



2019 Minerals Yearbook

COPPER [ADVANCE RELEASE]

COPPER

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In 2019, mine production of recoverable copper in the United States increased for the first time since 2016, by 3% to 1.26 million metric tons (Mt) from 1.22 Mt in 2018 (tables 1, 3). Production increased primarily because of higher mill throughput and greater volumes of ore added to leaching pads at two major copper mines. At another major mine, output recovered from that in 2018, when operations were affected by a landslide early in the year. Globally, the United States remained the fifth-ranked mine producer of copper after Chile, Peru, China, and Congo (Kinshasa), in descending order of output, and accounted for 6% of global production. World mine production of copper decreased to 20.4 Mt in 2019 from 20.5 Mt (revised) in 2018, mostly owing to decreases in production in Indonesia, Kazakhstan, and Zambia. These decreases were partially offset by increased output in China, Congo (Kinshasa), and Panama (table 20).

Smelter production in the United States decreased by 13% in 2019 to 464,000 metric tons (t) from 536,000 t in 2018, and domestic output of refined copper was 1.03 Mt, 7% less than 1.11 Mt in 2018 (tables 1, 21). One smelter and refinery temporarily shut down in October 2019 as the result of a worker strike, and production at another refinery was affected by multiple maintenance shutdowns at the associated smelter. The United States was the sixth-ranked producer of refined copper in 2019 (fourth-ranked in 2018), following China, Chile, Japan, Congo (Kinshasa), and Russia, in descending order of production, and accounted for 4% of global output. World refinery production of copper increased to a record-high 24.5 Mt from 24.4 Mt in 2018. Large production increases in China, Congo (Kinshasa), and Poland were partially offset by significantly decreased output in Chile, India, Japan, and Zambia (table 22).

Reported U.S. consumption of refined copper was essentially unchanged at 1.81 Mt in 2019 (tables 1, 4, 5). Domestic consumption of refined copper decreased from a record high of 3.02 Mt in 2000 to 1.65 Mt in 2009 and remained at approximately 1.8 Mt in all years since 2010. In 2019, China accounted for 52% of world apparent consumption, which decreased slightly to 24.3 Mt from 24.5 Mt (revised) in 2018, according to data compiled by the International Copper Study Group (ICSG). Consumption in China increased by 165,000 t from that in 2018, and consumption in all other countries and localities collectively decreased by 369,000 t. The ICSG calculation of China's apparent consumption was based on reported production, trade, and Shanghai Futures Exchange (SHFE) stock data and did not include unreported Government or industry stocks, which can fluctuate significantly on an annual basis. The United States remained the second-ranked consumer of refined copper and accounted for 8% of global apparent consumption, followed by Germany, Japan, and the Republic of

Korea, in descending order of rank (International Copper Study Group, 2020a, p. 9, 19–20).

In 2019, the average annual Commodity Exchange Inc. (COMEX) spot copper price decreased by 7% to \$2.72 per pound from \$2.93 per pound in 2018 (table 1). Several leading global copper companies primarily attributed the decrease in price to uncertainty in trade policies between the United States and China (Freeport-McMoRan Inc., 2020, p. 65; Glencore plc, 2020, p. 58; PJSC MMC Norilsk Nickel, 2020a, p. 51).

Legislation and Government Programs

In 2018, under section 301(b) of the Trade Act of 1974, as amended, the Office of the United States Trade Representative determined that acts, policies, and practices of China related to technology transfer, intellectual property, and innovation were discriminatory or unreasonable and those actions burdened or restricted United States commerce (83 FR 14906). Several lists of tariff lines (Lists 1, 2, 3) were compiled, and imports of those materials became subject to an additional import duty for products from China. Lists 1 and 2 had duty rates of 25% implemented in July 2018 and August 2018, respectively. List 3, which included nonfuel mineral commodities, had a duty rate of 10% imposed in late September 2018. The rate was scheduled to increase to 25% on January 1, 2019; however, that action was delayed. From January through May 2019, trade discussions between the United States and China were ongoing. In May 2019, because a trade agreement was not reached, the United States increased tariffs for List 3 items to 25% (84 FR 20459). China likewise imposed additional import duties for certain items originating in the United States. In December, a phase one trade agreement was reached between the United States and China, which reduced some tariff rates and resulted in additional tariffs not being implemented (Office of the United States Trade Representative, 2019).

Production

Domestic production data were compiled from U.S. Geological Survey (USGS) monthly canvasses of the mines, smelters, and refineries operating in the United States. In 2019, responses to the surveys and data from public company documents represented 99% of the mine production data, 100% of the smelter production data, and 96% of the refinery production data reported for these facilities in table 1.

Mine.—Recoverable copper production in the United States increased by 3% to 1.26 Mt in 2019 from 1.22 Mt in 2018, and the value of production decreased by 4% to \$7.75 billion from \$8.05 billion. Copper recoverable in concentrates and precipitates accounted for 58% of mine output and increased by 6% to 730,000 t in 2019 from 690,000 t in 2018, and copper produced by solvent extraction (leaching) and electrowinning

(SX–EW) represented 42% of mine production and decreased to 527,000 t from 532,000 t (tables 1, 3). Arizona was the leading copper-producing State and accounted for 68% of U.S. output in 2019, followed by, in descending order of production, Utah, New Mexico, Nevada, Montana, Michigan, and Missouri. Although copper was recovered at 25 mines in the United States (including 14 SX–EW facilities), 17 mines accounted for more than 99% of production (table 2). The remaining mines were small leach operations or byproduct producers of copper.

Domestic mine output of copper increased in 2019 primarily because of higher production at Freeport-McMoRan Inc.'s Morenci and Bagdad Mines and ASARCO LLC's Mission Mine; combined production from these three operations increased by approximately 48,900 t from that in 2018. At Freeport's mines, the company increased mill throughput and added greater volumes of ore to leaching pads. At the Mission Mine, production recovered from that in 2018, when operations were affected by a landslide early in the year (Grupo México, S.A.B. de C.V., 2018, p. 3; 2020b, p. 161; Freeport-McMoRan Inc., 2020, p. 7, 26, 60). These increases were partially offset by reduced output from Rio Tinto Kennecott's Bingham Canyon Mine as a consequence of lower ore grades. Production at Bingham Canyon in 2019 was 17,100 t less than that in 2018 (Rio Tinto Group, 2020b, p. 8, 25).

