

# **2011 Minerals Yearbook**

## **IRON AND STEEL [ADVANCE RELEASE]**

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The global recession of 2008–09 caused a retraction of global steel industries through 2009, followed by a weak and uneven recovery throughout 2010 and 2011, as demand decreased in the construction and automobile industries. Despite financial losses during the last quarter of 2010 by several steelmakers, many others predicted that they could raise prices in 2011 to offset raw material costs. By late 2011, the global steel market began to lose its recovered strength, and steelmakers began to slow production with the expectation of lower prices. U.S. capacity utilization for raw steel production, which had dipped to a low of 41% in April 2009, rose steadily to a high of 75% in May and June 2010, but then fluctuated significantly between 68% and 75% during the second half of 2010 and through 2011, ending at 75% in December 2011. U.S. apparent steel consumption, which had decreased to a low of 63 million metric tons (Mt) in 2009, after a high of 120 Mt in 2006 and 102 Mt in 2008, rebounded to 89 Mt in 2011. Apparent consumption in China, the world's largest producer and consumer of steel, was expected to fall by 7% in 2011 from that in 2010 after a strong increase of 25% in 2009 from that in 2008, as China eased back on its economic boom and the effects of government stimulus packages faded. Unprecedented rises of iron ore and metallurgical coal prices adversely affected steelmaking companies and their customers worldwide.

According to the World Steel Association (2012b), China was the top steel producer in the world during 2011 (684 Mt), with its leading steelmaker, Hebei Iron & Steel Group Co. Ltd. (44.4 Mt), placing second behind the world's leading steelmaker ArcelorMittal (97.2 Mt). India was the world's fourth-ranked steel producer (71.3 Mt), behind the United States (86.4 Mt), and ahead of the fifth-ranked producer Russia (68.9 Mt). China ranked first in the world for total exports of steel (47.9 Mt), followed by Japan (40.7 Mt) and the European Union (EU) (38.0 Mt). The EU ranked first in the world for total imports of steel (35.9 Mt) followed by the United States (26.9 Mt) and Germany (24.9 Mt).

The American Iron and Steel Institute (AISI) reported U.S. production of iron and steel and shipments of steel mill products. These data can be regarded as representing 100% of the raw steel producers in the United States. World production of iron and steel was reported by the World Steel Association and by foreign government agencies. Consistent with international usage and Federal Government policy, the U.S. Geological Survey reported all data on iron and steel in metric units unless otherwise noted.

#### **Environmental Issues**

AK Steel Corp. of Middletown, OH, planned to build a \$310 million powerplant that would use blast furnace waste gas that would ordinarily be flared. The U.S. Department of

Energy awarded AK Steel a \$30 million grant, and the U.S. Environmental Protection Agency (EPA) has approved the project (Plain Dealer, The, 2012).

In October 2011, the U.S. House of Representatives passed H.R. 2250, the EPA Regulatory Relief Act of 2011, which would provide the EPA with additional time to reconsider and re-propose its boiler Maximum Achievable Control Technology (MACT) air regulations, to extend compliance deadlines, and to ensure that final rules are achievable and based on real-world technologies. The current boiler MACT regulations would force steelmakers to consume more fossil fuels instead of using waste gases from the steelmaking process to fuel boilers (American Iron and Steel Institute, 2011a).

The EPA and the National Highway Traffic Safety Administration (NHTSA) proposed a new rule setting stringent fuel and emissions requirements for model years 2017 to 2025, including a 87.7 kilometers per gallon fuel standard. Advanced high-strength steels (AHSS) was the fastest growing automotive lightweighting material used to adapt to new emission and safety standards at affordable cost for consumers. Currently, about 80 kilograms (kg) of AHSS are used per vehicle, and the projected use of AHSS per vehicle is about 160 kg and 225 kg by 2020 and 2025, respectively (American Iron and Steel Institute, 2011b).

#### Production

Raw steel production in the United States was about 86.4 Mt in 2011, up about 7% from that in 2010 (table 1). The AISI estimated raw steel production capability to be 116 Mt, up slightly from that in 2010. Production represented 74.4% of estimated capacity, up from 70.4% in 2010 (American Iron and Steel Institute, 2012, p. 75).

Integrated steel producers smelted iron ores to make liquid iron in blast furnaces and used basic oxygen furnaces to refine the liquid iron with some steel scrap to produce raw liquid steel. The basic oxygen process was used to make 34.3 Mt of steel in the United States (American Iron and Steel Institute, 2012, p. 72). The use of this process increased to 39.7% of total steel production in 2011 from 38.7% in 2010. Blast furnace operations in the United States were operated by 6 companies at 16 locations in 2011 (Iron and Steel Technology, 2012).

Minimills and specialty mills are nonintegrated steel producers that use the electric arc furnace (EAF) to melt low-cost raw materials (usually scrap). They also employ continuous casting machines and hot-rolling mills that are often closely coupled to casting operations. Specialty mills include producers of alloy-electrical, stainless, and tool steel; hightemperature alloys; forged ingots; and other low-volume steel products. About 55 companies operated about 109 EAF facilities in the United States during 2011 (Iron and Steel Technology, 2011). These U.S. mills used the EAF steelmaking process to produce 52.1 Mt of steel, a 5.6% increase from that in 2010, and accounted for 60.3% of total steelmaking (American Iron and Steel Institute, 2012, p. 72–73).

Raw liquid steel is mostly cast into semifinished products in continuous casting machines. Only 2.2% of U.S. production was cast in ingot form in 2011, and subsequently rolled into semifinished forms, a slightly lower percentage than that of 2010. Continuous casting production was 84.4 Mt, or 97.8% of total steel production, 7.7% higher than in 2010 (American Iron and Steel Institute, 2012, p. 73).

