

# IRON ORE<sup>1</sup>

(Data in thousand metric tons of usable ore unless otherwise noted)

**Domestic Production and Use:** In 2022, seven open pit iron ore mines (each with associated concentration and pelletizing plants) in Michigan and Minnesota shipped 98% of domestic usable iron ore products, which were consumed in the steel industry in the United States. The remaining 2% of domestic iron ore products were consumed in nonsteel end uses. In 2022, the United States produced iron ore with an estimated value of \$5.2 billion, a 22% decrease from \$6.7 billion in 2021. Four iron metallic plants—one direct-reduced iron (DRI) plant in Louisiana and three hot-briquetted iron (HBI) plants in Indiana, Ohio, and Texas—operated during the year to supply steelmaking raw materials with an estimated value of \$1.3 billion. The United States was estimated to have produced 1.8% and consumed 1.5% of the world's iron ore output.

<b>Salient Statistics—United States:</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022<sup>e</sup></b>
Production:					
Iron ore	49,500	46,900	38,100	47,500	46,000
Iron metallics	3,560	3,660	3,500	5,010	4,900
Shipments	50,400	47,000	38,000	43,400	46,000
Imports for consumption	3,790	3,980	3,240	3,740	3,200
Exports	12,700	11,400	10,400	14,300	9,400
Consumption:					
Reported	36,600	34,800	NA	NA	NA
Apparent <sup>2</sup>	41,400	39,100	31,100	36,800	40,000
Price, average unit value reported by mines, dollars per metric ton	93.00	92.94	91.27	141.75	114
Stocks, mine, dock, and consuming plant, yearend	3,100	3,470	3,290	3,170	2,800
Employment, mine, concentrating and pelletizing plant, number	4,860	4,960	4,300	4,980	4,900
Net import reliance <sup>3</sup> as a percentage of apparent consumption	E	E	E	E	E

**Recycling:** None. See the Iron and Steel Scrap chapter.

**Import Sources (2018–21):** Brazil, 57%; Canada, 22%; Sweden, 8%; and other, 13%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–22</b>
	Iron ores and concentrates:		
	Concentrates	2601.11.0030	Free.
	Coarse ores	2601.11.0060	Free.
	Other ores	2601.11.0090	Free.
	Pellets	2601.12.0030	Free.
	Briquettes	2601.12.0060	Free.
	Sinter	2601.12.0090	Free.
	Roasted iron pyrites	2601.20.0000	Free.

**Depletion Allowance:** 15% (domestic), 14% (foreign).

**Government Stockpile:** None.

**Events, Trends, and Issues:** Slight decreases in production and trade in 2022 were due to rising global inflation, which resulted in decreased steel demand and consumption. Domestic iron ore production was estimated to be 46 million tons in 2022, a 3% decrease from 47.5 million tons in 2021. Total raw steel production was estimated to have decreased to 82 million tons in 2022 from 85.5 million tons in 2021. The World Steel Association<sup>4</sup> forecast global finished steel consumption to decrease by 2.3% in 2022 and increase by 1.0% in 2023. End-use consumption of steel products was expected to decline in 2022 following concurrent events affecting consumer demand, including the conflict in Ukraine, continuing coronavirus disease 2019 (COVID-19) mitigation measures in China, and rising energy costs and interest rates.

Overall, global prices trended downward to an average year-to-date unit value of \$128.65 per ton in the first 9 months of 2022, a 28% decrease from the 2021 average year-to-date unit value of \$178.27 per ton, but the 2022 average year-to-date unit value was a 28% increase from the 2020 average year-to-date unit value of \$100.83 per ton. Based on reported prices for iron ore fines (62% iron content) imported into China (cost, insurance, and freight into Tianjin Port), the highest monthly average price during the first 9 months of 2022 was \$152.07 per ton in March compared with the high of \$214.43 per ton in June 2021. The lowest monthly average price during the same period in 2022 was \$99.80 per ton in September compared with the low of \$96.24 per ton in November 2021.