Smelter and Refinery.—In 2019, smelter production in the United States, which consisted of primary (from ore) output only, decreased by 13% to 464,000 t from 536,000 t in 2018. Production of primary electrolytically refined copper consequently decreased by 15% to 457,000 t (table 1). In October 2019, ASARCO temporarily closed its smelter and electrolytic refinery because of a worker strike, and the facilities had not reopened as of yearend. Smelter and electrolytic refinery output also were affected by two maintenance shutdowns of the Rio Tinto smelter (Grupo México, S.A.B. de C.V., 2020b, p. 123; Rio Tinto Group, 2020b, p. 8). Primary refined copper produced by electrowinning was 527,000 t in 2019, essentially unchanged from that in 2018, and secondary (from scrap) electrolytic and fire-refined copper increased by 8% to 44,400 t. In 2019, total refinery production was 1.03 Mt, 7% less than 1.11 Mt in 2018. Primary copper accounted for 96% of total domestic refined output (45% electrolytic and 51% electrowon), and secondary copper accounted for 4%. Three smelters, three electrolytic refineries, and four fire refineries operated in the United States in 2019.

Operating Property Reviews.—In 2019, ASARCO LLC (a subsidiary of Grupo México, S.A.B. de C.V.) produced a total of 125,000 t of copper at its three mines in Arizona (an increase of 6% from 118,000 t in 2018) and 94,500 t of electrolytic copper cathodes at its refinery in Texas (a decrease of 4% from 98,600 t in 2018). At the Mission Mine, the company produced 54,800 t of copper in concentrates in 2019 and 43,500 t in 2018, when a landslide affected operations throughout the year. Output from the Ray Mine was 33,900 t of copper in concentrates (37,400 t in 2018) and 16,300 t of copper by SX–EW (18,300 t in 2018). The Silver Bell Mine produced 20,400 t of electrowon copper (19,100 t in 2018). In October 2019, ASARCO temporarily closed its smelter in Hayden, AZ, and electrolytic refinery in Amarillo, TX, because of a worker strike, which had not been resolved

as of yearend. The company's three mines and two electrowon refineries continued to operate at full capacity (Grupo México, S.A.B. de C.V., 2018, p. 3; 2020b, p. 123, 161, 163, 169, 170).

Copper production at the Pinto Valley Mine in Arizona (owned by Capstone Mining Corp.) decreased to 53,400 t in 2019 from 54,000 t in 2018, owing to slightly lower ore throughput as a result of planned mill maintenance. Production at the mine primarily consisted of copper contained in concentrates with a small quantity of copper produced by SX–EW (Capstone Mining Corp., 2020, p. 17).

Total output of recoverable copper at Freeport's U.S. operations in 2019 was approximately 790,000 t, an increase of 4% from about 757,000 t during the prior year because of higher mill throughput and greater volumes of ore added to leaching pads. Combined copper in concentrates and (or) electrowon production at each of the company's mines in Arizona was as follows: Bagdad—98,900 t (90,300 t in 2018), Miami—6,800 t (7,260 t in 2018), Morenci (the third-ranked global copper mine by production quantity in 2019, 72% owned by Freeport)—460,000 t (431,000 t in 2018), Safford—49,900 t (55,800 t in 2018), and Sierrita—72,600 t (68,900 t in 2018). In New Mexico, copper output at the Chino Mine totaled 79,400 t (78,500 t in 2018), and SX–EW production at the Tyrone Mine was 21,800 t (24,900 t in 2018). Freeport also produced refined copper cathodes at its electrolytic facility in El Paso, TX, but did not publicly report cathode output. In 2019, the company continued to develop significant copper resources at its Lone Star property near the Safford Mine. The project was expected to produce roughly 90,000 metric tons per year (t/yr) of copper, starting by yearend 2020 (Freeport-McMoRan Inc., 2020, p. 7, 9, 26, 60).

KGHM International Ltd. (a subsidiary of KGHM Polska Miedź S.A.) produced 48,800 t of recoverable copper in concentrates at the Robinson Mine in Nevada. Output increased slightly compared with 48,000 t in 2018 because of higher ore grades and increased copper recovery rates. At the Carlota Mine in Arizona, electrowon production was 4,400 t in 2019 and 3,200 t in 2018 (KGHM Polska Miedź S.A., 2019, p. 13; 2020, p. 12, 13, 61).

In 2019, Lundin Mining Corp. produced 14,300 t of copper in concentrates at the Eagle nickel-copper mine in Michigan, 20% less than 18,000 t in 2018 owing to planned mine sequencing. The company processed the first ore from the Eagle East expansion of the Eagle Mine in the fourth quarter of 2019. As of yearend 2016, Eagle and Eagle East contained 117,000 t of probable copper reserves, enough to extend the mine life by 2 years to 2023 (Roscoe Postle Associates Inc., 2017, p. 1–6, 15–2; Lundin Mining Corp., 2020, p. 17).

Nevada Copper Corp. began producing copper at the underground Pumpkin Hollow Mine in Nevada on December 16, 2019. The company anticipated that the rampup to commercial production would last at least through the first half of 2020. At full capacity, the underground portion of Pumpkin Hollow was expected to generate approximately 23,000 t/yr of copper in concentrates over a mine life of nearly 14 years. An additional open pit project at the site, which was still in the feasibility stage, would potentially yield about 77,000 t/yr of copper in concentrates over a mine life of 19 years (French and others, 2019, p. 1–23, 20–14; Nevada Copper Corp., 2019a; 2019b, p. 9, 11).