#### Consumption

Steel mill products are produced at steel mills either by forging or rolling into forms normally delivered for fabrication or use. Some companies purchase semifinished steel mill products from other steel companies and use them to produce finished steel products. The accumulated shipments of all companies less the shipments to other reporting companies are identified as net shipments to avoid double counting.

U.S. apparent steel consumption, an indicator of economic growth, increased to 89 Mt in 2011 from 80 Mt in 2010. Net shipments of steel mill products by U.S. companies increased by 10% to 83.3 Mt compared with those of 2010 (American Iron and Steel Institute, 2012, p. 25). Compared with those in 2010, shipments of construction products, including maintenance, the leading single end-use market for steel, increased slightly in 2011; automotive product shipments increased by 18%; shipments of agricultural products increased by 33%; industrial machinery, equipment, and tools increased by 23%; oil, gas, and petrochemical shipments increased by 46%; steel service center shipments increased by 22%; lumbering, mining, quarrying industries shipments increased by 17%; shipments of appliances increased by 16%; and containers, packaging, and shipping material decreased by 20% (American Iron and Steel Institute, 2012, p. 29).

#### Prices

The U.S. Department of Labor, Bureau of Labor Statistics (2011), producer price index for steel mill products increased by 13% to 216.2 in 2011 from 191.7 in 2010 (1982 base=100) (table 1). The average monthly price of hot-rolled steel sheet increased steadily from about \$806 per metric ton in January 2011 to a high of \$965 in April, followed by a steady decline to a low of \$721 in November before rebounding to \$751 in December (American Metal Market, 2012).

#### **Foreign Trade**

Export shipments of steel mill products by AISI reporting companies increased to 12.2 Mt from 11.0 Mt in 2010 (table 4). Canada received the largest amount of U.S. exported steel, 6.1 Mt, the same as that in 2010 (table 4). Mexico was again the second ranked importer, receiving 3.1 Mt, 30% more than that in 2010. Domestic imports of steel mill products increased by 19% to 25.9 Mt from 21.7 Mt in 2010 (table 4). Brazil, Canada, China, the EU, Japan, the Republic of Korea, Mexico, and Russia were major sources of steel mill product imports in 2011 (table 4).

Imports of semifinished steel (table 6) by steel companies are taken into consideration in evaluating apparent consumption (supply) of steel mill products in the United States and the share of the market represented by imported steel. To avoid double counting the imported semifinished steel and the products produced from it, the amount of semifinished steel consumed by companies that also produced raw steel is subtracted from domestic consumption. Between 1993 and 2006, semifinished steel imports ranged between 2.5 million metric tons per year (Mt/yr) and 8.5 Mt/yr. Prior to 1993, the amount was less than 0.2 Mt/yr. Taking the imported semifinished steel into consideration, the share of the U.S. steel market represented by imported steel was an estimated 29% in 2011 compared with 27% in 2010.

U.S. imports continued to recover from a 2009 low of 14.7 Mt to 25.9 Mt in 2011 as the steel industry, among others, sought protection from low-priced Chinese competition that was blamed for lost sales and jobs. Steel product imports from China were at a low of 44,500 t in February 2011, then rose to a high of 147,000 t in July, and decreased to 80,000 t at vearend (U.S. International Trade Administration, 2011). U.S. companies and the U.S. Government continued in 2011 to accuse Chinese competitors of receiving Chinese Government subsidies, thus allowing the sale of products in the United States at artificial and unfairly low prices. The U.S. International Trade Commission determined that the U.S. industry was materially injured by Chinese imports of drawn stainless steel sinks, steel wheels, galvanized steel wire, high pressure steel cylinders, and other steel products, and as a result, the U.S. Department of Commerce issued antidumping and countervailing duties. To avoid these duties, Chinese exporters allegedly transshipped products through countries that had no antidumping duties, such as Malaysia, to the United States (Lawrence, 2011).

"Fabricated steel products" reported in tables 4, 5, and 6 are those produced from steel mill products but do not include those that incorporate steel products with other materials. Examples of fabricated steel products are structural steel and steel fasteners. "Other iron and steel products" refers to products that are not produced from steel mill products. Examples of other iron and steel products include iron or steel castings and direct reduced iron (DRI).

#### **World Review**

World production of pig iron totaled about 1.09 billion metric tons (Gt), about 5% more than that in 2010 (table 9). Pig iron production of the EU was about 95 Mt, slightly less than that in 2010. Germany was the leading producer in the EU, producing about 28 Mt, slightly less than that in 2010. China continued to be the leading producer of pig iron in the world, producing nearly 630 Mt, 5% more than that of 2010, followed by Japan (81 Mt), Russia (50 Mt), the Republic of Korea (42 Mt), India (39 Mt), Brazil (31 Mt), the United States (30 Mt), Ukraine (29 Mt), and Germany (28 Mt). Russia and Ukraine were the only major pig iron producers in the Commonwealth of Independent States (CIS). In North America, the only major producer of pig iron was the United States, where in 2011 production increased by 13% from that in 2010. In South America, the only major pig iron producer was Brazil.

World capacity for DRI production in 2010 was estimated to be about 87 Mt/yr (Midrex Technologies, Inc., 2012). DRI production worldwide reached a record of 76.3 Mt in 2011, 7.5% more than that in 2010 (table 9). The leading producer of DRI was India, followed by, in descending order of tonnage, Iran, Venezuela, and Mexico. In 2011, additional DRI capacity of almost 22 Mt/yr was under construction in China, Bahrain, Egypt, India, Iran, Pakistan, the United States, and Venezuela. The leading technology was, according to declining order of production, the Midrex process, followed by coal-based, HYL/Energiron, and Finmet processes.

