron ore to use as collateral for credit. Imports were 87 Mt in January, an 18% increase from December 2013 and a 32% increase from January 2013 (Bloomberg News, 2014). As of June, the China Metallurgical

Mining Enterprise Association reported that 20% to 30% of iron ore mines in China closed or were idled in 2014 owing to low prices. Credit Suisse Group AG estimated that production in China will decline by 16% to 310 Mt in 2014 and to 275 Mt in 2015 (Ng, 2014).

As of the third quarter, some mines in China, notably those owned by steel mills or central Government enterprises, were expected to maintain operations despite price forecasts ranging from $70 to $90 per ton. A study by the China Iron and Steel Association indicated that more than 20 major iron ore mines in China that were owned by major steel mills maintained consistent production rates throughout 2013. Producers in China's larger Provinces, such as Anhui, Guangdong, Hubei, and Sichuan, increased production in 2014 (Stanway, 2014).

Guinea.—In July, ArcelorMittal agreed to acquire BHP Billiton Ltd.'s and Areva S.A.'s shares in the Mount Nimba iron ore project in Guinea, giving the company a 56.6% stake in Euronimba Ltd., which holds controlling stake in the Mount Nimba deposit. The agreement was contingent on permission from Guinea's Government to transport iron ore into Liberia (MacDonald, 2014). In November, Rio Tinto plc halted work on its $20 billion Simandou project in Guinea owing to volatile iron ore pricing and regional effects of the Ebola virus disease (McGroarty and others, 2014).

India.—Following mining bans in the States of Karnataka and Goa in 2013, India was the only major iron-ore-producing country to have significantly reduced production in 2014. Production in India fell by 15% to 129 Mt in 2014 from the 152 Mt produced in 2013. India's iron ore production decreased 78 Mt over the 5-year period from 2010 through 2014 (table 9).

In April, the Supreme Court of India lifted mining bans in Goa after 19 months, although production was capped at 20 Mt/yr of iron ore (Mohanty and Serapio, 2014). In September, the Steel Authority of India Ltd. announced a $1.4 billion investment for expanding iron and steel operations, specifically at the Rowghat and Chiria Mines; the mines were expected to increase capacity to 14 Mt/yr and 15 Mt/yr, respectively, after completion (Das, 2014).

Liberia.—In November, ArcelorMittal S.A. delayed the $1.7 billion expansion of its iron ore mine in Liberia, owing to volatile iron ore pricing and regional effects of the Ebola virus disease (McGroarty and others, 2014).

Mexico.—Authorities in Mexico closed 11 mineral loading docks, seized $15 million worth of mining equipment, and confiscated 119,000 t of iron ore being exported by an organized crime group at the Port of Lazaro Cardenas in March 2014. About 300,000 t of iron ore was stolen from mining companies in Michoacan in 2013, with an additional 100,000 t stolen from the nearby Port of Manzanillo in Colima in the first quarter of 2014. Authorities estimated that additional funds, averaging $15 per ton of iron ore, were being surrendered by miners, shippers, and foreign traders throughout the supply chain to the cartels (Whitaker, 2014).

Pakistan.—The Metallurgical Corp. of China signed an agreement with the government of Punjab Province to explore iron ore deposits in Chiniot. The Chiniot district was estimated to contain 600 Mt of iron ore resources, including 500 Mt of inferred or undiscovered resources and 100 Mt of indicated resources, of which 27 Mt were measured reserves. A study carried out by the Geological Survey of Pakistan indicated that the deposit contined iron grades ranging from 44% to 77% Fe (Siddiqui, 2014).

Sierra Leone.—In October, London Mining PLC announced that it would idle its Marampa Mine in Sierra Leone. The 2.5-Mt/yr Marampa Mine contains approximately 1,000 Mt of iron ore resources (Els, 2014). In December, African Minerals Ltd. announced that it would idle its Tonkolili Mine in Sierra Leone. In the third quarter of 2014, the operation exported 4.4 Mt of iron ore at an average direct cash cost of $36 per metric ton (African Minerals Ltd., 2014). This was the fourth large-scale iron ore mine or project in West Africa to idle operations in the fourth quarter of 2014 owing to low iron ore prices and regional impacts from an Ebola virus disease outbreak.

