



2011 Minerals Yearbook

IRON ORE

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U.S. iron ore production increased by 9.6% to 54.7 million metric tons (Mt) in 2011 from 49.9 Mt in 2010. Reported consumption (iron ore and agglomerates) increased by 9.5% to 46.3 Mt in 2011 compared with 42.3 Mt in 2010. World iron ore production increased by 6.5% in 2011 compared with 2010. China was the leading producer and consumer of iron ore, accounting for 45% of gross iron ore production (about 30% by metal content), followed by Australia, Brazil, and India (tables 1, 16). These four countries accounted for about 83% of gross global iron ore production.

Iron ore is the basic raw material for producing iron and steel. The supply of iron ore is critical to the economies of all industrialized nations. Scrap, a supplement to iron ore in steelmaking, is also an extremely important feed material, but owing to lack of supply of high-quality scrap, its use has limitations. Direct reduced iron (DRI) is an alternative to scrap, but requires iron ore for its production.

Two iron oxides—hematite (Fe_2O_3) and magnetite (Fe_3O_4)—are the primary ore minerals of iron. Taconite, the primary iron ore mined in the United States, contains hematite and magnetite in varying proportions and is found in hard, fine-grained, banded iron formations with iron content between 20% and 30%. Almost all domestic iron ore production is transformed into molten iron in blast furnaces by the iron and steel industry. Most molten iron then goes directly to a basic oxygen furnace (BOF) for conversion to steel by removing most of the residual carbon. The remainder is poured into molds to produce pig iron.

In 2011, the United States used 46.3 Mt of iron ore, an increase from 42.3 Mt in 2010. The United States also produced 30.2 Mt of pig iron in 2011 compared to 26.8 Mt in 2010 (American Iron and Steel Institute, 2012, p. 73).

Raw steel production, at 86.4 Mt, increased by 7.3% compared with 80.5 Mt in 2010. U.S. apparent steel consumption increased to 90 Mt from 80 Mt in 2010. Imported iron ore supplemented domestically produced iron ore in the production of pig iron, which is used along with imported pig iron, DRI, and scrap to produce raw steel. Integrated steel mills produce steel from iron ore; minimills produce steel from DRI and scrap. In 2011, the minimill sector of the steel industry accounted for 60% of the U.S. raw steel production. Integrated steelmakers can increase steel mill product production without increasing blast furnace production by importing pig iron and semifinished steel. This permits steelmakers to avoid costly startup of less-efficient blast furnaces held in reserve and the employment of additional skilled workers. In 2011, net U.S. exports (exports minus imports) of pig iron, sponge (DRI), and scrap were 14.3 Mt, while in 2010 the net exports were 9.6 Mt.

Legislation and Government Programs

The Minnesota taconite production tax rate for 2012 changed for concentrates and pellets produced in 2011, increasing to \$2.412 from \$2.380 per taxable long ton. The taxable tonnage for 2011 was based on the average tonnage produced in 2009–11 (Minnesota Department of Revenue, 2012, p. 5).

Production

The U.S. Geological Survey (USGS) develops U.S. iron ore production data through an annual “Iron Ore” survey, which is sent to iron ore mines, and those mines provided the domestic production statistics shown in tables 1 through 4. This information is supplemented by employment data, information from consumers, tax records, and mine inspection reports. Steel plant data continues to be compiled by the American Iron and Steel Institute (AISI).

In 2011, domestic iron ore production was 54.7 Mt, 9.6% more than the 2010 production, which was 49.9 Mt. Michigan and Minnesota taconite mines accounted for almost all domestic iron ore production—seven mines operated on the Mesabi Range in northeastern Minnesota and two on the Marquette Range in Michigan’s Upper Peninsula. Domestic iron ore supply (production minus exports) met 94% of domestic demand in 2011.

Cliffs Natural Resources Inc. (Cleveland, OH) reported that 2011 iron ore production for its North American operations totaled 37.9 Mt from the Empire, Hibbing Taconite, Northshore, Tilden, and United Taconite Mines in the United States and the Wabush Mine in Canada. Cliffs’ share of the total production from these North American operations was 23.7 Mt from the United States operations and 6.9 Mt from the Canadian mine. Total Cliffs’ North American production tonnage share for the mines it managed during the year increased by 15% compared with that of 2010, and overall iron ore sales revenue increased by 61% to \$4.69 billion compared with that of 2010 (Cliffs Natural Resources Inc., 2012, p. 8, 64, 66).

Minnesota.—Minnesota produced more than 75% of the usable iron ore in the United States in 2011; nearly all of the output was pellet production. Almost all of the production from the State came from open pits on the Mesabi Iron Range, although a minor amount of the production did come from reworked tailings. Minnesota taxable production, grouped by operating company, was summarized as follows: United States Steel Corp. (Pittsburgh, PA) produced 5.01 Mt of partial flux pellets and a minor amount of fines, chips, and concentrates from its Keetac Taconite operations and 14.1 Mt of fluxed pellet

production from its Minntac operations; Hibbing Taconite Co. [joint venture of Mittal Steel USA (62.3%), Cliffs Natural Resources (23%), U.S. Steel Canada (14.7%)] produced 7.91 Mt of partial fluxed (containing less than 2% flux) pellets; United Taconite Co., LLC (subsidiary of Cliffs Natural Resources) produced 5.23 Mt of partial fluxed pellets, a minor amount of pellet chips and fines, and a minor amount of concentrates; Northshore Mining Co. (subsidiary of Cliffs Natural Resources) produced 5.57 Mt of partial fluxed pellets and a small amount of pellet chips and fines; and ArcelorMittal Minorca Mine Inc. (Chicago, IL) produced 2.79 Mt of flux pellets and 111,000 metric tons (t) of pellet chips and concentrates (Lesar, 2011, p. 8–9).

U.S. Steel received final permitting for eventual expansion of its Keetac iron ore pelletizing facility near Keewatin, MN. The anticipated cost of the expansion was \$800 million with the expansion increasing the company's pelletizing production capacity by 3.6 million metric tons per year (Mt/yr) (United States Steel Corp., 2012, p. 13).

Steel Dynamics, Inc. (Fort Wayne, IN) continued with the permitting process for its Mesabi Mining, LLC iron ore property near Hoyt, MN. The Mesabi Mining operation will provide iron ore concentrate for its Mesabi Nugget, LLC [joint venture with Kobe Steel Ltd. (19%)] iron nugget plant, which was commissioned in January 2010. Steel Dynamics also continued developing its Mining Resources operation site near Chisholm, MN. The company planned to recover iron ore from tailings at the Mining Resources, LLC site and process them in a plant being constructed adjacent to the property, which was slated for startup in the third quarter 2012 (Steel Dynamics, Inc., 2012, p. 18, 35–36).