World production of raw steel was 1.5 Gt, 6% more than the revised production in 2010 (table 10). Steel production increased during 2011 in North America (6.3%), the EU (2.7%), South America (3.1%), and the CIS (3.8%). Positive growth also took place in India (5.7%) and China (7.2%). As in previous years, production varied widely among major regions of the world. China produced 45% of world total crude steel in 2011. Asian countries produced about 58% of the world's steel; the EU, 12%; North America, 8%; and the CIS, 7%.

During 2011, China was again the world's leading steel producer, about 683 Mt, a gain of 7.2% compared with that of 2010. In descending order of production, the leading producers behind China were Japan, the United States, India, the Republic of Korea, Russia, and Germany. These six countries accounted for 29% of world production. The combined steel production of the seven steel-producing countries in the CIS was about 112 Mt, an increase of 4% from that in 2010. Russia and Ukraine remained the leading producers in the CIS. U.S. steel production during 2011 was greater than 86 Mt, an increase of 7.3% from that in 2010.

World Steel Association (2012a) reported that world steel capacity utilization rate at yearend 2011 was about 72%, after a low of about 57% in December 2008 and a high of 84% in April 2010. China, the leading steel-consuming and steel-producing country in the world, had a capacity utilization rate of 82% in 2010, according to Ernst & Young (2012, p. 11). The average capacity utilization rate during 2011 was 80% (David Ko, KPMG, unpub. data, August 16, 2012).

#### Outlook

The expansion or contraction of gross domestic product (GDP), the broadest measure of a nation's economic activity, may be considered a predictor of the health of the steelmaking and steel manufacturing industries, worldwide and domestically. The World Bank's forecast of global GDP growth for 2011, 2012, and 2013 was 3.2%, 3.6%, and 3.6%, respectively, after 3.8% in 2010 (World Bank, The, 2011). The International Monetary Fund's projection of GDP growth for 2012 was 4.0%, which was down from an earlier projection of 4.5% (International Monetary Fund, 2012). The U.S. Federal Reserve's January 2012 projections for the U.S. 2012 GDP growth rate was between 2.1% and 3.0%, between 2.4% and 3.8% for 2013, and between 2.8% and 4.3% for 2014, which were reduced from earlier projections (Board of Governors of

the Federal Reserve System, 2012). The 2011 GDP growth for China was 10.3% and was projected to be 8.7% in 2012 and 8.8% in 2013, and that of India was projected to be 7.7% and 7.9% for those years, respectively (World Bank, The, 2011).

MEPS (International) Ltd. forecast total world steel production in 2012 to be 1.625 Gt, up 11% from that in 2010 and up 5% from that forecast in 2011. MEPS also forecast increasing steel production in 2012 in South America, Africa and the Middle East, China, other Europe and the CIS, and the EU of 5%, 3%, 8%, 4%, and 2%, respectively [MEPS (International) Ltd., 2011, 2012].

World apparent steel consumption (ASC) was expected to increase by 3.6% to 1.422 Gt during 2012, after increasing by 5.6% in 2011, and then increase by 4.5% in 2013, to reach a historic high of 1.49 Gt (World Steel Association, 2012c). China's ASC was expected to increase by about 4% to 649 Mt in 2012, and then by 4% in 2013 to 675 Mt. ASC in India was expected to increase by about 7% in 2012 to about 73 Mt and by 9.4% in 2013. The U.S. ASC was expected to increase by 5.7% to 94 Mt in 2012 and by 5.6% in 2013. The EU's ASC was expected to decrease by 1.2% to 151 Mt in 2012 and increase by 3.3% to 156 Mt in 2013. In Japan, the 2012 ASC was expected to decrease by 0.6% to 64 Mt, and decrease an additional 2.2% to 62 Mt in 2013. The ASC of the CIS was expected to increase by 4% to 56 Mt in 2012 and then by 5% to 59 Mt in 2013.

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### TABLE 1 SALIENT IRON AND STEEL STATISTICS<sup>1</sup>

#### (Thousand metric tons unless otherwise noted)

	2007	2008	2009	2010	2011
United States:					
Pig iron:					
Production <sup>2</sup>	36,300	33,700	19,000	26,800	30,200
Exports <sup>3</sup>	71	51	10	2,220	51
Imports for consumption <sup>3</sup>	5,220	4,980	2,420	3,780	4,190
Direct-reduced iron:					
Production <sup>4</sup>	250	260			
Exports <sup>3</sup>	(5)	1 <sup>r</sup>	(5)	1 <sup>r</sup>	4
Imports for consumption <sup>3</sup>	2,330	2,340	1,020	1,640	1,800
Raw steel production: <sup>6</sup>					
Carbon steel	89,800	84,100	55,200	73,600	79,100
Stainless steel	2,170	1,930	1,620	2,200	2,070
All other alloy steel	6,140	5,810	2,620	4,680	5,220
Total	98,100	91,900	59,400	80,500	86,400
Capability utilization, percent	87.0	81.4	52.4	70.4	74.4
Steel mill products:					
Net shipments <sup>2</sup>	96,500	89,400	56,400	75,700	83,300
Exports <sup>2</sup>	10,100	12,200	8,420	11,000	12,200
Imports <sup>2</sup>	30,200	29,000	14,700	21,700	25,900
Producer price index $(1982=100.0)^7$	182.9	220.6	165.2	191.7	216.2
World production: <sup>8</sup>					
Pig iron	956,000	931,000	921,000 r	1,040,000 r	1,090,000
Direct-reduced iron <sup>4</sup>	65,000 <sup>r</sup>	66,900 <sup>r</sup>	65,400 <sup>r</sup>	71,000 <sup>r</sup>	76,300
Raw steel	1,350,000	1,330,000	1,240,000	1,440,000 <sup>r</sup>	1,520,000

<sup>r</sup>Revised. -- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits, except producers price index; may not add to totals shown.