South Africa.—South Africa's iron ore production increased by 22 Mt from 2010 through 2014 and accounted for 4% of the rise in global production (table 9).

Outlook

Global consumption of iron ore increased at a slower rate in 2014 than in 2013 and is expected to decline further throughout the next decade owing to reduced economic growth rates in China and reduced large-scale infrastructure spending in Europe and North America. During the past 5 years, from 2010 through 2014, production has increased by 454 Mt, a 24% increase from 2010, with 98 Mt of additional iron ore introduced into the market during 2014 (fig. 2, table 9). In 2014, the seaborne trade market was at or near equilibrium as new production entered the market and, owing to reductions in price, small-scale miners reduced or idled production capacity. Delays in more significant price reductions may be attributed to stockpiling at ports and steel mills in China, which temporarily increased consumption.

From 2013 to 2015, an estimated 200 to 250 Mt of capacity was idled or reduced, mainly among small-scale miners in direct competition with markets supplying China and iron ore producers in countries that increased imports of low-cost steel from China and are traditionally reliant on domestic iron ore for steel production. Companies in Australia and Brazil are expected to continue to ramp up iron ore operations, mainly Anglo American plc, BHP Billiton Ltd., Fortescue Metals Group Ltd., Hancock Prospecting Pty Ltd, Rio Tinto Group, and Vale S.A. As these companies continue to invest in high-efficiency, high-quality, and low-cost operations that expand production, small-scale miners are expected to continue idling operations as they become uneconomic. From 2016 to 2020, companies are expected to bring an additional 240 Mt of production capacity into the market. Production of iron ore is expected to decrease in China over the next decade as high-cost mines are phased out as part of industry optimization and efforts to reduce environmental pollution. Global steel demand is expected to rise only modestly over the next 2 years, by 0.5% and 1.4% in 2015 and 2016, respectively (World Steel Association, 2015). During the next decade, construction in parts of Africa and Asia may shift to suburban infrastructure and residential development, owing to a growing middle class and decreasing growth in population centers. This shift could diminish steel consumption as urban

development and construction slows. Residential construction would be expected to temporarily increase investments in transportation and utilities projects but to decrease in the long term as demand for high-tonnage structural steel decreases and demand for smaller-scale specialty steels and ferroalloys rises for use in appliance, automotive, and finished steel products.

As steel consumption has risen in the past two decades, greater amounts of scrap are expected to become available throughout the next decade, peaking in 2025 in China. Increased availability of scrap would further decrease demand for iron ore as EAF production continues to increase and BOF production becomes less environmentally and economically beneficial. Potentially, intermediate iron metallic products may be used in EAF production, which has become increasingly economic as new natural gas technologies have made production more competitive. Trends in the steel industry are provided in the "Outlook" section in the Iron and Steel chapter of the 2014 USGS Minerals Yearbook, volume I, Metals and Minerals.

The global iron ore market is expected to see additional production capacity become operational and supply the seaborne market through at least 2019, resulting in reduced iron ore prices when production exceeds consumption. This trend could extend for the next 3 to 5 years as projects continue to ramp up operations or until major global developments in construction, energy, or infrastructure lead to increased consumption. Opportunities exist for development of iron metallics for use in EAF production; however, reduced iron and steel prices would make investment in new technologies and operations uneconomic for many producers. In the United States, the market for iron ore is buffered from global markets; however, as seaborne iron ore prices continue to decline, low-cost steel imports may increase, which would result in reduced domestic demand for iron ore.