Magnetation, Inc. (Nashwauk) entered into a 50.1%–49.9% joint venture, Magnetation LLC, with AK Steel Corp. The joint venture will operate Magnetation Inc.'s original iron ore concentration plant near Keewatin, MN, and also construct a 1 Mt/yr iron ore concentration plant nearby. Magnetation LLC also began site selection in anticipation of constructing a 3 Mt/yr pelletizing plant to convert its recovered hematite concentrate into pellets for AK Steel (AK Steel Corp., 2011; Magnetation, Inc., 2011).

Consumption

U.S. iron ore consumption increased by 9.5% to 46.3 Mt from consumption of 42.3 Mt in 2010 (table 1). Pig iron production, at 30.2 Mt in 2011, was 12.7% greater than the 2010 production of 26.8 Mt (American Iron and Steel Institute, 2012, p. 73). Raw steel production using BOF technology, which had been at the lowest production level in more than a decade in 2009, increased by 9% to 34.3 Mt (American Iron and Steel Institute, 2012, p. 81).

Consumption of iron ore, including agglomerates, reported to the American Iron and Steel Institute by producers of iron and steel totaled 45.7 Mt, including 39.3 Mt of pellets; 5.9 Mt of sinter, briquettes, and other products; and 0.5 Mt of natural coarse ore (table 6). Of the ore consumed, 89% was domestic production; 7.8%, imports from Canada; and 2.8%, imports

from other countries. Other iron-bearing materials charged to blast furnaces included mill scale, slag scrap, and steel furnace slag (American Iron and Steel Institute, 2012, p. 80).

The three consumption numbers used in this annual review are reported in tables 1, 6, and 7. The first consumption number (46.3 Mt in 2011, in table 1) is the sum of the ore consumed by input type, the ore consumed in DRI production, and the ore consumed in nonsteel uses, as reported to the USGS. The second consumption number (45.7 Mt in 2011, in table 6) is the ore consumed in U.S. iron and steel plants by type of ore reported by the AISI. The third consumption number is an estimate of consumption for DRI and other miscellaneous uses, which include iron ore consumed in production of cement and iron ore shipped for use in manufacturing cattle feed, ferrites, heavy media, paint, refractory and weighing materials, and for use in lead smelting (table 7). Data on iron ore consumption for DRI production (none in 2011) and for nonsteel end uses (605,000 t in 2011) were compiled from USGS surveys and information provided by Midrex Technologies, Inc. (2012, p. 6).

Prices

The average unit value of iron ore produced in the United States was \$99.45 per metric ton in 2011, a decrease from \$98.79 per ton in 2010. The average unit value for Michigan and Minnesota combined was \$99.45 per ton in 2011, an increase from 2010. The average unit value for California and South Dakota combined was \$48.13 per ton, a decrease from 2010. The average unit value of exports was \$120.05 per ton, ranging from \$62.37 per ton for coarse ores to \$137.07 per ton for pellets (table 9). The average value of imports was \$159.50 per ton, ranging from \$65.75 per ton for roasted pyrites to \$329.83 per ton for briquettes (table 10).

The producer price index (PPI) for iron ore under North American Industry Classification (NAICS) code 2122102122100 for iron ore, including crude, concentrates, agglomerates, and pellets increased from 161.3 in January (December 1997=100) to 168.4 in April, declined slightly in May, and was 195.7 at yearend. The average index of 173.8 in 2011 was significantly greater than the average of 154.6 in 2010. The PPI measured the average change in the selling prices charged by domestic producers of iron ore over time (U.S. Bureau of Labor Statistics, 2012).

With the rise in prices in 2011, the steelmakers began passing along the increased costs to their customers through escalator clauses (Matthews, 2011). The average price of imported Australian iron ore fines with 62% iron content, spot price at Tianjin, China, port, was \$180 per ton in January and remained about the same through September (\$177 per ton). Demand for iron ore then declined as the Chinese economy slowed. By December, the price was \$137 per ton (Freeman, 2011; Index Mundi, undated).

With the end of benchmark pricing in 2010, all new purchase prices were determined using spot pricing in 2011. With some long-term contracts still in place, the full impact of spot pricing was not evident.

Transportation

The Lake Carriers' Association (2012) reported that the iron ore shipments on the Great Lakes were 49.9 Mt in 2011, an increase of 14% compared with 43.7 Mt in 2010 and almost twice the 26.0 Mt shipments of 2009. Iron ore shipments for 2011 were slightly greater than those attained before the 2008–09 recession.

Foreign Trade

In 2011, U.S. exports of iron ore exceeded imports by 5.8 Mt. Exports increased by more than 11%, while imports decreased by 18% compared with 2010 figures. U.S. iron ore exports were 77% pellets (8.5 Mt), and 64% of the exports was shipped via the Great Lakes to Canadian steel companies, while 29% was shipped to China, 3.9% to France, and 1.7% to Spain. U.S. imports totaled 5.3 Mt, of which Canada's share increased to 74% from 70% in 2010 and Brazil's share increased to 11% from 8% in 2010. Imports from Mexico, Russia, and Trinidad and Tobago declined significantly. The largest decline was for Russia, which took place because of the idling and eventual sale of Severstal NA's Sparrow's Point steel plant in Baltimore, MD.

World Industry Structure

Consumption.—Although not a direct measure, imports of iron ore and production of crude steel, DRI, and pig iron can be used as guides to indicate whether global iron ore consumption rises or falls. DRI and pig iron production are likely to be more direct indicators of iron ore consumption than crude steel production because, to varying degrees in each country, part of steel production comes from scrap consumption in minimills. Iron ore net imports cannot be used as a straightforward indicator of a change in iron ore consumption in countries that produce iron ore unless a country's own ore production remains constant. World consumption of iron ore was estimated to have increased, owing to increases in production of pig iron (6.6%) and DRI (5%) compared with 2010 levels.

Companies continued to expand current mines and facilities, develop mines, and also investigate new deposits. An estimated \$1.84 billion was spent in 2011 for iron ore exploration with a primary focus on deposits in Australia (\$1.08 billion), Brazil (\$111 million), and Guinea (\$113 million) (Metals Economics Group, 2011, p. 9–10). Further evaluations and (or) developmental work were made on iron ore deposits in Australia, Cameroon, Congo (Brazzaville), Liberia, and Sweden (Mining Journal, 2011b).