At the Bingham Canyon Mine in Utah (25th-ranked), owned by Rio Tinto Kennecott (a subsidiary of Rio Tinto Group), production of copper in concentrates was 187,000 t in 2019, 8% lower than 204,000 t in 2018 as a result of lower ore grades. Publicly reported production of copper cathodes at the company's electrolytic refinery in Magna, UT, decreased by 5% to 185,000 t from 195,000 t in 2018 because of multiple smelter maintenance shutdowns. Total refinery output reported to the USGS was higher than that stated in company reports because smelter and refinery production from purchased and toll third-party concentrates were not included in the company's public figures. In 2019, Rio Tinto processed 92,000 t of third-party concentrates at its smelter in Magna, UT. The company continued a project to push back the south wall of the Bingham Canyon open pit, which was anticipated to result in higher copper ore grades beginning in the first quarter of 2021. A second phase of the project was approved in 2019 and would allow mining to continue until 2032 (Rio Tinto Group, 2020a, p. 50, 51, 271; 2020b, p. 8, 25).

Consumption

Domestic consumption data were compiled from USGS annual and monthly canvasses of U.S. manufacturers. In 2019, copper was consumed (used) as refined copper and scrap at about 30 brass mills; 15 wire-rod mills; and 500 chemical plants, foundries, and miscellaneous manufacturers in the United States. Reported U.S. consumption of refined copper was 1.81 Mt, essentially unchanged from that in 2018; consumption by wire-rod mills was 1.33 Mt (74% of total refined use), and consumption by brass mills was 413,000 t (23%). Domestic consumption of copper-base scrap in 2019 was 931,000 t (gross weight), slightly higher than 915,000 t (revised) in 2018. Brass mills consumed 646,000 t of copper-base scrap (equivalent to 69% of total use), followed by refineries and miscellaneous manufacturers—178,000 t (19%), and wire-rod mills—107,000 t (12%) (tables 1, 4, 5, 10, 11).

Copper recovered from refined or remelted scrap (of copper-base and non-copper-base) in the United States increased to 864,000 t (81% from new scrap and 19% from old scrap) from 853,000 t (revised) in 2018 and accounted for 34% of the total U.S. copper supply of 2.52 Mt (defined as primary refined production plus copper recovered from new and old scrap plus refined imports for consumption minus refined exports, including adjustments for changes in refined copper stocks). The conversion of old (post-consumer) scrap to alloys and refined copper increased by 17% to 164,000 t from 141,000 t (revised), and recovery of new (manufacturing) scrap decreased slightly to 700,000 t from 712,000 t (tables 1, 6). The overall larger quantity of copper produced from scrap in 2019 was likely a consequence of increased domestic scrap availability; in terms of copper content, total U.S. exports of copper scrap were 8% lower than those in 2018 because of new import restrictions in China (table 18; discussed in the "China" and "Foreign Trade" sections). Brass and wire-rod mills accounted for 81% of copper recovered from scrap in 2019 (table 7).

According to preliminary data from the Copper Development Association Inc. (2020, p. 18), copper and copper-alloy product supply to the U.S. market by fabricators (brass mills, foundries,

powder producers, and wire mills), consisting of shipments from domestic companies and net imports, was essentially unchanged at 2.59 Mt in 2019 from that in 2018. Since 2000, when the copper supply reached a record high of 4.33 Mt of contained copper, deliveries to the domestic market trended downward, and those in 2019 were 40% less than those in 2000. In 2019, wire-mill products accounted for 56% of the total U.S. copper supply; brass mill products, 32%; net imports, 9%; and foundry and powder products, 3% combined. The building construction sector remained the leading end-use market and accounted for 43% of total shipments, followed by electrical and electronic products, 21%; transportation equipment, 19%; consumer and general products, 10%; and industrial machinery and equipment, 7%. Examples of product categories included in each sector are as follows: building construction—air conditioning, building wire, commercial refrigeration, and heating and plumbing; consumer and general products—appliances, consumer electronics, and cords; electrical and electronic products—lighting and wiring devices, power utilities, and telecommunications; industrial machinery and equipment—industrial valves and fittings and plant equipment; and transportation equipment—aircraft, automobiles, railroads, and ships.

The essentially unchanged quantity of copper and copper-alloy product shipments to the domestic market in 2019 compared with those in 2018 corresponded with mixed economic trends in major industries that used copper. In 2019, housing starts in the United States increased by 3% to 1.29 million units from 1.25 million units. Manufacture of telecommunications equipment increased by 12% from output in 2018, fabrication of power transmission products increased by 4%, and production of appliances and electrical equipment (such as batteries, generators, lighting components, and wiring devices) was unchanged. Output of aircraft, automobiles, and ships decreased slightly, and manufacture of equipment for heating, ventilation, and air-conditioning (HVAC) was 5% lower than that in 2018 (U.S. Census Bureau, 2020; Board of Governors of the Federal Reserve System, 2021).

Prices and Stocks

After 2 consecutive years of increases, the average annual COMEX spot copper price decreased by 7% to \$2.72 per pound in 2019 from \$2.93 per pound in 2018 (table 1). Several leading global copper companies attributed the decrease in price primarily to uncertainty in trade policies between the United States and China. The monthly average COMEX price ranged from a low of \$2.57 per pound in August to a high of \$2.92 per pound in April. The minimum monthly price coincided with a period of negative sentiment regarding trade negotiations between the United States and China, and the maximum monthly price coincided with a period of reduced output from copper mines in Chile and stable demand for copper in China (Freeport-McMoRan Inc., 2020, p. 65; Glencore plc, 2020, p. 58; PJSC MMC Norilsk Nickel, 2020a, p. 51).

Copper scrap prices generally followed the trend in refined copper prices, and prices for various types of scrap decreased by 7% to 9% in 2019 (table 13). The refiners no. 2 scrap price averaged \$2.33 per pound, 9% less than \$2.55 per pound in 2018. The average annual discount for refiners no. 2 scrap from

the COMEX spot price increased to 39.1 cents per pound from 37.7 cents per pound, and the average monthly discount ranged between 33.0 cents per pound in January and 42.3 cents per pound in May.

In 2019, total refined copper stocks in the United States decreased by 135,000 t (55%) to 110,000 t at the end of December from 244,000 t at the beginning of January. Inventories of domestic refined copper at yearend were primarily located in London Metal Exchange Ltd. (LME) warehouses (32% of total stocks), COMEX warehouses (31%), and wire-rod mills (18%). LME stocks, COMEX stocks, and wire-rod stocks decreased by 68,900 t (66%), 65,600 t (66%), and 1,870 t (9%), respectively, in 2019. Combined stockpiles at brass mills, refineries, and other manufacturers increased by 1,600 t (8%) from those at yearend 2018 (table 1).