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TABLE 1
SALIENT IRON ORE STATISTICS[1]

(Thousand metric tons and thousand dollars, unless otherwise specified)

		2010	2011	2012	2013 [2]	2014
United States, iron ore, usable:						
Production		49,900	56,200 r	54,700 r	52,800 r	56,100
Shipments		50,600	56,900 r	53,900 r	53,400 r	55,000
Value:						
Minnesota:[3]						
Cost of mining	dollars per metric ton	10.40	12.27	13.31	13.57	13.62
Cost of beneficiation	do.	29.31	31.02	30.78	32.66	34.49
Average value of production	do.	80.31	85.67	92.75	87.42	84.43
United States:						
Reported value at mines[4]		5,000,000	5,850,000 r	5,080,000 r	4,610,000 r	4,730,000
Average value at mines	dollars per metric ton	98.79	104.10 r	116.48 r	87.42 r	85.88
Exports:						
Quantity		9,950	11,100	11,200	11,000	12,100
Value		1,090,000	1,330,000	1,440,000	1,480,000	1,320,000
Imports for consumption:						
Quantity		6,420	5,270	5,160	3,250	5,140
Value		703,000	841,000	759,000	426,000	676,000
Reported consumption, iron ore and agglomerates		41,700 r	45,700 r	46,900	44,200 r	44,400
Stocks, December 31		3,470	2,320 r	4,440 r	2,350 r	4,460
World, production, iron ore, usable		1,870,000 r	2,030,000 r	2,070,000 r	2,230,000 r	2,330,000
United States, iron metallics:[5]						
Production		301	386	404	469	1,950
Shipments:						
Quantity		293	389	395	471	1,950
Value		102,000	135,000	137,000	164,000	678,000
Imports for consumption:						
Quantity		1,630	1,850	2,760	2,360	2,390
Value		609,000	801,000	1,020,000	831,000	859,000
World, production, iron metallics		70,600	73,600	73,500	75,400	74,600

rRevised. do. Ditto.

[1]Data are rounded to no more than three significant digits, except costs and average values; may not add to totals shown.

[2]Data revised to separate iron ore and secondary products, iron metallics, included in 2013 and prior years.

[3]As reported in Minnesota Department of Revenue's annual Mining Tax Guide.

[4]Value for iron ore as reported by mines, which may refer to price or value of shipments or production as sold on the open market or within the company. In 2013, one company changed the reporting standard from the method used in prior years.

[5]Data for iron metallics may include cold pig iron, direct-reduced iron, hot-briquetted iron, iron nuggets, and solid sponge iron.

TABLE 2
EMPLOYMENT AND PRODUCTION STATISTICS FOR IRON OPERATIONS IN THE UNITED STATES IN 2014, BY STATE[1]

(Thousand metric tons, net weight, unless otherwise specified)

District and State	Number of operations	Number of employees[2]	Worker hours (thousands)	Usable ores					Shipments	Average iron content[4] (percent)
				Crude ore	Pellets	Iron metallics	Other[3]	Total		
Indiana	2	60	115	--	(5)	250 [6]	--	250	250	62.2
Louisiana	1	25	12	--	--	1,460 [6]	--	1,460	1,450 [6]	--
Michigan	2	1,285	2,730	35,700 [6]	12,100 [6]	--	--	12,100	11,900 [6]	60.8
Minnesota	11	4,514	9,050	145,000	41,400	241 [6]	1,560	43,200	42,100	63.4
Utah	1	389	166	3,330 [6]	--	--	998 [6]	998	998 [6]	65.1
Total or average	16	6,273	12,100	184,000	53,500	1,950	2,560	58,000	56,700	63.2

-- Zero.
[1]Data are rounded to no more than three significant digits, except number of employees; may not add to totals shown.
[2]Does not include professional or clerical workers at mines, pelletizing plants, and maintenance shops or research lab workers.
[3]Includes other, unspecified products not included in other categories; may include concentrates, direct-shipping ore, flux, and pellet chips.
[4]Data for iron metallics (cold pig iron, direct-reduced iron, hot-briquetted iron, iron nuggets, and sponge iron) not included.
[5]Iron pellets were produced by Magnetation Inc. but not included in production totals as they were not mine production.
[6]Calulcated, estimated, or reported from publicly available data.