World crude steel production increased to 1.5 billion metric tons (Gt) from 1.4 Gt in 2010. Nine countries each produced more than 35 Mt of crude steel and combined accounted for almost 79% of world production in 2011. Of those countries, China produced about 53 Mt more crude steel in 2011 than in 2010; Korea produced 10 Mt more; the United States produced 6 Mt more; and Japan produced 2 Mt less. Combined production from the others (India, Brazil, Ukraine, Russia and Germany) was 9.5 Mt more in 2011 than in 2010 (United Nations Conference on Trade and Development, 2012, p. 137–139).

Production.—World iron ore production of 2.9 Gt, gross weight, increased by 14% from 2010 production levels. Gross weight includes reporting by China of crude ore, rather than ore concentrate. In 2011, world production of ore concentrate was 2.2 Gt when the crude Chinese iron ore production was converted to concentrate. China remained the leading iron ore producer (1.33 Gt of ore and approximately 710 Mt of concentrate), followed by Australia (488 Mt), Brazil (373 Mt), and India (240 Mt). These four countries account for about 83% of the world production of iron ore (gross weight and concentrate). In 2011, iron ore was produced in 41 countries, with production exceeding 1 Mt, gross weight, in 26 of those countries (table 16). World DRI production increased to 73.3 Mt, which was 4% greater than that of 2010 (Midrex Technologies, Inc., 2012).

Trade.—World iron ore imports rose by 6.8% to 1.12 Gt compared with 2010 levels. This continued the trend of large year-on-year increases in imports for the past 10 years. Since 2002, four countries, China, Germany, Japan, and the Republic of Korea, have accounted for more than two-thirds of world iron ore imports, with their share increasing to 82% in 2011 from 62% in 2002. China's share almost tripled during this 10-year period to 61% from 21% of the world's iron ore imports. Germany's share of imports in that period decreased to 3.7% from 8.4%, Japan's share decreased to 11% from 24%, and the Republic of Korea's share decreased to 6% from 8% (United Nations Conference on Trade and Development, 2012, p. 122–123).

World iron ore exports of 1.16 Gt increased by 7.9% compared with 2010 levels. Australia's and Brazil's combined share of world iron ore exports increased slightly to 68.2% in 2010 compared with their 66.7% share in 2010. Five countries accounted for more than 83% of world iron ore exports. Australia was the source of 38% of iron ore exports; Brazil, 30%; India, 6.8%; South Africa, 4.5%; and Ukraine, 3.0% (United Nations Conference on Trade and Development, 2012, p. 120–121).

China, the world's leading importer of iron ore with an 11% increase, imported 687 Mt of iron ore in 2011 compared with 619 Mt in 2010. China imported 653 Mt of nonagglomerated ore and 34.2 Mt of agglomerated ore. The leading exporters of nonagglomerated ore to China were Australia (45%), Brazil (21%), India (11%), South Africa (6%), and Iran (2%), with the remainder shared among more than 40 countries. Brazil (25%), Russia (17%), Canada (13%), and Ukraine (11%) were the leading exporters of agglomerated ore to China. In 2011, nine countries exported more than 10 Mt of ore to China compared with four countries in 2007 (TEX Report, 2011a–b).

Mergers and Acquisitions.—There were 66 acquisitions and mergers related to iron ore in 2011. The leading five, which accounted for \$6.59 billion of the \$9.10 billion bid in acquisitions and mergers in 2011, were Cliffs Natural Resources acquiring Consolidated Thompson Iron Mines Ltd. (\$4.4 billion); Atlas Iron Ltd. acquiring Giralla Resources NL (\$805 million); Wah Nam International Holdings Ltd. acquiring Brockman Resources Ltd. (\$698 million, ongoing through June 2012); ArcelorMittal and Nunavut Iron Ore Acquisition Inc. acquiring Baffinland Iron Mines Corp. (\$514 million); and

Xstrata plc finalizing its acquisition of Sphere Minerals Ltd. (\$458 million) (Grant, 2012).

World Review

Afghanistan.—The Government of Afghanistan awarded rights to develop three areas in the Hajigak iron ore deposit in Bamiyan Province to a consortium of companies from India. The consortium, composed of Jindal Steel & Power Ltd., JSW Steel Ispat Ltd., JSW Steel Ltd., Monnet Ispat and Energy Ltd., National Mineral Development Corp., Rashtriya Ispat Nigam Ltd., and Steel Authority of India Ltd., planned to spend \$75 million conducting a geological study during the next 3 years. The consortium also agreed to invest \$10.9 billion to construct a 6-Mt/yr steel plant, 1-gigawatt powerplant, and infrastructure during a 10-year period. Rights to develop a fourth area in the deposit were awarded to the Canadian firm Kilo Goldmines Ltd. Iron ore resources in the Hajigak deposit were estimated to be 1.8 Gt at 62% to 63% iron content (Mining Journal, 2011a).

Australia.—BHP Billiton Ltd. (Melbourne) produced 149 Mt in 2011, a 16% increase from 128 Mt in 2010. BHP Billiton's share of salable quantities of iron ore (wet) from its joint-venture projects in the Pilbara region of Western Australia were as follows: Area C JV (85% owned), 40.5 Mt; Goldsworthy JV (85% owned), 1.18 Mt; Mount Newman JV and Jimblebar (85% owned), 50.8 Mt; and Yandi JV (85% owned), 45.5 Mt. The company's share of shipments from Pilbara was 31.6 Mt of lump and 106 Mt of fines (BHP Billiton Ltd., 2012, p. 9).

BHP Billiton continued work on its Rapid Growth Project 5 in Western Australia, including upgrading the Newman rail line, adding two new berths in Port Hedland harbor, and crushing, screening, and stockpiling facilities at Yandi. The company also approved an additional \$7.4 billion to continue expansion of its Western Australia iron ore operations. That expansion included development of the Jimblebar Mine and rail links and adding two berths and shiploaders, a blending facility, a car dumper, conveyor system, and rail lines at its Port Hedland site (BHP Billiton Ltd., 2011, p. 54).

Rio Tinto PLC announced full-year production figures for 2011. Rio Tinto's share of salable quantities of iron ore plus pellets for Australia were as follows—Channar (60% owned), 6.6 Mt; Eastern Range (100% owned), 9.4 Mt; Hamersley (100% owned), 122 Mt; Hope Downs (50% owned), 15.9 Mt; and Robe River (53% owned), 30.5 Mt. Rio Tinto's share of total world mine production (Australian and Canadian operations) was 192 Mt, a 4% increase from 185 Mt in 2010 (Rio Tinto plc, 2012, p. 46).