Foreign Trade

Imports of refined copper into and exports of refined copper from the United States both decreased in 2019. Overall, net imports were 537,000 t (663,000 t of imports and 125,000 t of exports), a decrease of 9% from 588,000 t (778,000 t of imports and 190,000 t of exports) in 2018 (tables 14, 16). Refined copper from U.S. inventories likely replaced some refined copper imports, as 135,000 t of refined copper was removed from domestic stockpiles in 2019 (table 1). Most of the decrease in refined exports was attributed to reduced shipments to China; the United States exported 33 t of refined copper to China in 2019, significantly less than 47,600 t in 2018. Refined copper exports likely were affected by the enactment of a 25% tariff on deliveries of copper cathodes from the United States into China, effective June 1, 2019 (Luk, 2019). In addition, the Chinese copper market was oversupplied in 2019; output of refined copper in China increased by 493,000 t (table 22), whereas apparent consumption increased by 153,000 t. Imports of refined copper into China from all countries consequently decreased by 203,000 t (5%) from those in 2018 (International Copper Study Group, 2020a, p. 19, 28).

In 2019, refined copper accounted for 83% of all U.S. unmanufactured copper imports (consisting of refined copper, unalloyed copper scrap, and the copper content of alloyed copper scrap; blister and anodes; matte, ash, and precipitates; and ore and concentrates), and the copper content of scrap accounted for 14% (10% copper-alloy scrap and 4% unalloyed scrap). The copper content of scrap was the primary source of copper shipped to international markets and represented 58% of total unmanufactured copper exports (24% alloyed and 35% unalloyed), followed by the copper content of ore and concentrates (29%) and refined copper (10%). Chile was the leading foreign source of refined copper for the United States and accounted for 64% of the total refined import quantity, followed by Canada (21%) and Mexico (12%). The leading destinations for refined copper exports from the United States were Mexico (73%) and Canada (26%). Imports of copper ore and concentrates predominantly originated from Mexico (greater than 99%) and decreased by 16% to 27,000 t in 2019. Exports of copper ore and concentrates increased by 39% and were primarily shipped to Mexico (52%), Spain (14%), Japan (14%), and the Republic of Korea (6%), in descending order of

quantity. Ore and concentrates exports to China decreased to 7 t in 2019 from 47,500 t in 2018, owing to the enactment of a tariff on these shipments from the United States by the Government of China in September 2018 (Daly, 2020) (tables 14, 16, 18, 19).

The United States imported an estimated 108,000 t of copper contained in scrap during 2019, a decrease of 12% from 123,000 t in 2018. Imports of copper in scrap primarily originated from Canada (49%) and Mexico (38%) (table 19). Shipments of copper scrap (copper content) from the United States to international markets decreased by 7% in 2019, to 714,000 t from 772,000 t, owing to new regulations in China (discussed in the “China” section). In 2018, copper scrap exports to China totaled 309,000 t (copper content) and accounted for 40% of total U.S. copper scrap exports. In 2019, shipments to China decreased by 153,000 t (49%) to 157,000 t and accounted for 22% of the total. The decrease in copper scrap exports to China was partially offset by significantly higher shipments to Malaysia, where U.S. deliveries increased by 72,600 t. Malaysia was the leading destination for domestic copper scrap in 2019 and accounted for 23% of total copper scrap exports, followed by China (22%), Canada (11%), the Republic of Korea (9%), and India (6%) (table 18).

World Industry Structure

Mine Production.—In 2019, world mine production of copper decreased to 20.4 Mt from 20.5 Mt (revised) in 2018. Copper in concentrates accounted for 80% of global mine output and decreased to 16.3 Mt from 16.5 Mt (revised) in 2018. Copper produced by SX–EW represented 20% of world mine production and increased slightly to 4.04 Mt from 3.96 Mt (revised). Chile was the leading producer of mined copper in 2019 and accounted for 28% of total global production, followed by Peru (12%), China (8%), Congo (Kinshasa) (6%), and the United States (6%). The remaining countries among the 10 leading producers, in descending order of output, were Australia, Russia, Zambia, Mexico, and Canada. Fifty-four countries and localities were known to have mined copper in 2019. The 10 leading producers accounted for 80% of production, and the 20 leading producers accounted for 94%. The largest increases in production took place in Panama, where output increased by 147,000 t (from no production in 2018); Congo (Kinshasa), by 64,900 t (5% higher than country production in 2018); and China, by 58,800 t (4%). These increases were offset by significant decreases in Indonesia, where output decreased by 290,000 t (45%); Kazakhstan, by 73,400 t (12%); and Zambia, by 56,700 t (7%) (table 20). According to data compiled by the International Copper Study Group (2020a, p. 9), global mine capacity increased to 24.2 Mt in 2019 from 24.1 Mt (revised) in 2018.

Refined Production.—Global output of refined copper in 2019 increased to a record-high 24.5 Mt from 24.4 Mt in 2018. Production of primary copper represented 83% of world refined production and totaled 20.3 Mt, unchanged from that in 2018; electrowon copper output (16% of worldwide refined production) increased slightly, and primary copper produced by electrolytic and fire refining (other primary, 67%) was unchanged from that in 2018. Production of secondary copper accounted for 17% of global refined output in 2019

and increased to 4.15 Mt from 4.14 Mt. China was the leading producer of refined copper and accounted for 40% of world refinery production, followed by Chile (9%), Japan (6%), Congo (Kinshasa) (4%), Russia (4%), and the United States (4%). The remaining countries among the 10 leading producers, in descending order of output, were the Republic of Korea, Germany, Poland, and Kazakhstan. In 2019, 45 countries and localities were known to have produced refined copper. The 10 leading producers represented 78% of worldwide output, and the 20 leading producers represented 92%. Most of the increase in refined copper production was in China, where output increased by 493,000 t (5% greater than country production in 2018). Large increases also took place in Congo (Kinshasa), by 128,000 t (13%); and Poland, by 63,800 t (13%). The most significant decreases were in Chile, where production decreased by 192,000 t (8%); Zambia, by 163,000 t (38%); India, by 125,000 t (23%); Japan, by 99,200 t (6%); and the United States, by 81,900 t (7%) (table 22). Global refinery capacity increased by 3% to 28.8 Mt in 2019 from 27.9 Mt (revised) in 2018 (International Copper Study Group, 2020a, p. 9).