<sup>2</sup>Data are from the American Iron and Steel Institute (AISI).

<sup>3</sup>Data are from the U.S. Census Bureau.

<sup>4</sup>Data are from Midrex Technologies, Inc., governments, and companies.

<sup>5</sup>Less than <sup>1</sup>/<sub>2</sub> unit.

<sup>6</sup>Raw steel is defined by AISI as steel in the first solid state after melting, suitable for rolling.

<sup>7</sup>Data are from the U.S. Department of Labor, Bureau of Labor Statistics.

<sup>8</sup>Data are from the U.S. Geological Survey and the World Steel Association.

## TABLE 2 MATERIALS CONSUMED IN BLAST FURNACES AND PIG IRON PRODUCED<sup>1</sup>

#### (Thousand metric tons)

Material	2010	2011
Iron oxides: <sup>2</sup>		
Ores		
Pellets	36,000	46,300
Sinter <sup>3</sup>	5,090	6,830
Total	41,100	53,100
Scrap <sup>4</sup>	1,090	2,280
Coke <sup>2</sup>	8,430	9,270
Pig iron, produced	26,800	30,200

-- Zero.

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

<sup>2</sup>American Iron and Steel Institute.

<sup>3</sup>Includes sintered ore and pellet fines, dust, mill scale, and other revert iron-bearing materials; also some nodules.

<sup>4</sup>Mainly briquetted turnings and borings, shredded scrap, etc.; scrap produced at blast furnaces and remelt not included.

## TABLE 3 DISTRIBUTION OF SHIPMENTS OF STEEL MILL PRODUCTS, BY STEEL TYPE, PRODUCT, AND MARKET<sup>1</sup>

	Quan	tity		
	(thousand m	etric tons)	Perce	entage
	2010	2011	2010	2011
Shipments by steel type:				
Carbon steel	71,000	77,900	93.76	93.49
Allov steel	3.210	3,530	4.25	4.24
Stainless steel	1.510	1.890	1.99	2.27
Total	75,700	83,300	100.00	100.00
Steel mill products:		,		
Ingots, blooms, billets and slabs	927	811	1.22	0.97
Wire rods	1.710	1.960	2.25	2.35
Structural shapes, heavy	3.880	4.830	5.13	5.80
Steel piling	819	354	1.08	0.42
Plates, cut lengths	5.660	6.370	7.47	7.65
Plates, in coils	3,030	2,780	4.01	3.33
Rails	713	843	0.94	1.01
Railroad accessories	190	192	0.25	0.23
Bars, hot-rolled	4.080	4.510	5.39	5.41
Bars, light-shaped	1.760	1.870	2.33	2.25
Bars, reinforcing	5.740	5.060	7.58	6.07
Bars, cold finished	1,180	1,370	1.55	1.65
Tool steel	8	7	0.01	0.01
Pipe and tubing, standard pipe	626	779	0.83	0.93
Pipe and tubing, oil country goods	1.960	2.390	2.59	2.86
Pipe and tubing, line pipe	302	438	0.40	0.53
Pipe and tubing, mechanical tubing	521	658	0.69	0.79
Pipe and tubing, pressure tubing	39	46	0.05	0.06
Pipe and tubing, stainless	10	7	0.01	0.01
Pipe and tubing, structural	61	53	0.08	0.06
Wire	272	356	0.36	0.43
Tin mill products, blackplate	100	123	0.13	0.15
Tin mill products, tinplate	1.840	1.520	2.44	1.82
Tin mill products, tin-free steel	474	395	0.63	0.47
Tin mill products, tin coated sheets	84	73	0.11	0.09
Sheets. hot-rolled	16.600	19,700	21.88	23.60
Sheets, cold-rolled	9,070	9,700	11.98	11.64
Sheets and strip, hot dip galvanized	10,700	12,400	14.10	14.82
Sheets and strip, electrogalvanized	1,510	1,390	2.00	1.67
Sheets and strip, other metallic coated	965	1,480	1.27	1.77
Sheets and strip, electrical	306	339	0.40	0.41
Strip, hot rolled	37	51	0.05	0.06
Strip, cold rolled	584	565	0.77	0.68
Total	75,700	83,300	100.00	100.00
Shipments by markets:		,		
Service centers and distributors	20,400	25,000	26.96	29.95
Construction	16.300	16.300	21.53	19.57
Automotive	9,620	11,300	12.71	13.57
Machinery	795	978	1.05	1.17
Containers	2,390	1.900	3.15	2.28
All others	26,200	27,900	34.60	33.45
Total	75,700	83,300	100.00	100.00

<sup>1</sup>Data are rounded to no more than three significant digits, except percentages; may not add to totals shown.

## TABLE 4 U.S. IMPORTS AND EXPORTS OF STEEL MILL PRODUCTS, BY COUNTRY<sup>1</sup>

	20	10	20	11
Country	Imports	Exports	Imports	Exports
Argentina	128	15	167	13
Australia		28		33
Brazil	903	143	2,820	145
Canada	6,030	6,100	5,470	6,110
China	781	116	1,120	133
European Union <sup>2</sup>	2,570	342	2,680	445
Germany	1,090	73	975	94
Japan	1,350	16	1,820	19
Korea, Republic of	1,850	72	2,570	64
Mexico	2,560	2,390	2,620	3,120
Russia	1,250		1,250	
South Africa	117	2	131	7
Sweden	253	14	268	8
Taiwan	486	88	587	159
Turkey	528		665	
Ukraine	118		325	
Venezuela		62		87
Other	1,710	1,540	2,380	1,770
Total	21,700	11,000	25,900	12,200

#### (Thousand metric tons)

-- Zero.