Rio Tinto continued an expansion of its operations in Western Australia. The company committed \$933 million to maintain capacity at its Marandoo Mine in Pilbara and \$676 million to expanding its port facilities at its Cape Lambert Port. Rio Tinto also continued work to increase capacity at its Pilbara iron mine, and debottleneck and upgrade its port facilities at Dampier (Rio Tinto plc, 2012, p. 28).

Fortescue Metals Group LLC shipped 46.5 Mt of ore in 2011. The company also commissioned its Christmas Creek ore processing facility at the Chichester Hub and made its first

shipments from its joint venture at the Nullagine Mine near the Christmas Creek operation (Fortescue Metals Group LLC, 2011a, p. 11; b–c; 2012).

Brazil.—In 2011, Vale S.A (Rio de Janeiro) reported that its iron ore production increased by 5% to 323 Mt (including Vale's 50%-joint venture with BHP Billiton in Samarco) from 308 Mt in 2010. Vale's share of salable quantities of iron ore was as follows, in decreasing order of tonnage—Southeastern System, 120 Mt; Northern System, 110 Mt; Southern System, 76.3 Mt; Samarco, 10.8 Mt; and Midwestern System, 5.6 Mt. Vale pellet production in 2011 increased to 52.3 Mt [including interests in the pelletizing operations at Anyang (25%), Hispanobra (50.9%), Samarco (50%), Vale Oman Pelletizing Co. LLC (100%), and Zhuhai YPM (25%)] from 49.3 Mt in 2010. The breakdown of salable quantities of iron ore pellets from 100%-owned Vale operations was, in decreasing order of pellet production, Nibrasco, 9.34 Mt; Tubarão, 5.73 Mt; São Luis, 5.06 Mt; Kobrasco, 4.56 Mt; Itabrasco, 4.23 Mt; Vargem Grande, 4.07 Mt; Fabrica, 3.94 Mt; and Oman, 2.1 Mt (Vale S.A., 2012). Vale announced plans to construct a 9.25 Mt/yr pelletizing plant at its Samarco operation. The \$290 million plant was expected to be the largest in the world and was scheduled to be online by yearend 2013 (Metal-Pages, 2011).

Canada.—Iron Ore of Canada [owned jointly by Labrador Iron Ore Royalty Income Fund (15.1%), Mitsubishi Corp. (26.18%), and Rio Tinto (58.72%)] produced 4.8 Mt of iron ore concentrates and 8.7 Mt of iron ore pellets (Labrador Iron Ore Royalty Corp., 2012, p. 5, 6). ArcelorMittal Mines Canada (formerly Québec Cartier Mining Co.) produced 15.1 Mt of iron ore concentrates and pellets (ArcelorMittal S.A., 2012a, p. 38). Cliffs Natural Resources mined 6.9 Mt of pellets and concentrate at its eastern Canadian operations, which included Wabush Mines Ltd. and the former Consolidated Thompson Iron Mining Ltd. (Cliffs Natural Resources Inc., 2012, p. 38).

During 2011, Cliffs Natural Resources acquired all shares of Consolidated Thompson Iron Mining, which had a 75% interest in the Bloom Lake iron ore property near Fermont, Quebec. The acquisition included Consolidated Thompson's mine and concentrator at Bloom Lake and its port facilities at Pointe Noire in Sept Iles, Quebec. The transaction broadened Cliffs' customer base and expanded its service of international markets. Consolidated Thompson was to operate as Cliffs Quebec Iron Mining Ltd. China's Wuhan Iron and Steel (Group) Corp. owned the remaining 25% share of Bloom Lake (Cliffs Natural Resources Inc. 2012, p. 6, 39).

ArcelorMittal announced plans for a \$2.16 billion expansion of its Mont-Wright mine to increase ore output to 24 Mt from 14 Mt by 2012 and to increase iron ore pellet production at its Port-Cartier, Quebec, plant to 24 Mt from 14 Mt (Gordon, 2011).

Labrador Iron Mines Holdings Ltd. (LIM) began mining at its James Mine near Schefferville, Labrador. The company shipped 1.21 Mt of ore for processing to the Silver Yards processing plant which was commissioned in June. Processing of 570,000 t of ore yielded 230,000 t of lump and sinter fine products. LIM also made refinements to the Silver Yards plant to increase output of fines and ultra-fines. The company's sales in 2011,

totaled 386,000 t (Labrador Iron Mines Holding Ltd., 2012, p. 3–4).

Guinea.—Rio Tinto came to an agreement with the Government of Guinea regarding ownership of the Simandou iron ore deposit. Rio Tinto retained ownership of blocks 3 and 4 of the original four block prospect. The Government of Guinea retained up to a 35% ownership in the project, an increase from the original 20% interest. Under the agreement, Rio Tinto also will be expected to pay a 3.5% royalty, build a rail line through Guinea to the coast, and develop a port facility in Guinea. With the settlement, Rio Tinto can proceed to sell a 44.65% share of the iron ore asset to Aluminum Corporation of China Ltd. (Chinalco) for \$1.35 billion. Vale controlled a majority share of Blocks 1 and 2 of the Simandou deposit (Winning, 2011).

India.—Controversy continued concerning exports of iron ore from India, the fourth ranking producer of iron ore globally. The Indian steel industry argued that the iron ore should be conserved for domestic use rather than exported. The Government of India increased export duties on iron ore fines to 20% from 5% and on lump ore to 20% from 15% in the 2011–12 budget year. Exports of pellets were duty-free because they were considered value-added products. Iron ore exports declined by 17% in the 2009–10 budget year (Metal Bulletin, 2011, p. 18–19).

Liberia.—ArcelorMittal began producing iron ore from its Nimba County mine in September. The company produced 1.3 Mt of ore in 2011 and planned to mine 4 Mt in 2012. Plans were being reviewed to eventually expand mine production to 15 Mt by 2015 (ArcelorMittal S.A., 2012b, p. 23).

Malaysia.—Vale began construction of a \$1.3 billion distribution center near Telak Rubiah. The center will include a pelletizing plant, warehouses, and a shipping terminal with sufficient depth for Valemax vessels, dry bulk carriers designed to Vale's specifications with a capacity of 400,000 dead weight tons. The center was expected to be completed in 2014, handling 60 Mt/yr on startup (Iron Ore Team, 2011).

Oman.—Vale began producing direct reduction pellets at its \$1.36 billion pelletizing plant in the Sohar industrial complex. The plant contained two pelletizing units, each with a capacity of 4.5 Mt/yr. At yearend, one unit was operating at full capacity and the other, which began operating in November, had not yet reached full capacity. The complex was designed as a distribution center with an annual production capacity of 40 Mt/yr (Platts Metals Week, 2011; Vale S.A., 2012b, p. 20).