Apparent Consumption.—In 2019, global apparent consumption of refined copper decreased to 24.3 Mt from 24.5 Mt (revised) in 2018, according to the ICSG. China was the leading user of refined copper and accounted for 52% of worldwide consumption, followed by the United States (8%), Germany (4%), Japan (4%), and the Republic of Korea (3%). The remaining countries among the 10 leading consumers, in descending order of quantity, were Italy, India, the United Arab Emirates, Turkey, and Mexico. The 10 leading consumers accounted for 82% of global apparent consumption, and the 20 leading consumers accounted for 94%. Consumption of copper in China increased by 165,000 t to 12.7 Mt in 2019 from 12.5 Mt in 2018, and consumption collectively decreased by 369,000 t in all countries and localities except China. The ICSG calculation of China's apparent consumption was based on reported production, trade, and SHFE stock data and did not include unreported Government or industry stocks, which can fluctuate significantly on an annual basis. By region, use of refined copper in Asia accounted for 75% of the global total in 2019 (21% excluding China), followed by Europe (12%); North America (10%); and South America, Africa, and Oceania (3% combined). Consumption was unchanged in Asia and North America and decreased by 9% in Europe compared with that in 2018 (International Copper Study Group, 2020a, p. 9, 19–20).

World Review

Chile.—In 2019, 9 of the leading 25 copper mines in the world were located in Chile, the first-ranked global producer of mined copper since 1982. Mined copper production in Chile decreased to 5.79 Mt from 5.83 Mt in 2018 (table 20). At the Escondida Mine [the first-ranked global mine by copper output in 2019, majority-owned by BHP Group (57.5%)], production decreased by 4% to 1.16 Mt from 1.21 Mt in 2018, primarily owing to lower ore grades (BHP Group, 2019, p. 9; 2020, p. 14; Rio Tinto Group, 2020a, p. 51). Higher mill throughput offset planned lower ore grades at the Collahuasi Mine [second-ranked, Anglo American plc and Glencore plc (44% each)], and production increased to 565,000 t in

2019 from 559,000 t (Anglo American plc, 2020, p. 63, 232). Copper output at the Los Pelambres Mine [10th-ranked, Antofagasta plc (60%)] was 363,000 t in 2019, slightly greater than 358,000 t in 2018 because of higher copper ore grades (Antofagasta plc, 2020, p. 56–57). Owing to drought conditions that restricted water availability, copper production decreased by 9% at the Los Bronces Mine [12th-ranked, Anglo American (50.1%)], to 335,000 t from 370,000 t (Anglo American plc, 2020, p. 63, 232). The Centinela Mine [13th-ranked, Antofagasta (70%)] produced 277,000 t of copper in 2019, an increase of 12% from 248,000 t in 2018 as a result of higher ore grades in the concentrates circuit (Antofagasta plc, 2020, p. 58–59). In 2019, the Corporación Nacional del Cobre de Chile (Codelco) owned 7 mines in the country, 3 of which were ranked among the 25 leading global copper mines. Total production of mined copper from Codelco's operations decreased by 5%, to 1.59 Mt from 1.68 Mt in 2018. The company attributed the reduced output to heavy rainfall at some mines in February, a nearly 2-week strike at the Chuquicamata Mine in May, and maintenance of the concentrators at the Chuquicamata and Andina Mines (Corporación Nacional del Cobre de Chile, 2020, p. 30). These 12 operations accounted for 74% of mined copper production in Chile in 2019.

On August 14, 2019, Codelco began underground operations at the Chuquicamata Mine. The company expected the expansion to produce 320,000 t/yr of copper by 2026 and to extend the mine life by 40 years. Open pit mining at the site, ongoing since 1915, was anticipated to cease in 2020 (Rostás, 2019; Corporación Nacional del Cobre de Chile, 2020, p. 24, 90).

Refined copper output in Chile was 2.27 Mt in 2019, a decrease of 8% from 2.46 Mt in 2018 (table 22). In 2019, Codelco's three electrolytic refineries and five wholly owned electrowon refineries accounted for 54% of the refined copper capacity in Chile, and other SX–EW operations accounted for the remainder (International Copper Study Group, 2020b, p. 177–182). Codelco did not report refined copper production in 2019, but the company's refined sales decreased by 254,000 t (19%) to 1.11 Mt from 1.36 Mt in 2018 (Corporación Nacional del Cobre de Chile, 2019, p. 31; 2020, p. 40). Owing primarily to lower ore grades, output of refined copper in the form of SX–EW cathodes decreased by 16,600 t (6%) at Escondida; by 11,400 t (12%) at Centinela; and by approximately 9,100 t (10%) at Freeport's 51%-owned El Abra complex (BHP Group, 2019, p. 9; 2020, p. 14; Antofagasta plc, 2020, p. 58–59; Freeport-McMoRan Inc., 2020, p. 15, 26, 79; Rio Tinto Group, 2020a, p. 51). In contrast, production of refined copper at the Zaldivar division [Antofagasta and Barrick Gold Corp. (50% each)] increased by 21,600 t (23%) from that in 2018 because of higher ore grades and increased mill throughput. BHP stacked a record-high quantity of ore on the leaching pads and increased cathode output by 17,000 t (10%) at its Spence Mine (22d-ranked) in 2019 (BHP Group, 2019, p. 13; 2020, p. 1, 18; Antofagasta plc, 2020, p. 61). Using sales from the Codelco facilities as a proxy for production, these 13 operations accounted for approximately 80% of refined copper output in Chile in 2019.