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In November, one company petitioned the Minnesota Supreme Court for a review of State mineral leases that were terminated by the Minnesota Department of Natural Resources. In October, another company began construction on a \$150 million project to build a direct-reduced grade pellet plant that could be sold or feed a potential future DRI or HBI plant. An iron ore mine in northern Minnesota was expected to deplete its reserves of iron ore around 2025, and the company's leadership was seeking the land and mineral rights to a nearby deposit where construction of a new mine and facility was stalled and the mineral leases were expected to be reassigned in the near future.

**World Mine Production and Reserves:** Reserves for Australia, Peru, and Russia were revised based on company and Government reports.

	Mine production				Reserves <sup>5</sup>	
	Usable ore		Iron content		(million metric tons)	
	2021	2022 <sup>e</sup>	2021	2022 <sup>e</sup>	Crude ore	Iron content
United States	47,500	46,000	30,100	29,000	3,000	1,000
Australia	912,000	880,000	565,000	540,000	<sup>6</sup> 51,000	<sup>6</sup> 27,000
Brazil	431,000	410,000	273,000	260,000	34,000	15,000
Canada	57,500	58,000	34,500	35,000	6,000	2,300
Chile	17,700	16,000	11,200	10,000	NA	NA
China	394,000	380,000	246,000	240,000	20,000	6,900
India	273,000	290,000	169,000	180,000	5,500	3,400
Iran	72,900	75,000	47,900	49,000	2,700	1,500
Kazakhstan	64,100	66,000	13,100	14,000	2,500	900
Mauritania	12,800	13,000	8,000	8,100	NA	NA
Mexico	10,800	11,000	6,810	6,900	NA	NA
Peru	18,100	17,000	12,100	11,000	2,600	1,200
Russia	96,000	90,000	66,700	63,000	29,000	14,000
South Africa	73,100	76,000	46,500	48,000	1,000	670
Sweden	40,200	39,000	28,600	28,000	1,300	600
Turkey	16,100	17,000	9,710	10,000	130	38
Ukraine	83,800	76,000	52,400	47,000	<sup>7</sup> 6,500	<sup>7</sup> 2,300
Other countries	<u>56,700</u>	<u>59,000</u>	<u>4,900</u>	<u>5,000</u>	<u>18,000</u>	<u>9,500</u>
World total (rounded)	2,680,000	2,600,000	1,630,000	1,600,000	180,000	85,000

**World Resources:**<sup>5</sup> U.S. resources are estimated to be 110 billion tons of iron ore containing about 27 billion tons of iron. U.S. resources are mainly low-grade taconite-type ores from the Lake Superior district that require beneficiation and agglomeration prior to commercial use. World resources are estimated to be greater than 800 billion tons of crude ore containing more than 230 billion tons of iron.

**Substitutes:** The only source of primary iron is iron ore, used directly as direct-shipping ore or converted to briquettes, concentrates, DRI, iron nuggets, pellets, or sinter. DRI, iron nuggets, and scrap are extensively used for steelmaking in electric arc furnaces and in iron and steel foundries. Technological advancements have been made that allow hematite to be recovered from tailings basins and pelletized.

<sup>e</sup>Estimated. E Net exporter. NA Not available.

<sup>1</sup>Data are for iron ore used as a raw material in steelmaking—excluding iron metalics such as DRI, HBI, and iron nuggets—unless otherwise noted. See also the Iron and Steel and Iron and Steel Scrap chapters.

<sup>2</sup>Defined as production + imports – exports ± adjustments for industry stock changes.

<sup>3</sup>Defined as imports – exports ± adjustments for industry stock changes.

<sup>4</sup>Source: World Steel Association, 2022, Short range outlook October 2022: Brussels, Belgium, World Steel Association press release, October 19, 6 p.

<sup>5</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>6</sup>For Australia, Joint Ore Reserves Committee-compliant or equivalent reserves were 23 billion tons of crude ore and 10 billion tons of iron content.

<sup>7</sup>For Ukraine, reserves consist of the A and B categories of the Soviet reserves classification system.