South Africa.—Anglo American plc began shipping lump iron ore from its Kolomela Mine in December. The mine's output of 1.5 Mt supplemented Anglo American's production at the Sishen Mine in the Northern Cape (38.9 Mt), and the Thabazimibi Mine in Limpopo (0.9 Mt), and the company's Amapá operation in Brazil (4.8 Mt of pellet feed and sinter feed). Production at the Kolomela Mine was expected to be 4 to 5 Mt in 2012 and 9 Mt/yr when fully operational (Anglo American plc, 2012, p. 12, 55, 56).

Outlook

U.S. iron ore production has been recovering owing to improved domestic demand for steel for automotive production, increased exports, and decreased imports. Iron ore production

returned to tonnages seen before the 2008–09 economic downturn, and steel production also has been recovering from the downturn. Most U.S. iron ore production is sold directly to the domestic steel industry, although in 2011, 12% of domestic ore was shipped to Canada, 5.8% was shipped to China, and small amounts were exported to other countries. Neither the dominance of the domestic markets nor the pattern of exports to Canada is expected to change in the near future, although changes in ownership of some steel plants have led to minor changes in the countries from which iron ore is imported.

Although expectations of economic growth were lowered for many countries for 2012 and 2013, demand for iron ore still was expected to increase, driven largely by continued growth in construction in China where steel production was expected to increase at a rate of 6% in 2012 compared with 8% in 2011 (Standard Chartered Bank, 2012). The announced expansions and new mines developments are expected to adequately supply global iron demands, particularly considering the slowdown of the Chinese economic growth.

Trends in the steel industry are provided in the “Outlook” section in the Iron and Steel chapter of the 2011 USGS Minerals Yearbook, volume I, Metals and Minerals. The development of projects using new and existing direct reduction technology in northern Minnesota is expected to encourage growth of the U.S. iron ore industry within the next few years, as developments such as Steel Dynamics' Mesabi Nugget project comes to full production and Essar Steel's Minnesota Iron project is built.

China's economy was predicted to increase 8.2% in 2012, a lower rate than 9.2% in 2010, and 10.4% in 2009. So while the economy of the leading global consumer of iron ore and producer of steel is going to continue to expand, it will likely be at a slower pace than prior to 2011. According to the International Monetary Fund, economic growth in most of the other major steel producing countries, such as Germany, India, Japan, Russia, and the United States, is expected to be less in 2012 and 2013 than in 2010 and 2011. While several major iron ore producers are proceeding with their expansions, BHP Billiton, the third ranking iron ore producer, has scaled back its capital expenditures for expansion activities in Australia (Paul, 2012).

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TABLE 1
 SALIENT IRON ORE STATISTICS¹

(Thousand metric tons and thousand dollars unless otherwise specified)

	2007	2008	2009	2010	2011
United States, iron ore, usable, less than 5% manganese: ²					
Production	52,500	53,600	26,700	49,900	54,700
Shipments:					
Quantity	50,900	53,600	27,600	50,600	55,600
Value	3,040,000	3,770,000	2,560,000	5,000,000	5,530,000
Average value at mines	59.64	70.43	92.76	98.79	99.45
Exports:					
Quantity	9,310	11,100	3,920	9,950	11,100
Value	718,000	1,240,000	356,000	1,090,000	1,330,000
Imports for consumption:					
Quantity	9,400	9,250	3,870	6,420	5,270
Value	543,000	918,000	376,000	703,000	841,000
Consumption, iron ore and agglomerates	54,700	51,900	31,000	42,300	46,300 ^c
Stocks, December 31, at mines, plants and loading docks ^{3,4}	2,090	4,070	5,060	3,470	3,260
Additional stocks, December 31:					
Crude ore at mines and plants ⁴	749	947	580	734	978
Unagglomerated concentrates for pelletizing plants	1,550	1,320	896	949	1,120
World, production ⁵	2,040,000	2,200,000 ^f	2,220,000 ^f	2,590,000	2,940,000 ^c

^cEstimated. ^fRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Direct-shipping ore, concentrates, agglomerates, and byproduct ore.

³Excludes byproduct ore.

⁴Crude ore stocks and unagglomerated concentrates for pelletizing plants removed. Marketable stocks only.

⁵Gross weight.

TABLE 2
EMPLOYMENT AT IRON ORE MINES AND BENEFICIATING PLANTS, QUANTITY AND TENOR OF ORE PRODUCED, AND AVERAGE OUTPUT PER WORKER HOUR IN THE UNITED STATES IN 2011, BY DISTRICT AND STATE¹

District and State	Number of mines	Average number of employees	Worker hours (thousands)	Production				Average quantity per worker hour (metric tons)		
				Crude ore (thousand metric tons)	Usable ore (thousand metric tons)	Iron contained in usable ore (thousand metric tons)	Iron content natural (percent)	Crude ore	Usable ore	Iron contained
Lake Superior:										
Michigan ²	2	1,470	3,450	39,600	12,400	7,550	60.7	11.49	3.61	2.19
Minnesota	7	3,740	7,780	116,000	42,200	26,200	62.0	14.88	5.43	3.36
Total or average	9	5,210	11,200	155,000	54,700	33,700	61.7	13.84	4.87	3.00
Other States ³	4	57	110	13 ^e	13 ^e	7 ^e	54.0	0.12 ^e	0.12 ^e	0.06 ^e
Grand total or average	13	5,270	11,300	156,000	54,700	33,700	61.7	13.71	4.82	2.97

^eEstimated.

¹Data are rounded to no more than three significant digits, except "Average per worker hour, crude ore"; may not add to totals shown.

²Does not include professional or clerical workers at mines, pelletizing plants, maintenance shops, or research lab workers.

³Includes California and South Dakota.

TABLE 3
USABLE IRON ORE PRODUCED IN THE UNITED STATES IN 2011,
BY DISTRICT, STATE, AND TYPE OF PRODUCT^{1,2}

(Thousand metric tons)

District and State	Concentrates	Sinter	Other	Total
			agglomerates ³	
Lake Superior:				
Michigan	--	--	12,400	12,400
Minnesota	1,210	131	40,900	42,200
Total	1,210	131	53,300	54,700
Other States ⁴	13 ^e	--	5	13
Grand total	1,220	131	53,300	54,700

^eEstimated. -- Zero.

¹Excludes ore containing 5% or more manganese.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Data may include pellet chips, screenings, and sinter.

⁴Includes California and South Dakota.