TABLE 3
IRON OPERATIONS IN THE UNITED STATES IN 2014

(Million metric tons unless otherwise specified)

State and operation	County or Parish	Operator	Primary product	Capacity[1]	Production[1]	Reserves[2, 3]
Indiana:						
Iron Dynamics	DeKalb	Steel Dynamics Inc.	Hot-briquetted iron	0.3	0.3	(4)
Reynolds Pellet Plant	White	Magnetation, Inc.	Iron ore pellets	3.3	NA	(4)
Louisiana, Nucor Steel Louisiana, LLC	St. James	Nucor Corp.	Direct-reduced iron	2.5	NA	(4)
Michigan:						
Empire Mine	Marquette	Cliffs Natural Resources Inc.	Iron ore pellets	5.6	4.4	14.8
Tilden	do.	do.	do.	8.1	7.7	673
Minnesota:						
Hibbing Taconite	Saint Louis	do.	Iron ore pellets	8.1	7.8	264
Keewatin Taconite	Itasca	United States Steel Corp.	do.	5.4	5.3	351
Mesabi Chief Plant #1	do.	Magnetation, Inc.	Iron ore concentrates	0.4	0.3	3.6
Mesabi Chief Plant #2	do.	do.	do.	1.0	0.8	18
Mesabi Chief Plant #4	do.	do.	do.	2.0	(5)	NA
Mesabi Nugget Delaware LLC	Saint Louis	Steel Dynamics Inc.	Iron nuggets	0.4	0.2	(4)
Mining Resources LLC	do.	do.	Iron ore concentrates	1.0	0.4	NA
Minntac Mine	do.	United States Steel Corp.	Iron ore pellets	15	15	476
Minorca	do.	ArcelorMittal S.A.	do.	2.7	2.9	134
Northshore Mine	Lake, Saint Louis	Cliffs Natural Resources Inc.	do.	6.1	5.3	1,050
United Taconite	Saint Louis	do.	do.	5.5	5.0	483
Utah, Comstock Mountain Lion Mine	Iron	CML Metals Corp.	Iron ore concentrates	2.0	NA	(6)

do. Ditto. NA Not available.
[1]As reported by the respective company in annual reports, oral communications, published online data, or Securities Exchange Commission filings.
[2]Proven and probable reserves or equivalent, including those on owned and leased property, as reported by the company at the last publicly available date.
[3]Magnetation, Inc. owned mineral rights for 1,400 million metric tons of unspecified iron ore equivalent resources or reserves as of April 2014.
[4]Facility does not operate an independent mine and has no reserves.
[5]Facility opened in December 2014 and reported no marketable production for the year.
[6]CML Metals Corp. idled the Comstock Mountain Lion Mine on October 18, 2014.

TABLE 4
CONSUMPTION OF IRON ORE AT U.S. IRON AND STEEL PLANTS, BY TYPE OF PRODUCT[1]

(Thousand metric tons)

Type of product	2013 [r]	2014
Blast furnaces:		
Pellets	38,200	37,500
Sinter[2]	5,420	5,360
Total	43,600	42,900
Steelmaking furnaces:		
Direct-shipping ore	454	1,320
Sinter[2]	159	159
Total	613	1,470
Grand total	44,200	44,400

[r]Revised.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes briquettes, nodules, and other.

Source: American Iron and Steel Institute.

TABLE 5
U.S. EXPORTS OF IRON ORE, BY COUNTRY AND TYPE OF PRODUCT[1, 2]

	2013			2014		
Country and type of product	Quantity (thousand metric tons)	Value (thousands)	Unit value[3] (dollars per metric ton)	Quantity (thousand metric tons)	Value (thousands)	Unit value[3] (dollars per metric ton)
Country:						
Belgium	--	--	--	51	$5,130	100.51
Canada	6,080	$899,000	147.88	8,630	1,030,000	119.33
China	2,750	365,000	132.42	1,690	151,000	89.23
France	137	17,400	126.85	--	--	--
Germany	12	4,510	375.75	(4)	9	1.80
Hong Kong	164	11,700	71.46	(4)	22	4.40
Japan	89	10,800	121.62	122	13,000	106.29
Mexico	1,130	110,000	97.99	1,600	124,000	77.26
Slovakia	115	7,530	65.44	--	--	--
Spain	135	17,100	127.01	--	--	--
United Kingdom	423	39,100	92.47	26	1,580	60.65
Other	3	500	166.67	1	223	223.00
Total or average	11,000	1,480,000	134.33	12,100	1,320,000	109.25
Type of product:						
Coarse ores	213	23,300	109.23	10	710	71.00
Concentrates	2,390	280,000	117.05	1,460	137,000	93.70
Fine ores	382	46,800	122.59	171	18,700	109.39
Other agglomerates	266	23,500	88.16	847	66,800	78.83
Pellets	7,790	1,110,000	142.47	9,630	1,100,000	114.30
Roasted pyrites	1	176	176.00	1	247	247.00
Total or average	11,000	1,480,000	134.33	12,100	1,320,000	109.25