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

<sup>2</sup>Excludes Germany and Sweden.

## TABLE 5 U.S. EXPORTS OF IRON AND STEEL PRODUCTS<sup>1</sup>

#### (Thousand metric tons)

	2010	2011
Steel mill products:		
Ingots, blooms, billets, slabs	609	904
Wire rods	170	189
Structural shapes, heavy	760	1,060
Steel piling	31	38
Plates, cut lengths	1,070	1,230
Plates, in coils	979	850
Rails, standard	84	99
Rails, other	23	18
Railroad accessories	27	32
Bars, hot-rolled	563	683
Bars, light-shaped	235	197
Bars, concrete reinforcing	520	523
Bars, cold-finished	147	182
Tool steel	29	46
Pipe and tubing, standard pipe	95	135
Pipe and tubing, oil country goods	366	437
Pipe and tubing, line pipe	186	145
Pipe and tubing, mechanical tubing	38	54
Pipe and tubing, stainless	33	42
Pipe and tubing, nonclassified	370	443
Pipe and tubing, structural	221	222
Pipe for piling	20	17
Wire	193	200
Tin mill products, blackplate	3	4
Tin mill products, tinplate	208	214
Tin mill products, tin-free steel	21	20
Sheets, hot-rolled	876	705
Sheets, cold-rolled	832	939
Sheets and strip, hot-dip galvanized	960	1,140
Sheets and strip, electrogalvanized	393	424
Sheets and strip, other metallic coated	240	276
Sheets and strip, electrical	213	230
Strip, hot-rolled	194	188
Strip, cold-rolled	298	326
Total	11,000	12,200
Fabricated steel products:		
Structural shapes, fabricated	384	388
Rails, used	16	16
Railroad products	64	148
Wire rope	19	20
Wire, stranded products	30	33
Wire, other products	122	126
Springs	142	167
Nails and staples	30	29
Fasteners	911	666
Chains and parts	37	45
Grinding balls	114	118
Pipe and tube fittings	38	40
Other <sup>2</sup>	104	126
Total	2,010	1,920
Grand total	13,000	14,100
Cast iron and steel products:		
Cast steel pipe fittings	38	40
Cast iron pipe and fittings	115	55
Cast steel rolls	1	1
Cast grinding balls	34	31
Granules, shot and grit	31	36
Other castings	68	87
Total	287	250
		_

See footnotes at end of table.

### TABLE 5—Continued U.S. EXPORTS OF IRON AND STEEL PRODUCTS<sup>1</sup>

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

<sup>2</sup>Includes shapes cold formed, sashes and frames, fence and sign post, architectural and ornamental work, and conduit.

### TABLE 6 U.S. IMPORTS OF MAJOR IRON AND STEEL PRODUCTS<sup>1</sup>

#### (Thousand metric tons)

	2010	2011
Steel mill products:		
Ingots, blooms, billets, and slabs	4,600	6,060
Wire rods	1,200	921
Structural shapes-heavy	474	465
Steel piling	77	94
Plates, cut lengths	680	1,060
Plates, in coils	928	1,230
Rails and railroad accessories	260	277
Bars, hot-rolled	952	1,200
Bars, light-shaped	99	101
Bars, reinforcing	469	595
Bars, cold-finished	243	350
Tool steel	122	156
Pipe and tubing, standard pipe	705	755
Pipe and tubing, oil country goods	2.160	2.640
Pipe and tubing, line pipe	1.350	1.790
Pipe and tubing, mechanical tubing	386	558
Pipe and tubing, pressure tubing	78	121
Pipe and tubing, stainless	100	115
Pipe and tubing, nonclassified	22	17
Pipe and tubing, structural	282	343
Pipe for piling	14	13
Wire	573	577
Tin mill products-blackplate	31	40
Tin mill products-tinplate	459	366
Tin mill products-tin-free steel	134	132
Sheets hot-rolled	2 180	2 420
Sheets cold-rolled	1 110	1 260
Sheets and strip hot-dip galvanized	1 290	1 330
Sheets and strip, let up garranized	91	88
Sheets and strip, other metallic coated	375	483
Sheets and strip, electrical	86	103
Strip hot-rolled	40	61
Strip, cold-rolled	144	144
Total	21 700	25 900
Fabricated steel products:	21,700	23,700
Structural shapes fabricated	772	587
Rails used	53	71
Railroad products	125	180
Wire rope	140	140
Wire-stranded products	202	211
Springs	280	330
Nails and staples	492	506
Easteners	957	1 000
Chains and parts	116	1,000
Pine and tube fittings	265	338
Other	709	760
	4 110	4 270
Grand total	25 800	30 100
Cast iron and steel products:	23,000	30,100
Cast steel nine fittings	265	338
Cast iron nine and fittings	205	220
Other products	2.5	29
Total	605	751

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

## TABLE 7U.S. IMPORTS OF STAINLESS STEEL1

#### (Metric tons)

Product	2010	2011
Semifinished	101,000	132,000
Plate	88,600	158,000
Sheet and strip	353,000	356,000
Bars and shapes	110,000	143,000
Wire and wire rods	60,300	63,800
Pipe and tube	99,700	115,000
Total	813 000	968 000

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

Source: American Iron and Steel Institute.