TABLE 4
SHIPMENTS OF USABLE IRON ORE FROM MINES IN THE UNITED STATES IN 2011^{1,2}

District and State	Gross weight of ore shipped (thousand metric tons)				Average iron content, natural (percent)	Value (thousands)
	Concentrates	Sinter	Other			
			agglomerates	Total		
Lake Superior:						
Michigan	--	--	13,200	13,200	60.7	W
Minnesota	1,210	76	41,100	42,400	62.0	W
Total reportable or average	1,210	76	54,300	55,600	61.7	\$5,530,000
Other States ³	8 ^e	--	--	8	54.0	385
Grand total or average	1,220	76	54,300	55,600	61.7	5,530,000

^eEstimated. W Withheld to avoid disclosing company proprietary data; included in "Total reportable or average." -- Zero.

¹Includes byproduct ore. Excludes ore containing 5% or more manganese.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Includes California and South Dakota.

TABLE 5
IRON ORE-PRODUCING MINES IN THE UNITED STATES IN 2011

State and mine	County	Operator	Source of iron ore
<u>California:</u>			
Baxter Mine	San Bernardino	Hahm International Inc.	Quarried ore.
Dredge 21	Yuba	Cal Sierra Development Inc.	Dredged sands.
Silverlake Mine	San Bernardino	Hahm International Inc.	Quarried ore.
<u>Michigan:</u>			
Empire	Marquette	Cliffs Natural Resources Inc.	Magnetite taconite ore.
Tilden	do.	do.	Hematite-magnetite taconite ore.
<u>Minnesota:</u>			
Hibbing Taconite	Saint Louis	do.	Magnetite taconite ore.
Keewatin Taconite	do.	United States Steel Corp.	Do.
Mesabi Chief Plant	do.	Magnetation, Inc.	Hematite tailings.
Minntac	do.	United States Steel Corp.	Magnetite taconite ore.
Minorca	do.	ArcelorMittal S.A.	Do.
Northshore	do.	Cliffs Natural Resources Inc.	Do.
United Taconite	do.	do.	Do.
South Dakota, CF & I Pit	Lawrence	Pete Lien & Sons Inc.	Quarried ore.
Do., do. Ditto.			

TABLE 6
CONSUMPTION OF IRON ORE AT U.S. IRON
AND STEEL PLANTS, BY TYPE OF PRODUCT¹

(Thousand metric tons)

Type of product	2010	2011
<u>Blast furnaces:</u>		
Pellets	36,000	39,300
Sinter ²	5,090	5,780
Total	41,100	45,100
<u>Steelmaking furnaces:</u>		
Direct-shipping ore	408	454
Sinter ²	136	159
Total	544	613
Grand total	41,700	45,700

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes briquettes, nodules, and other.

Source: American Iron and Steel Institute.

TABLE 7
U.S. CONSUMPTION OF IRON ORE FOR
DIRECT-REDUCED IRON AND NONSTEEL END USES^{1,2}

(Thousand metric tons)

Year	Direct-reduced iron for steelmaking ³	Nonsteel end uses ⁴	Total
2010	--	616	616
2011	--	605 ^c	605 ^c

^cEstimated. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes agglomerates. Excludes ore containing 5% or more manganese.

³U.S. Geological Survey estimates based on production reports compiled by Midrex Corp.

⁴An estimate, which includes iron ore consumed in production of cement and iron ore shipped for use in cattle feed, ferrites, heavy media, lead smelting, manufacturing, paint, refractory and weighing materials.

TABLE 8
U.S. EXPORTS OF IRON ORE, BY COUNTRY OF DESTINATION^{1,2}

(Thousand metric tons and thousand dollars)

Country	2010		2011	
	Quantity	Value	Quantity	Value
Belgium	107	\$14,900	3	\$229
Canada	8,110	896,000	7,050	915,000
China	725	51,800	3,190	271,000
France	236	33,000	430	80,400
Germany	341	47,700	81	15,100
Mexico	188	15,900	51	5,850
Spain	156	21,800	187	35,000
Other	95 ^r	10,600 ^r	66	4,300
Total	9,950	1,090,000	11,100	1,330,000

^rRevised.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes agglomerates.

Source: U.S. Census Bureau.

TABLE 9
U.S. EXPORTS OF IRON ORE, BY TYPE OF PRODUCT^{1,2}

Type of product	2010			2011		
	Quantity (thousand metric tons)	Value (thousands)	Unit value ^{3,4} (dollars per metric ton)	Quantity (thousand metric tons)	Value (thousands)	Unit value ^{3,4} (dollars per metric ton)
Concentrates	391	\$30,200	77.20	627	\$41,200	65.74
Coarse ores	259	13,500	52.21	1,740	109,000	62.37
Fine ores	78	9,990	128.09	208	15,500	74.60
Pellets	9,220	1,040,000	112.61	8,470	1,160,000	137.07
Briquettes	5	31	6.20	(5)	19	77.00
Other agglomerates	1	82	82.00	1	87	87.00
Roasted pyrites	1	104	104.00	3	233	77.67
Total	9,950	1,090,000	109.70	11,100	1,330,000	120.05

¹Data are rounded to no more than three significant digits, except "Unit value"; may not add to totals shown.

²Includes agglomerates.

³Unit values shown are calculated from unrounded data.

⁴Weighted average calculated from unrounded data by dividing total value by total tonnage.

⁵Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 10
U.S. IMPORTS OF IRON ORE, BY COUNTRY AND TYPE OF PRODUCT^{1,2}

Country and type of product	2010			2011		
	Quantity (thousand metric tons)	Value (thousands)	Unit value ^{3,4} (dollars per metric ton)	Quantity (thousand metric tons)	Value (thousands)	Unit value ^{3,4} (dollars per metric ton)
Country:						
Brazil	506	\$65,400	129.28	562	\$81,600	145.19
Canada	4,490	471,000	105.04	3,910	617,000	157.88
Chile	131	15,500	118.08	165	28,300	171.70
Mexico	138	12,400	89.55	27	2,240	83.04
Russia	606	69,900	115.35	(5)	3	43.00
South Africa	--	--	--	147	28,800	196.14
Trinidad and Tobago	120	17,200	142.14	8	3,650	455.63
Venezuela	251	28,600	113.98	279	49,300	176.80
Other	177 [†]	22,900 [†]	131.46 [†]	174	29,500	169.40
Total	6,420	703,000	109.63 [†]	5,270	841,000	159.50
Type of product:						
Concentrates	652	78,600	120.50	796	124,000	156.13
Coarse ores	36	4,160	115.61	42	8,660	206.26
Fine ores	628	76,000	121.02	731	111,000	152.42
Pellets	5,100	544,000	106.77	3,650	587,000	160.58
Briquettes	4	178	44.50	12	3,960	329.83
Other agglomerates	--	--	--	34	5,890	173.26
Roasted pyrites	1	4	4.00	4	263	65.75
Total	6,420	703,000	109.59	5,270	841,000	159.50

[†]Revised. -- Zero.