-- Zero.
[1]Data are rounded to no more than three significant digits, except "Unit value"; may not add to totals shown.
[2]Includes agglomerates.
[3]Unit values shown are calculated from unrounded data. Weighted average calculated from unrounded data by dividing total value by total tonnage.
[4]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS OF IRON ORE, BY COUNTRY AND TYPE OF PRODUCT[1, 2]

Country and type of product	2013 Quantity (thousand metric tons)	2013 Value (thousands)	2013 Unit value[3, 4] (dollars per metric ton)	2014 Quantity (thousand metric tons)	2014 Value (thousands)	2014 Unit value[3, 4] (dollars per metric ton)
Country:						
Argentina	137	$23,100	168.88	98	$12,000	122.34
Brazil	630	74,700	118.63	1,780	225,000	126.73
Canada	2,090	280,000	133.97	2,860	395,000	138.34
Chile	152	12,400	161.08	70	8,640	123.40
China	1	52	52.00	(5)	24	4.80
Luxembourg	--	--	--	28	3,200	114.25
Mexico	1	90	90.00	--	--	--
Norway	78	11,900	152.77	(5)	72	14.40
Peru	12	2,260	187.92	35	4,150	118.63
South Africa	95	13,800	145.55	29	3,360	115.79
Sweden	49	7,310	149.27	154	18,000	116.79
United Kingdom	(5)	5	1.00	(5)	5	1.00
Venezuela	--	--	--	97	6,270	64.64
Other	(5)	79	15.60	(5)	18	3.60
Total	3,250	426,000	131.18	5,140	676,000	131.40
Type of product:						
Coarse ores	45	6,390	141.91	43	4,370	101.67
Concentrates	566	56,900	115.88	731	58,400	79.87
Fine ores	573	79,600	138.84	461	50,800	110.30
Other agglomerates	1	50	50.00	28	1,840	65.68
Pellets	2,060	283,000	137.26	3,880	560,000	144.38
Roasted pyrites	(5)	19	3.80	(5)	5	1.00
Total	3,250	426,000	131.18	5,140	676,000	131.40

-- Zero.
[1]Data are rounded to no more than three significant digits, except "Unit value"; may not add to totals shown.
[2]Includes agglomerates.
[3]Unit values shown are calculated from unrounded data.
[4]Weighted average calculated from unrounded data by dividing total value by total tonnage.
[5]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 7
U.S. IMPORTS OF IRON ORE IN 2014, BY COUNTRY AND TYPE OF PRODUCT[1, 2]

(Thousand metric tons)

Country of origin	Coarse	Concentrates	Fine ores	Pellets	Other	Total
Argentina	--	--	98	--	--	98
Brazil	--	391	114	1,270	--	1,780
Canada	--	130	177	2,520	27	2,860
Chile	--	70	--	--	--	70
Luxembourg	--	28	--	--	--	28
Norway	--	(3)	(3)	--	--	1
Peru	--	--	35	--	--	35
South Africa	--	30	--	--	--	30
Sweden	43	--	37	74	--	154
United Kingdom	--	--	--	--	(3)	(3)
Venezuela	--	82	--	15	--	97
Other	--	(3)	--	--	(3)	1
Total	43	731	461	3,880	28	5,140

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes agglomerates.
[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 8
U.S. IMPORTS OF IRON ORE, BY CUSTOMS DISTRICT[1, 2]

(Thousand metric tons and thousand dollars)