## TABLE 8 COAL AND COKE AT COKE PLANTS<sup>1, 2</sup>

#### (Thousand metric tons)

	2010	2011
Coal, consumption	19,100	19,400
Coke: <sup>3</sup>		
Production	13,600	14,000
Exports	1,330	880
Imports	1,100	1,290
Consumption, apparent	13,500	14,400

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

<sup>2</sup>Includes furnace and merchant coke plants.

<sup>3</sup>Coke production and consumption do not include breeze.

Source: Energy Information Administration, Quarterly Coal Report, DOE/EIA–0121(2011/04Q).

#### TABLE 9

### PIG IRON AND DIRECT-REDUCED IRON: WORLD PRODUCTION, BY COUNTRY<sup>1, 2, 3, 4</sup>

#### (Thousand metric tons)

Country <sup>5</sup>	2007	2008	2009	2010	2011
Algeria	1,193	690 <sup>e</sup>	493	696 <sup>r</sup>	360
Argentina:	,				
Pig iron	2,593	2,581 <sup>r</sup>	2,042 r	2,532 r	2,500 °
Direct-reduced iron	1,810	1,847 <sup>r</sup>	807 r	1,566 r	1,650
Australia	6,351	6,409	4,370	6,259 <sup>r</sup>	6,400 <sup>e</sup>
Austria	5,908 <sup>r</sup>	5,795 <sup>r</sup>	4,353 <sup>r</sup>	5,621 <sup>r</sup>	5,815
Belgium	6,576	7,125	3,087	4,725	4,700 °
Bosnia and Herzegovina	60 °	243	482	621	685
Brazil:					
Pig iron	35,571	34,871	25,135	30,898 <sup>r</sup>	31,000 <sup>p, e</sup>
Direct-reduced iron <sup>e</sup>	362	302	305	305	305
Bulgaria	1,069	441			
Burma <sup>.e</sup>	,				
Pig iron	2	2	2	2	2
Direct-reduced iron	r	r	r	r	
Canada:					
Pig iron <sup>e</sup>	8,577 <sup>6</sup>	9,000	5,000	6,000	7,500
Direct-reduced iron	910	690 °	300 °	800	700
Chile	1.147	1.109 <sup>r</sup>	923	635 <sup>r</sup>	1.130 °
China <sup>7</sup>	476.520	470.670	552.830	597.330 <sup>r</sup>	629.690
Colombia	341	300	342	327 r	325 °
Czech Republic	5.289	4.737	3.483	3.987	4.137
Egypt:	- ,	· · · ·	-,	- ,	,
Pig iron	1.000	1.000	3,900	3,600	3.600 °
Direct-reduced iron <sup>e</sup>	2.786 <sup>6</sup>	2,600	3.100	3.000	2.970
Finland	2.914	2,943	2.042	2.600 r	2.600 °
France	12.426	11.372	8,105	10.137	9.700 °
Germany:	, -	<u>,</u>	-,	- ,	- ,
Pig iron	31,149	29,111	20,104	28,560	27,795
Direct-reduced iron <sup>e</sup>	590	520	380	450	380
Hungary	1.393 <sup>r</sup>	1.289	1.050	1.325 <sup>r</sup>	1.315
India:	,	,	,	,	,
Pig iron	28.800	29.000 <sup>e</sup>	34.000	38,685	38.900
Direct-reduced iron	19,060 r	21,200 r	22,030 r	23,420 r	27,560
Indonesia, direct-reduced iron <sup>e</sup>	1,420	1,290	1,230 r	1,360 r	1,400
Iran: <sup>e</sup>					
Pig iron	2,572 6	2,200	2,300	2,300	2,500
Direct-reduced iron	7,440	7,500	8,000	9,000	10,000
Italy	11,110	10,373	5,719	8,549	9,800
Japan	86,771	86,171	66,943	82,283	81,028
Kazakhstan	3,795	3,106	2,997	2,984	3,141
Korea, North <sup>e</sup>	900	900	900	900	900
Korea, Republic of	29,437	31,043	27,405	31,228	42,213
Libya, direct-reduced iron	1,660	1,569	1,097	1,270 <sup>r</sup>	300
Malaysia, direct-reduced iron	1,840	1,957	2,388	2,390 <sup>r</sup>	2,400 e
Mexico:					
Pig iron	4,077	4,670	3,929	4,720	4,600 e
Direct-reduced iron	6,265	5,940	4,203	5,455	5,900 °
Morocco <sup>e</sup>	15	15	15	15	12
Netherlands <sup>8</sup>	6,412	6,130	4,655	5,799	5,900 °
New Zealand <sup>e</sup>	679	622	608	667	659
Nigeria	200		e		
Norway <sup>e</sup>	100	100	100	100	100
Pakistan <sup>e</sup>	1,001 <sup>r</sup>	1,000	1,000	1,000	1,200
Paraguay	148	145	146	146 <sup>e</sup>	146 <sup>e</sup>
Peru: <sup>e</sup>					
Pig iron	351 <sup>6</sup>	395 <sup>6</sup>	400	400	400
Direct-reduced iron	90	72	75	75	75

See footnotes at end of table.