¹Data are rounded to no more than three significant digits, except "Unit value"; may not add to totals shown.

²Includes agglomerates.

³Unit values shown are calculated from unrounded data.

⁴Weighted average calculated from unrounded data by dividing total value by total tonnage.

⁵Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS OF IRON ORE IN 2011, BY COUNTRY AND TYPE OF PRODUCT^{1,2}

(Thousand metric tons)

Country of origin	Concentrates	Coarse ores	Fine ores	Pellets	Briquettes and other agglomerates	Roasted pyrites	Total
Brazil	155	--	163	244	--	--	562
Canada	168	--	302	3,410	--	--	3,880
Chile	165	--	--	--	--	--	165
South Africa	--	--	137	--	--	--	137
Venezuela	266	--	--	--	--	--	266
Other	41	42	130	--	46	4	263
Total	796	42	731	3,650	46	4	5,270

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes agglomerates.

Source: U.S. Census Bureau.

TABLE 12
AVERAGE UNIT VALUE FOR SELECTED IMPORTS OF IRON ORE IN 2011¹

Type of product	Country of origin	Average unit value ² (dollars per metric ton, gross weight)
Concentrates	Brazil	152.05
Do.	Canada	135.15
Do.	Chile	171.21
Do.	Venezuela	170.43
Fine ores	Brazil	150.39
Do.	Canada	119.11
Do.	South Africa	198.08
Pellets	Brazil	137.33
Do.	Canada	162.27
Do. Ditto.		

¹Includes agglomerates.

²Weighted averages of individual customs values.

Source: U.S. Census Bureau.

TABLE 13
U.S. IMPORTS OF IRON ORE, BY CUSTOMS DISTRICT^{1,2}

(Thousand metric tons and thousand dollars)

Customs district	2010		2011	
	Quantity	Value	Quantity	Value
Baltimore, MD	1,980	\$200,000	1,710	\$289,000
Buffalo, NY	--	--	(3)	2
Chicago, IL	569	74,700	675	102,000
Cleveland, OH	2,740	300,000	2,110	332,000
Columbia-Snake, OR	21	3,370	--	--
Detroit, MI	(3)	11	16	4,210
El Paso, TX	55	3,000	18	972
Houston-Galveston, TX	76	10,500	83	17,000
Laredo, TX	--	--	1	43
Los Angeles, CA	--	--	(3)	11
Minneapolis, MN	(3)	3	--	--
Mobile, AL	179	24,500	13	4,510
New Orleans, LA	788	87,200	616	86,600
New York, NY	(3)	4	(3)	23
Norfolk, VA	1	42	1	29
Ogdensburg, NY	8	169	1	237
Philadelphia, PA	--	--	4	263
Port Arthur, TX	3	348	--	--
San Francisco, CA	--	--	5	268
St. Albans, VT	(3)	13	1	565
Tampa, FL	--	--	15	3,190
Total	6,420	703,000	5,270	841,000

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes agglomerates.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 14
U.S. IMPORTS OF PELLETS, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2010		2011	
	Quantity	Value	Quantity	Value
Brazil	76	\$10,500	244	\$33,600
Canada	4,090	426,000	3,410	553,000
Russia	606	69,900	--	--
Trinidad and Tobago	120	17,200	--	--
Ukraine	95	13,700	--	--
Venezuela	107	7,020	--	--
Total	5,100	544,000	3,650	587,000

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau.

TABLE 15
 IRON ORE: WORLD PELLETIZING CAPACITY,
 BY CONTINENT AND COUNTRY IN 2011¹

	Rated capacity, gross weight (million metric tons)
North America:	
Canada	27.5 ^e
Mexico	15.0 ^e
United States	57.4
Total	99.9
South America:	
Brazil	56.0 ^e
Chile	5.3
Peru	3.5
Venezuela	11.8 ^e
Total	76.6
Europe and Central Eurasia:	
Kazakhstan	8.4 ^e
Netherlands	4.4 ^e
Russia	31.4 ^e
Slovakia	0.4
Sweden	26.0 ^r
Turkey	1.5 ^e
Ukraine	33.5 ^e
Total	105.6 ^r
Asia:	
Bahrain	11.0
China	135.0 ^{e,r}
India	24.0 ^r
Iran	12.3 ^e
Oman	9.0
Japan	3.0 ^e
Total	194.3 ^r
Oceania, Australia	4.3 ^e
Grand total	480.7 ^r

^eEstimated. ^rRevised.

¹Data may not add to totals shown because of independent rounding.

Sources: International Iron and Steel Institute; United Nations Commission on Trade and Development, Trust Fund on Iron Ore Information; U.S. Geological Survey.