	2013		2014	
Customs district	Quantity	Value	Quantity	Value
Baltimore, MD	11	1,820	301	44,700
Buffalo, NY	(3)	9	(3)	30
Charleston, SC	--	--	(3)	44
Chicago, IL	527	57,400	987	78,100
Cleveland, OH	1,560	206,000	896	129,000
Detroit, MI	1	125	(3)	51
Houston-Galveston, TX	44	6,380	49	6,080
Minneapolis, MN	--	--	(3)	37
Los Angeles, CA	(3)	7	--	--
Mobile, AL	18	1,900	247	30,200
New Orleans, LA	1,080	150,000	2,650	386,000
New York, NY	(3)	41	(3)	38
Ogdensburg, NY	(3)	65	--	--
Pembina, ND	(3)	10	--	--
Philadelphia, PA	--	--	(3)	5
San Diego, CA	1	90	--	--
Seattle, WA	--	--	(3)	28
St. Albans, VT	3	85	--	--
Tampa, FL	9	1,610	10	1,380
Washington, DC	--	--	(3)	8
Total	3,250	426,000	5,140	676,000

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes agglomerates.
[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
IRON ORE: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons)

	Usable ore, unless otherwise specified					Iron content				
Country	2010	2011	2012	2013	2014[e]	2010	2011	2012	2013	2014[e]
Algeria	1,469	1,320	1,784	1,067	911	771	693	937 [r]	560 [r]	478
Australia	433,000	488,000	555,500 [r]	682,700 [r]	774,200 [3]	271,000	277,000	336,000 [r]	413,000 [r]	468,000
Austria	2,070 [r]	2,210 [r]	2,140 [r]	2,320 [r]	2,300	1,293 [r]	1,379 [r]	1,339 [r]	1,452 [r]	1,438 [3]
Azerbaijan	58	214	207 [r]	141 [r]	91	36 [r]	134 [r]	129 [r]	88 [r]	57
Bosnia and Herzegovina	1,401	1,891	2,076	2,122 [r]	2,128 [3]	876 [r]	1,180 [r]	1,300 [r]	1,330 [r]	1,330
Brazil	372,120	398,131	400,822	386,270	411,183 [3]	248,000 [r]	265,000 [r]	258,000 [r]	246,000 [r]	262,000
Canada	36,178 [r]	35,705 [r]	38,892 [r]	42,063 [r]	44,196 [3]	23,300	21,000	25,000 [r]	26,000	27,300
Chile	9,130 [r]	12,624 [r]	17,330	17,109	18,866 [3]	5,850 [r]	7,750 [r]	9,430 [r]	9,090 [r]	10,100
China, crude ore[4]	1,080,000 [r]	1,340,000 [r]	1,330,000	1,450,000	1,510,000	XX	XX	XX	XX	XX
China, usable ore[4]	371,231	442,179	420,206	417,287	410,000	230,000 [r]	274,000 [r]	261,000 [r]	259,000 [r]	254,000
Colombia	77	174	809 [r]	710	676 [3]	48 [r]	109 [r]	506 [r]	444 [r]	423
Egypt	2,314 [r]	3,321 [r]	3,930 [r]	3,320 [r]	3,300	1,660 [r]	1,960 [r]	2,320 [r]	1,960 [r]	1,950
Greece[5]	2,200 [r, e]	2,250 [r]	2,306 [r]	2,221 [r]	2,380	1,030 [r]	1,060 [r]	1,080 [r]	1,040	1,120
India[6]	207,157 [r]	168,582 [r]	136,618 [r]	152,433 [r]	129,103 [3]	128,000 [r]	104,000 [r]	84,000 [r]	94,000 [r]	80,000
Indonesia	4,600 [r]	4,475 [r]	4,800 [r]	4,000 [r]	3,013 [3]	2,830 [r]	2,750 [r]	2,950 [r]	2,460 [r]	1,850
Iran[6]	35,000	44,335	36,000 [r]	38,000 [r]	33,000	16,500	20,900	17,000 [r]	17,900 [r]	15,600