China.—Beijing Antaika Information Co., Ltd. (2018, p. 8–9) reported that refined copper capacity in China would increase by about 1.8 Mt in 2018 and 2019, to 12.9 Mt at yearend 2019 from 11.1 Mt at yearend 2017. In 2019, output of refined copper in China consequently increased by 5% to 9.78 Mt from 9.29 Mt (revised) in 2018 (table 22).

As of December 31, 2018, the Government of China banned the importation of copper-containing scrap materials that must be disassembled prior to processing (known in China as category 7 scrap), including electrical appliances, motors, and unstripped wire and cable. Additional restrictions on imports of copper scrap into China took effect on July 1, 2019. Companies that imported high-grade copper scrap (known in China as category 6 scrap) were required to apply for a license and quota from the Ministry of Ecology and Environment and to demonstrate that they had the capability to process the material into refined metal or semifinished products in compliance with environmental regulations. Effective June 1, 2019, imports of copper anodes and cathodes from the United States into China were subject to a tariff of 25% (Ministry of Ecology and Environment, 2018; Daly and Singh, 2019; Luk, 2019).

Congo (Kinshasa).—Owing primarily to the rampup of operations at the Kamoto Mine [17th-ranked; Katanga Mining Ltd. (75%), a subsidiary of Glencore] following the completion of expansion projects in late 2018, production of mined and refined copper in Congo (Kinshasa) increased in 2019. Mined copper output increased by 64,900 t (5%) to 1.29 Mt from 1.23 Mt in 2018, and refined copper production was 1.08 Mt, higher by 128,000 t (13%) compared with 953,000 t in 2018 (tables 20, 22). Output of SX–EW cathode at Kamoto increased by 82,200 t (54%) in 2019, to 235,000 t from 152,000 t, and was expected to increase by an additional 35,000 t in 2020 (Katanga Mining Ltd., 2019, 2020). Production also increased significantly, by 31,100 t (58%), at the Kolwezi Mine [Zijin Mining Group Co., Ltd. (72%)], where a leaching circuit began operating in 2019. The mine produced 84,300 t of copper in 2019, consisting of 58,100 t of copper in concentrates and 26,200 t of electrowon cathodes, and 53,200 t of copper in 2018, consisting of copper in concentrates only (Zijin Mining Group Co., Ltd., 2019, p. 15; 2020, p. 24, 27). At the Tenke Fungurume Mine and electrowon refinery [China Molybdenum Co., Ltd. (80%)], copper metal output was 178,000 t, 9,650 t (6%) more than 168,000 t in 2018 (China Molybdenum Co., Ltd., 2019, p. 18; 2020, p. 18). These production increases were partially offset by lower output at Glencore’s Mutanda copper-cobalt mine and MMG Ltd.’s Kinsevere Mine. Owing to low cobalt prices and oversupply in the cobalt market, Glencore reduced operations at Mutanda in 2019 and placed the mine on temporary care-and-maintenance status in November. Mutanda produced 103,000 t of SX–EW cathodes in 2019, a decrease of 95,800 t (48%) from 199,000 t in 2018. Production of electrowon cathodes at Kinsevere decreased by 11,800 t (15%), to 67,900 t from 79,700 t in 2018, because of lower ore grades and reduced access to the open pit (MMG Ltd., 2019, p. 25; 2020, p. 18, 25; Glencore plc, 2020, p. 8, 49, 70, 236). In 2019, these five operations accounted for 52% of copper mine production and 56% of copper refinery production in Congo (Kinshasa).

India.—In 2019, refined copper production in India was 426,000 t, a decrease of 23% from 551,000 t (revised) in 2018 (table 22). The Tuticorin smelter and refinery, owned by Vedanta Resources Ltd., were closed for the entire year. The operations had an annual capacity of 400,000 t of refined copper, equivalent to nearly 40% of the copper refinery capacity in India (Vedanta Resources Ltd., 2019, p. 21; International Copper Study Group, 2020b, p. 188). In 2018, Vedanta shut down Tuticorin for planned maintenance in March, and in May the government of the State of Tamil Nadu ordered the permanent closure of the complex owing to violations of environmental laws. In February 2019, the Supreme Court of India issued a decision that finalized the closure and overturned a previous judgement that would have allowed the operations to reopen. The Supreme Court ruling allowed Vedanta to petition a lower court to restart Tuticorin, but the facilities remained shuttered at yearend (de la Paz, 2019a; Vedanta Resources Ltd., 2019, p. 123).

Indonesia.—Mine production of copper in Indonesia decreased by 45%, to 361,000 t from 651,000 t in 2018, primarily owing to lower mill throughput rates and reduced copper ore grades associated with a transition from open pit to underground mining at PT Freeport Indonesia’s (PT-FI’s) Grasberg Mine (14th-ranked). In 2019, PT-FI mined the final ore from the Grasberg pit and was developing or ramping up production at four underground ore deposits. The company produced 275,000 t of copper at Grasberg, a decrease of 48% from 526,000 t in 2018, and expected that copper output would remain relatively low until 2021 (Freeport-McMoRan Inc., 2020, p. 17, 26, 82).

Panama.—First Quantum Minerals Ltd. commenced production of copper at its 90%-owned Cobre Panama Mine in March 2019. The company declared that commercial production was achieved in September, brought the final mill online in December, and anticipated that the rampup to full capacity (285,000 to 310,000 t/yr of copper) would be completed in 2020. In 2019, output of copper in concentrates at Cobre Panama was 147,000 t (First Quantum Minerals Ltd., 2020, p. 26–27, 46). The startup of Cobre Panama represented the largest addition to global copper mine capacity from a new mine or expansion since the Las Bambas Mine in Peru began operating in late 2015.