TABLE 16
IRON ORE: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country ⁵	Gross weight ³					Metal content ⁴				
	2007	2008	2009	2010	2011 ^e	2007	2008	2009	2010	2011 ^e
Algeria	1,982	2,077	1,307	1,469	1,500	1,030	1,050	700	786 ^e	800
Australia ^e	299,000	342,000	394,000	433,000	488,000	194,000	209,000	228,000	271,000	277,000
Austria	2,153	2,033	2,002	2,069 ^r	2,050	689	650	641	662 ^r	656
Azerbaijan	18	28	--	58 ^r	60	9 ^e	14 ^e	--	33 ^r	34
Bosnia and Herzegovina	1,614	1,482	1,615	1,401 ^r	1,850	678	622	678	588 ^r	777
Brazil	354,674	350,707 ^r	298,528 ^r	372,120 ^r	372,500 ^{p,6}	235,504	233,514 ^r	198,710 ^r	247,772 ^r	248,000 ^p
Canada ⁷	32,744	32,102	31,704	37,001	33,573 ^{p,6}	20,751	20,300	20,000 ^e	23,300 ^e	21,000
Chile	8,818	9,316	8,242	9,129 ^r	12,624 ⁶	5,379	5,670	5,006	5,852	7,747 ⁶
China ^{c,8}	707,000	824,000	880,000	1,070,000	1,330,000	233,000	270,000	280,000	332,000	412,000
Colombia	624	473 ^r	281	77	174 ⁶	341	300 ^r	154 ^e	42 ^e	96
Cuba	3	--	--	--	--	2 ^e	--	--	--	--
Egypt ^c	665	773	195 ^r	256 ^r	300	335	390	65 ^r	85 ^r	100
Germany ⁹	422	455	364 ^r	390 ^r	400	44	48 ^r	38 ^r	41 ^r	42
Greece ^{c,10}	1,500	1,500	1,500	1,500	1,200	575	575	570	570	560
Guatemala	31	(11)	5	2	2	6	(11)	1	(11) ^e	(11)
India ^e	207,000	215,000	225,000	230,000	240,000	126,000	138,000	144,000	147,000	154,000
Indonesia	61	65 ^e	45	46	46	35	37 ^e	25	26 ^e	27
Iran ^{c,12}	31,538 ⁶	32,000	26,000	28,000	28,000	15,000	15,000	12,000	13,000	13,000
Kazakhstan	23,834	21,486	22,281	24,229	24,813 ⁶	13,600	12,200	12,700	13,800	14,100
Kenya ^c	(11)	1 ^r	11 ^r	11 ^r	11	(11) ^r	(11) ^r	7 ^r	7 ^r	7
Korea, North ^e	5,130	5,136 ⁶	5,300	5,300	5,300	1,400	1,488 ⁶	1,500	1,500	1,500
Korea, Republic of	291	366	455	513	510	163	205	274	308 ^e	300
Malaysia	802	982	1,470	3,466	7,696 ⁶	457 ^e	560 ^e	838 ^e	1,976	4,380
Mauritania	11,817	10,950	10,270	11,500 ^r	12,000	7,280	7,120	6,680	7,150 ^e	7,200
Mexico ^{c,13}	10,916	11,688	11,677	13,998	14,482 ⁶	6,550	7,013	7,007	8,400 ^e	7,722 ⁶
Mongolia	265	1,387	1,379	3,203	3,000	170	888	883	2,050 ^r	2,000
Morocco	9 ^e	9 ^e	31	45	45	5 ^e	5 ^e	16	23	24
New Zealand ¹⁴	1,723	2,020	2,092	2,439	2,300	982 ^e	1,200 ^e	1,200 ^e	1,400 ^e	1,300
Nigeria ^e	58 ⁶	62 ⁶	61 ^r	50	--	21	23	23 ^r	16	--
Norway	620	668	711	712 ^e	700	400 ^e	430 ^e	460 ^e	460 ^e	450
Pakistan ^{c,15}	207 ⁶	250 ⁶	270	290	300	104 ⁶	125	135	145	150
Peru	7,614	7,823	6,698	9,160	10,459 ⁶	5,186	5,244	4,490	6,140	7,124 ^{p,6}
Portugal ^{c,16}	14	14	14	14	14	10	10	10	10	10

See footnotes at end of table.

TABLE 16—Continued
IRON ORE: WORLD PRODUCTION, BY COUNTRY^{1,2}
(Thousand metric tons)

Country ⁵	Gross weight ³					Metal content ⁴				
	2007	2008	2009	2010	2011 ^e	2007	2008	2009	2010	2011 ^e
Romania	45	--	--	--	--	11	--	--	--	--
Russia	105,000	99,900	92,000	95,500 ^r	100,000	60,800 ^e	57,800 ^e	53,200 ^e	58,500 ^e	60,000
Slovakia	570	392	--	--	--	194	133	--	--	--
South Africa ¹⁷	42,083	48,983	55,313	58,709	59,500 ⁶	26,500	30,800	34,800	38,000 ^r	38,500
Sweden ^e	24,700	23,800	17,700	25,300	25,300	16,000	14,280	11,500	16,400	16,400
Thailand	1,555	2,029	1,401	970 ^r	1,000	779	855	800	485 ^r	500
Tunisia	180	211	151	181 ^r	175	94	110	79	86	90
Turkey	4,849	4,697	4,170	4,500 ^e	4,500	2,600	2,500 ^e	2,200 ^e	2,400 ^e	2,400
Ukraine	77,900	72,688	66,476	78,171	80,581 ⁶	42,800 ^e	40,000 ^e	36,600 ^e	43,000 ^e	44,300
United Kingdom	(11) ^e	(11)	--	--	--	(11) ^e	(11)	--	--	--
United States	52,500	53,600	26,700	49,900	54,700 ⁶	33,100	33,800	16,600	31,300	34,300 ⁶
Venezuela ^e	20,700	20,650 ⁶	17,000 ^r	17,000 ^r	17,000	13,500 ^r	13,423 ^{r,6}	11,100 ^r	11,100 ^r	11,100
Vietnam ^e	1,060	1,000	1,000	1,000	1,000	530	530	530	530	530
Zimbabwe ^e	100	50	-- ⁶	--	--	50	25	-- ⁶	--	--
Total	2,040,000	2,200,000 ^r	2,220,000 ^r	2,590,000	2,940,000	1,070,000	1,130,000	1,090,000	1,290,000 ^r	1,390,000

^eEstimated. ^fPreliminary. ^rRevised. -- Zero.

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

²Table includes data available through July 22, 2012.

³Insofar as availability of sources permit, gross weight in this table represents the nonduplicative sum of marketable direct-shipping iron ores and iron ore concentrates; iron agglomerates produced from imported iron ores have been excluded under the assumption that the ore from which such materials are produced has been credited as marketable ore in the country where it was mined.

⁴Data represent actual reported weight of contained metal or are calculated from reported metal content. Estimated figures are based on latest available iron content reported, except for the following countries for which grades are U.S. Geological Survey estimates: Azerbaijan, Kazakhstan, North Korea, and Ukraine.

⁵In addition to the countries listed, Uganda may also produce iron ore, but definitive information on output levels, if any, is not available.

⁶Reported figure.

⁷Series represented gross weight and metal content of usable iron ore (including byproduct ore) actually produced, natural weight.

⁸China's gross weight iron ore production figures are significantly higher than that of other countries, because China reports crude ore production only with an average iron content of 33%, whereas other countries report production of usable ore.

⁹Iron ore is used domestically as an additive in cement and other construction materials but is of too low a grade to use in the steel industry.

¹⁰Nickeliferous iron ore.

¹¹Less than ½ unit.

¹²Data are for year beginning March 21 of that stated.

¹³Gross weight calculated from reported iron content based on grade of 60% iron.

¹⁴Concentrates from titaniferous magnetite beach sands.

¹⁵Pakistan iron ore is based on fiscal years ending June 30 of stated.

¹⁶Includes mangamiferous iron ore.

¹⁷Includes magnetite ore as follows, in thousand metric tons: 2007—3,781; 2008—3,987; 2009—4,725; 2010—5,474; and 2011—5,325.