Kazakhstan	24,016 [r]	24,736 [r]	25,889 [r]	25,228 [r]	24,561 [3]	13,700 [r]	14,100	14,800 [r]	14,400 [r]	14,100
Korea, North	2,097 [r]	2,508 [r]	2,412 [r]	3,054 [r]	4,500 [3]	1,220 [r]	1,460 [r]	1,400 [r]	1,770 [r]	2,610
Korea, Republic of	513	542	593	663 [r]	660	287 [r]	303 [r]	332	371 [r]	369
Laos	51	43	316	1,459	1,850	32	26	196	561	712
Liberia	--	1,300 [r]	3,300 [r]	5,103 [r]	5,740	--	780 [r]	1,980 [r]	3,110 [r]	3,500
Malaysia	3,558 [r]	8,078	12,144 [r]	11,588 [r]	11,900	2,220 [r]	5,050 [r]	7,590 [r]	7,240 [r]	7,440
Mauritania	11,534	11,160	11,200	13,400 [r]	14,000	7,500	7,250	7,280	8,380 [r]	8,780
Mexico	13,998	12,806	14,915	18,840 [r]	16,600	8,750 [r]	8,000 [r]	9,320 [r]	11,800 [r]	10,400
Mongolia	3,203	5,678	7,561	6,736 [r]	6,390	2,050	3,630 [r]	4,760	4,120 [r]	3,890
Morocco	45	79	261	301 [r]	300	24	43	141 [r]	163 [r]	162
New Zealand[5]	2,439	2,357	2,395	3,157 [r]	2,400	1,400	1,300	1,320	1,740 [r]	1,320
Norway	3,292	3,427	3,911	3,409 [r]	3,850	1,930 [r]	2,050 [r]	2,410 [r]	2,320 [r]	2,620
Pakistan[6]	418	430	412 [r]	193 [r]	255	253 [r]	260 [r]	249 [r]	117 [r]	154
Peru	9,160 [r]	10,626 [r]	10,132 [r]	10,126 [r]	10,731 [3]	6,140 [r]	7,120 [r]	6,790 [r]	6,790 [r]	7,190
Philippines	--	468	1,800 [e]	1,057	827 [3]	--	293	1,150	793	517
Russia	95,272 [r]	103,607 [r]	104,010 [r]	102,156 [r]	102,019 [3]	57,600 [r]	62,700 [r]	62,900 [r]	61,800 [r]	61,700
Sierra Leone	--	339 [r]	5,203 [r]	11,895 [r]	12,000	--	195 [r]	2,990 [r]	6,840 [r]	6,900
South Africa	58,709	58,057	67,100	71,645 [r]	80,759 [3]	36,900	36,500	42,900	45,700	51,500
Sweden	28,797 [r]	30,840 [r]	25,927 [r]	37,411 [r]	37,400 [3]	17,400 [r]	18,700 [r]	15,700 [r]	22,600 [r]	22,600
Thailand	904 [r]	489 [r]	256 [r]	334 [r]	532	547 [r]	296 [r]	155 [r]	202 [r]	322
Tunisia	180 [r]	172 [r]	223 [r]	244 [r]	240 [3]	109 [r]	103 [r]	135 [r]	148 [r]	145
Turkey	5,378 [r]	6,661 [r]	8,102 [r]	8,589 [r]	7,790	3,250 [r]	4,030 [r]	4,900 [r]	5,200 [r]	4,710
Ukraine	63,773 [r]	65,807 [r]	66,379 [r]	67,020 [r]	67,874 [3]	38,600 [r]	39,800 [r]	40,200 [r]	40,500 [r]	41,100
United States	49,900	56,200 [r]	54,700 [r]	52,800 [r]	56,100	31,300	34,300	33,400	33,000 [r]	35,500
Venezuela	14,004	17,037	15,124	16,800 [r]	18,000 [3]	8,700 [r]	10,600 [r]	9,400	10,400 [r]	11,200
Vietnam	3,721	4,474	2,870	4,708 [r]	4,355	1,970 [r]	2,370 [r]	1,520 [r]	2,500 [r]	2,310
Other[e, 7]	93	139	203	147	147	57	85	120	91	91
Total	1,870,000 [r]	2,030,000 [r]	2,070,000 [r]	2,230,000 [r]	2,330,000	1,170,000 [r]	1,240,000 [r]	1,280,000 [r]	1,370,000 [r]	1,430,000

[e]Estimated. [r]Revised. -- Zero. XX Not applicable.