## TABLE 9—Continued PIG IRON AND DIRECT-REDUCED IRON: WORLD PRODUCTION, BY COUNTRY<sup>1, 2, 3, 4</sup>

#### (Thousand metric tons)

0 4 5	2007	2008	2000	2010	2011
Country	2007	2008	2009	2010	2011
Poland	5,804	4,934	3,095	3,638 1	3,975
Portugal <sup>e</sup>	100	100	100	100	100
Qatar, direct-reduced iron	1,200	1,700 e	2,100	2,157 r	2,230
Romania	3,923	2,945	1,575	1,880	1,600 e
Russia:					
Pig iron	51,523	48,300	43,930	48,200 r	50,000 °
Direct-reduced iron	3,410	4,560	4,670	4,700 <sup>e</sup>	4,800 <sup>e</sup>
Saudi Arabia, direct-reduced iron <sup>e</sup>	4,340 6	4,970 <sup>6</sup>	5,000	5,000	5,500
Serbia	1,485	1,582	1,006	1,265	1,226
Slovakia	4,012	3,529	3,019	3,649	3,600 °
South Africa:	_				
Pig iron	5,358	5,138 <sup>r</sup>	4,444 <sup>r</sup>	5,266 <sup>r</sup>	4,800 °
Direct-reduced iron	1,736	1,178 <sup>r</sup>	1,340	1,120 <sup>r</sup>	1,100 <sup>e</sup>
Spain <sup>e</sup>	3,974 6	3,995 <sup>6</sup>	4,000	4,000	4,000
Sweden	3,815	3,800 e	3,700	3,500 r, e	3,300 e
Taiwan	10,550	9,750	7,939	9,358	12,940
Trinidad and Tobago, direct-reduced iron	2,065	1,600	1,182	1,752 <sup>r</sup>	1,915
Turkey <sup>e</sup>	6,234 6	6,600	7,000	8,000	8,200
Ukraine	35,647	30,982	25,682 <sup>r</sup>	27,361 <sup>r</sup>	28,881
United Kingdom	10,960	10,137	7,674	7,235	6,600
United States:	_				
Pig iron	36,300	33,700	19,000	26,800	30,200
Direct-reduced iron	250	260			
Venezuela, direct-reduced iron	7,782	7,140	7,150	7,150 <sup>e</sup>	7,150 <sup>e</sup>
Grand total	1,020,000	998,000 <sup>r</sup>	986,000 <sup>r</sup>	1,110,000 <sup>r</sup>	1,170,000
Of which:	_				
Pig iron <sup>9</sup>	956,000	931,000	921,000 r	1,040,000 r	1,090,000
Direct-reduced iron <sup>10</sup>	65,000 r	66,900 <sup>r</sup>	65,400 <sup>r</sup>	71,000 <sup>r</sup>	76,300

<sup>e</sup>Estimated. <sup>p</sup>Preliminary. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>2</sup>Production is pig iron unless otherwise specified.

<sup>3</sup>Direct-reduced iron is obtained from ore by reduction of oxides to metal without melting.

<sup>4</sup>Table excludes ferroalloy production except where otherwise noted. Table includes data available through September 7, 2012. <sup>5</sup>In addition to the countries listed, Vietnam has facilities to produce pig iron and may have produced limited quantities during 2007–11, but output is not reported and available information is inadequate to make reliable estimates of output levels. <sup>6</sup>Reported figure.

<sup>7</sup>Figures reported by State Statistical Bureau that the Government of China considers to be official statistical data. <sup>8</sup>Includes blast furnace ferroalloys.

<sup>9</sup>Includes unspecified pig iron and direct-reduced iron.

<sup>10</sup>Listed separately.

## TABLE 10 RAW STEEL: WORLD PRODUCTION, BY COUNTRY<sup>1, 2, 3</sup>

#### (Thousand metric tons)

Country <sup>4</sup>	2007	2008	2009	2010	2011
Albania	263	380	440	440 <sup>e</sup>	440 <sup>e</sup>
Algeria	1,278	646	543 <sup>r</sup>	696 <sup>r</sup>	440
Argentina	5,387	5,441	4,014	5,138	5,655
Australia	8,047	7,724	6,135	7,140	6,538
Austria	7,578	7,594	5,662	7,206	7,474
Azerbaijan	273	75 <sup>r</sup>	79	129	150 <sup>e</sup>
Belarus	2,214	2,660	2,449	2,672	2,700 e
Belgium	10,692	10,676	5,636	8,088	8,000 °
Bosnia and Herzegovina, ingot production	533	608	519	591 <sup>r</sup>	649
Brazil <sup>5</sup>	33,782	33,726	26,506	32,928 <sup>r</sup>	33,100 <sup>p</sup>
Bulgaria	1,909	1,330	726	740	834
Burma <sup>e</sup>	25	25	25	25	25
Canada	15,572 <sup>r</sup>	14,845 <sup>r</sup>	9,245 <sup>r</sup>	13,003 <sup>r</sup>	12,891 <sup>p</sup>
Chile <sup>5</sup>	1,679	1,523	1,308	1,011 r	1,620 °
China <sup>6</sup>	489,290	500,490	572,180	637,230 <sup>r</sup>	683,270
Colombia	1,245	1,053	1,079	1,209	1,290
Croatia	76	122	52	110 <sup>e</sup>	100 <sup>e</sup>
Cuba <sup>e</sup>	262 7	274 7	274	265	290
Czech Republic	7,059	6,387	4,594	5,180	5,583
Ecuador	87	128	259 <sup>r</sup>	368	525
Egypt	6,224	6,198	5,508	6,700	6,486
El Salvador	73	71	56 <sup>r</sup>	51	100
Ethiopia, all from scrap <sup>e</sup>	110	150	150	150	130
Finland	4,431	4,418	3,078	4,000 r	4,000 e
France	19,252	17,874	12,836	15,416	15,800
Germany	48,550	45,833	32,671 r	43,830	44,288
Ghana all from scrap <sup>e</sup>	25				
Greece	2.554	2.400 °	2.082	2.100	2.000 e
Guatemala	349	250	224	272	445
Hong Kong <sup>e</sup>	550	550	550	500	200
Hungary	2 22 7 r	2 097 r	1 403 r	1 678	1 733
India	53 500 r	57 800 r	63 500 <sup>r</sup>	68 300 <sup>r</sup>	72 200
Indonesia	4 160	3 915	3 500 °	3 700	3 800
Iran <sup>e</sup>	10.051 7	9 960	10,000	12,000	13,000
Israel <sup>e</sup>	480	480	380	430	480
Italy	31 990	30 477	19 737	25 751	28 700
Japan	120 203	118 739	87 534 <sup>r</sup>	109 599 <sup>r</sup>	107 595
Iordan <sup>e</sup>	150	150	150	150	150
Kazakhstan	4 784	4 244	4 147	4 256	4 808
Korea North <sup>e</sup>	1.230	1,279 7	1.300	1.300	1.300
Korea, Republic of	51.517	53.322	48.752	58.914 <sup>r</sup>	68.519
Latvia <sup>e</sup>	550	550	550	550	550
Libva	1.151	1.137	914	825 r	100
Luxembourg	2.858	2,582	2.215	2.563	2.500
Macedonia	372	252	276	291	386
Malavsia	6.895	6.423	5.354 <sup>r</sup>	5.693 <sup>r</sup>	5.800
Mauritania <sup>e</sup>	1 7	2 7	2	2	2
Mexico	17,573	17,209	14,172	17,041	18,100
Moldova	995	885	426 r	242 r	321
Montenegro	174	202	90	95 <sup>e</sup>	100
Morocco <sup>e</sup>	314 7	478 <sup>7</sup>	480	480	475
Netherlands	7.368	6.853	5,194	6,651	6.900
New Zealand	845	853	765	853 r	844
Norway <sup>e</sup>	680	590	591 <sup>7</sup>	600	600
Pakistan <sup>e</sup>	1.090 7	1,100 7	1,100	1,100	1,200
Paraguav <sup>e</sup>	132 7	130 7	130	130	130
Pem <sup>e</sup>	881 7	1.150	1.200	1.200	1.200
Philippines <sup>e</sup>	718 7	711 7	824 r	800 r	800