Peru.—In 2019, 6 of the leading 25 copper mines in the world were located in Peru, and mine production of copper in the country increased to 2.46 Mt from 2.44 Mt (revised) in 2018 (table 20). At the Antamina Mine [sixth-ranked, BHP and Glencore (33.75% each)], copper output was 449,000 t, an increase of 2,400 t from that in 2018 as a result of higher ore grades (Teck Resources Ltd., 2020, p. 17). Production also increased at the Toquepala Mine (16th-ranked; Southern Copper Corp., a subsidiary of Grupo México), by 87,800 t in 2019 to 258,000 t, because of additional capacity from a new concentrator that began operating in the fourth quarter of 2018 (Grupo México, S.A.B. de C.V., 2020a, p. 3; 2020b, p. 155). Higher production at Antamina and Toquepala in 2019 was partially offset by reduced output from other leading copper mines in Peru. Owing to lower copper ore grades and recovery rates, production at the Cerro Verde Mine [fifth-ranked, Freeport (53.56%)] decreased by roughly 20,900 t to 455,000 t (Freeport-

McMoRan Inc., 2020, p. 14, 26, 79). At the Las Bambas Mine [ninth-ranked, MMG Ltd. (62.5%)], protestors from the local community blockaded access roads in the first and third quarters and restricted the transport of copper concentrates for more than 100 days in 2019. Copper output from the mine was 383,000 t, lower by 2,780 t compared with that in 2018 (MMG Ltd., 2019, p. 4; 2020, p. 4). Glencore produced 198,000 t of copper at the Antapaccay Mine (21st-ranked) in 2019, a decrease of 7,800 t from that in 2018 because of lower ore grades (Glencore plc, 2020, p. 70, 235). These five operations accounted for 71% of mined Peruvian copper production in 2019.

Poland.—KGHM Polska Miedź S.A. owned the three electrolytic copper refineries that operated in Poland during 2019. Production of refined copper at these facilities was 566,000 t, an increase of 13% from 502,000 t in 2018 (table 22), owing to multiple projects that increased copper recovery rates and capacity utilization. In April 2019, KGHM brought a new furnace online at the Legnica smelter and refinery that allowed for increased processing of copper scrap (KGHM Polska Miedź S.A., 2020, p. 48–49).

Russia.—Refined copper production in Russia increased to an estimated 1.05 Mt in 2019 from 1.04 Mt (revised) in 2018 (table 22). PJSC MMC Norilsk Nickel, which owned multiple refineries that accounted for roughly 40% of the refined copper capacity in Russia, reported refined output of 431,000 t from its Russian facilities in 2019 and 426,000 t in 2018. The company attributed the increased production to higher copper content in the feedstock ores (International Copper Study Group, 2020b, p. 196–198; PJSC MMC Norilsk Nickel, 2020a, p. 76–82; 2020b). None of the other major copper refining companies in Russia reported publicly available information on the operation of their facilities in 2019.

Zambia.—New taxes on mining operations in Zambia went into effect at the beginning of 2019. The Government enacted a 5% tariff on imports of copper concentrates and increased mine royalty rates by 1.5%, with higher duties when the copper price exceeded \$3.40 per pound. In early January 2019, Konkola Copper Mines plc (a subsidiary of Vedanta Resources Ltd.) subsequently suspended production at the Nchanga smelter, which used imported copper concentrates as a feed material, and at the Nchanga Mine, which relied on sulfuric acid generated at the smelter for the leaching of copper ores. The Nchanga smelter restarted on June 22, but the operational status of the mine was uncertain as of yearend 2019 (CRU International Ltd., 2019, p. 14; de la Paz, 2019b; McKay, 2019).

In 2019, output of mined copper in Zambia decreased by 7% to 797,000 t from 854,000 t in 2018 (table 20). Production at some of the leading copper mines in Zambia was as follows: the Kansanshi Mine [18th-ranked, First Quantum (80%)]—232,000 t (252,000 t in 2018); the Sentinel Mine (20th-ranked, First Quantum)—220,000 t (224,000 t in 2018); and the Lumwana Mine (Barrick Gold Corp.)—108,000 t (102,000 t in 2018). The combined output of these three operations was equivalent to 70% of the country's total mined copper in 2019. First Quantum attributed the reduced production at Kansanshi and Sentinel to decreased copper ore grades, and copper recoveries in the SX–EW circuit at the Kansanshi Mine were lower as a result of a sulfuric acid shortage. At Lumwana,

Barrick Gold Corp. increased mill throughput and improved operational efficiency (Barrick Gold Corp., 2020, p. 56, 67; First Quantum Minerals Ltd., 2020, p. 23–25).

Refined copper production in Zambia was 262,000 t in 2019, a decrease of 38% from 425,000 t in 2018 (table 22). In addition to reduced output of electrowon copper cathodes from the Nchanga Mine (the decrease could not be quantified because publicly reported calendar year production statistics were unavailable), refined production at Glencore's Mopani operations decreased to 51,300 t in 2019 from 120,000 t in 2018, reflecting a lengthy planned maintenance shutdown of the smelter in the second half of the year. At the Kansanshi Mine, copper produced by SX–EW decreased to 45,000 t from 72,400 t because of reduced copper recoveries as a result of a sulfuric acid shortage and lower copper ore grades (First Quantum Minerals Ltd., 2020, p. 24, 44; Glencore plc, 2020, p. 70, 236).

Outlook

Domestic mine output is tentatively expected to increase in 2020, based on production guidance published by companies that operate in the United States, but mine operations could potentially be affected by the global coronavirus disease 2019 (COVID-19) pandemic that emerged in China in late 2019. Production of refined copper in the United States will likely decrease because of the worker strike at the ASARCO smelter and electrolytic refinery, as well as a planned 45-day maintenance shutdown of the Rio Tinto smelter. The Gunnison project in Arizona is scheduled to begin operating in the second quarter of 2020, and the rampup to commercial production at the Pumpkin Hollow Mine in Nevada, which started producing copper in late 2019, is anticipated to last at least through the first half of 2020. Globally, the International Copper Study Group (2020b, p. 16, 18) projects that mine and refinery production capacities will each increase by 3% in 2020. Worldwide and domestic copper consumption will continue to depend on economic trends in sectors such as automobiles, housing and building construction, HVAC, power utilities, and telecommunications.