[1]World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown. Includes data available through December 15, 2015.

[2]Production of usable ore represents total for all iron ore products used in steelmaking, unless otherwise noted, produced in the country, excluding agglomerates produced from imported iron ore. Iron content indicates either reported weight of contained iron ore or metal content as calculated based on surveyed and reported figures or estimates.

[3]Reported figure.

[4]Data for China are for reported usable ore and crude ore, as opposed to only crude ore used in prior reports. China's crude ore production is not included in "Total."

[5]Production includes alternative iron ore source as follows: Greece (nickeliferous iron ore) and New Zealand (titaniferous magnetite beach sands).

[6]Production is based on fiscal year, with starting dates as follows: India, April 1; Iran, March 21; and Pakistan, July 1.

[7]Includes the following countries for which inadequate information is available: Bhutan, Guatemala, Kenya, Nigeria, Portugal (manganiferous iron ore), Togo, and Uganda.

Figure 1. Global production of usable iron ore in 2014. Source: U.S. Geological Survey.

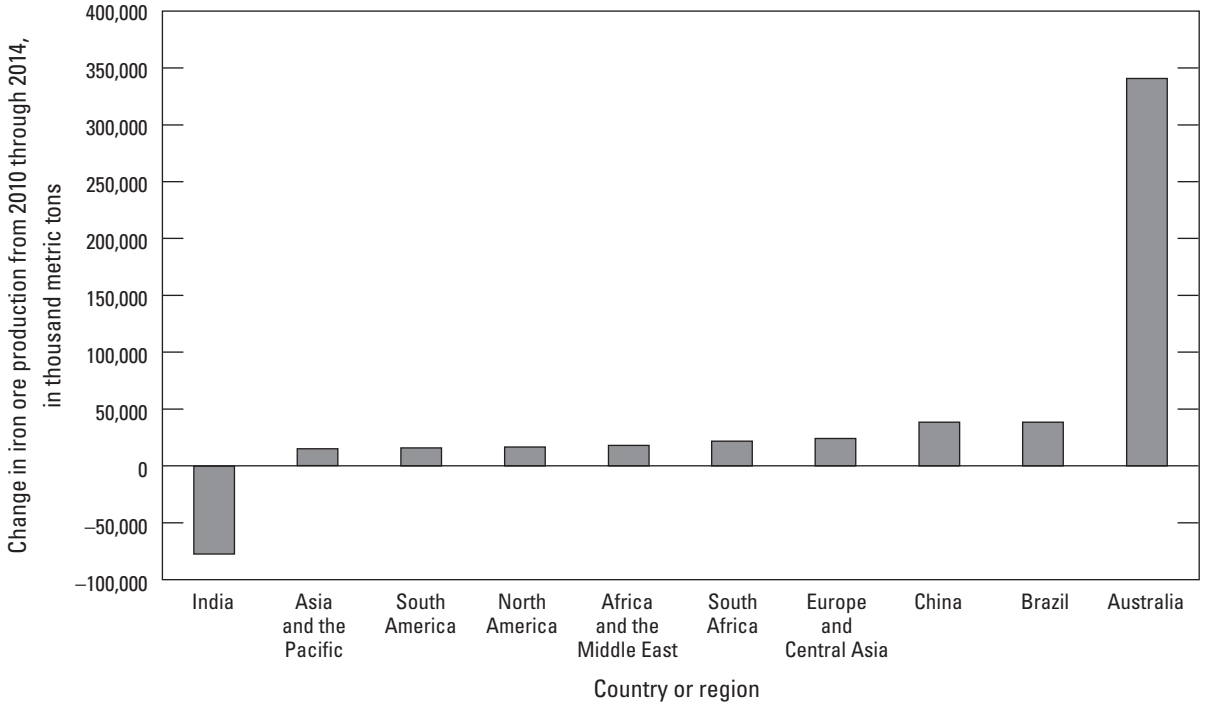

Figure 2. Change in production of usable iron ore from 2010 through 2014 for select countries and regions (excluding the selected countries). Source: U.S. Geological Survey.