See footnotes at end of table.

## TABLE 10—Continued RAW STEEL: WORLD PRODUCTION, BY COUNTRY<sup>1, 2, 3</sup>

#### (Thousand metric tons)

Country <sup>4</sup>	2007	2008	2009	2010	2011
Poland	10,621	9,727	7,129	7,996 <sup>r</sup>	8,794
Portugal <sup>e</sup>	1,400	1,400	1,400	1,400	1,400
Qatar	1,147	1,406	1,400	2,000	2,000
Romania	6,261	5,035	2,761	3,896	3,800
Russia	72,389	68,700	59,166	66,300 <sup>r</sup>	68,000 <sup>e</sup>
Saudi Arabia <sup>e</sup>	4,644 7	4,670	4,700	5,000	5,300
Serbia	1,478	1,662	1,097 <sup>r</sup>	1,254	1,324
Singapore <sup>e</sup>	620	600	620	650	650 <sup>e</sup>
Slovakia	5,100	4,489	3,747	4,588	4,500 <sup>e</sup>
Slovenia	638	642	430	606	600 <sup>e</sup>
South Africa	9,098	8,246 <sup>r</sup>	7,484	7,617 <sup>r</sup>	6,650 <sup>e</sup>
Spain <sup>e</sup>	18,999 <sup>7</sup>	19,048 <sup>7</sup>	19,100	19,100	19,100
Sri Lanka <sup>e</sup>	30	30	30	30	30
Sweden <sup>e</sup>	5,673 <sup>7</sup>	5,500	5,000	4,800 r	4,900
Switzerland	1,264	1,260	981	1,300 r	1,250
Syria <sup>e</sup>	70	70 7	70	70	70
Taiwan	20,883	19,222	15,566	20,498	22,879
Thailand	5,565	5,211	3,645	4,145 <sup>r</sup>	4,100 <sup>e</sup>
Trinidad and Tobago	682	489	417	572	610
Tunisia	61	82	155	180	150
Turkey <sup>e</sup>	25,750 7	26,809 7	25,000	30,000	34,000
Uganda <sup>e</sup>	30	30	25	20 r	10
Ukraine	42,830	37,279 <sup>r</sup>	29,855 <sup>r</sup>	33,559	35,332
United Arab Emirates <sup>e</sup>	90	90	90	90	100
United Kingdom	14,300	13,538	10,080	9,709	9,500
United States	98,100	91,900	59,400	80,500	86,400
Uruguay <sup>e</sup>	71 7	70 7	70	70	70
Uzbekistan <sup>e</sup>	740	686 <sup>7</sup>	716 7	745	760
Venezuela <sup>e</sup>	5,005 7	4,240 7	5,000	5,000	5,000
Vietnam	2,024	2,250	2,700	4,314 <sup>r</sup>	4,300 e
Zimbabwe <sup>e</sup>	23 7	10	10		
Total	1,350,000	1,330,000	1,240,000	1,440,000 r	1,520,000

<sup>e</sup>Estimated. <sup>p</sup>Preliminary. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>2</sup>Steel formed in solid state after melting, suitable for further processing or sale; for some countries, includes material reported as "liquid steel," presumably measured in the molten state prior to cooling in any specific form.

<sup>3</sup>Table includes data available through September 7, 2012.

<sup>4</sup>In addition to the countries listed, Mozambique is known to have steelmaking plants, but available information is inadequate to make reliable estimates of output levels.

<sup>5</sup>Excludes castings.

<sup>6</sup>Figures reported by the State Statistical Bureau that the Government of China considers as official statistical data.

<sup>7</sup>Reported figure.