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TABLE 1
SALIENT COPPER STATISTICS¹

(Metric tons, copper content, unless otherwise specified)

| | 2015 | 2016 | 2017 | 2018 | 2019 |
|--|-------------------------|-------------------------|-------------------------|--------------------------|-------------|
| United States: | | | | | |
| Mine production: | | | | | |
| Copper ore concentrated, gross weight | 164,000,000 | 155,000,000 | 151,000,000 | 154,000,000 [†] | 165,000,000 |
| Average copper yield of concentrated copper ore | 0.47 | 0.50 | 0.44 | 0.43 [†] | 0.43 |
| Recoverable copper:² | | | | | |
| Arizona | 961,000 | 969,000 | 868,000 | 801,000 | 859,000 |
| Other States | 422,000 | 461,000 | 391,000 | 421,000 | 398,000 |
| Total | 1,380,000 | 1,430,000 | 1,260,000 | 1,220,000 | 1,260,000 |
| Total value ³ | \$7,810 | \$7,090 | \$7,920 | \$8,050 | \$7,750 |
| Smelter production: | | | | | |
| Primary (from ore) ⁴ | 527,000 | 563,000 | 470,000 | 536,000 | 464,000 |
| Byproduct sulfuric acid, sulfur content | 553,000 [†] | 590,000 [†] | 489,000 | 586,000 [†] | 522,000 |
| Refinery production: | | | | | |
| Primary (from ore): | | | | | |
| Electrolytic | 503,000 | 561,000 | 482,000 | 538,000 | 457,000 |
| Electrowon | 588,000 | 615,000 | 557,000 | 532,000 | 527,000 |
| Total | 1,090,000 | 1,180,000 | 1,040,000 | 1,070,000 | 985,000 |
| Secondary (from scrap), electrolytic and fire-refined | 48,800 | 46,300 | 40,100 | 41,200 | 44,400 |
| Grand total, primary and secondary | 1,140,000 | 1,220,000 | 1,080,000 | 1,110,000 | 1,030,000 |
| Secondary production, refineries and manufacturers:⁵ | | | | | |
| Recovered from new (manufacturing) scrap | 640,000 | 690,000 | 702,000 | 712,000 | 700,000 |
| Recovered from old (post-consumer) scrap | 166,000 | 149,000 | 146,000 | 141,000 [†] | 164,000 |
| Total | 806,000 | 838,000 | 847,000 | 853,000 [†] | 864,000 |
| Copper sulfate production, gross weight | 18,500 | 18,400 | 18,400 | 18,200 | 17,500 |
| Exports, refined ⁶ | 86,200 | 134,000 | 94,200 | 190,000 | 125,000 |
| Imports for consumption, refined ⁶ | 687,000 | 708,000 | 813,000 | 778,000 | 663,000 |
| Closing stocks, December 31: | | | | | |
| Blister and anodes | 13,900 | 14,400 | 12,600 | 9,230 | 16,400 |
| Refined copper: | | | | | |
| Refineries | 12,000 | 4,190 | 5,840 | 3,850 | 7,010 |
| Wire-rod mills | 36,200 | 26,700 | 27,800 | 21,800 | 20,000 |
| Brass mills | 7,580 | 7,380 | 7,870 | 8,210 | 7,520 |
| Other industry | 5,730 | 5,430 | 5,360 | 7,070 | 6,200 |
| Commodity Exchange Inc. (COMEX) ⁷ | 63,200 | 80,700 | 191,000 | 99,600 | 34,100 |
| London Metal Exchange Ltd. (LME), U.S. warehouses ⁷ | 83,800 | 98,900 | 27,100 | 104,000 | 35,000 |
| Total | 209,000 | 223,000 | 265,000 | 244,000 | 110,000 |
| Consumption: | | | | | |
| Reported, refined copper | 1,810,000 | 1,800,000 | 1,800,000 | 1,820,000 | 1,810,000 |
| Apparent, primary refined and copper from old scrap ⁸ | 1,840,000 [†] | 1,880,000 | 1,860,000 [†] | 1,820,000 [†] | 1,820,000 |
| Price, annual average:⁷ | | | | | |
| U.S. producers cathode ⁹ | 256.150 | 224.873 | 285.393 | 298.738 | 279.596 |
| COMEX, high grade first position | 250.814 | 219.727 | 280.425 | 292.568 | 272.267 |
| LME, grade A cash | 249.526 | 220.571 | 279.518 | 295.960 | 272.364 |
| World, production: | | | | | |
| Mine | 19,300,000 [†] | 20,500,000 [†] | 20,000,000 [†] | 20,500,000 [†] | 20,400,000 |
| Smelter | 18,400,000 | 19,100,000 [†] | 19,500,000 [†] | 20,100,000 [†] | 20,000,000 |
| Refinery | 23,200,000 | 23,600,000 | 23,900,000 | 24,400,000 | 24,500,000 |

[†]Revised. do. Ditto.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits, except prices; may not add to totals shown.

²Copper recoverable in concentrates (of copper and other metals) and precipitates plus copper produced by solvent extraction and electrowinning.

³Calculated with the U.S. producers cathode price.

⁴May contain small amounts of scrap.

⁵Copper converted to refined metal and alloys by refineries and manufacturers (brass mills, chemical plants, foundries, wire-rod mills, and other).

⁶Source: U.S. Census Bureau.

⁷Source: S&P Global Platts Metals Week.

⁸Primary refined production plus copper recovered from old scrap plus refined imports for consumption minus refined exports, including adjustments for changes in refined stocks.

⁹Sum of the annual average COMEX price and annual average New York dealer cathode premium; reflects the delivered price of copper to U.S. consumers by U.S. producers.

TABLE 2
LEADING COPPER-PRODUCING MINES IN THE UNITED STATES IN 2019, IN ORDER OF PUBLICLY AVAILABLE OUTPUT^{1,2}

| Rank | Mine | County and State | Operator | Source of copper | Capacity ³ (thousand metric tons) |
|------|-----------------|------------------|---|---|--|
| 1 | Morenci | Greenlee, AZ | Freeport-McMoRan Inc. | Copper-molybdenum ore, concentrated and leached | 595 |
| 2 | Bingham Canyon | Salt Lake, UT | Rio Tinto Kennecott ⁴ | Copper-molybdenum ore, concentrated | 220 |
| 3 | Bagdad | Yavapai, AZ | Freeport-McMoRan Inc. | Copper-molybdenum ore, concentrated and leached | 115 |
| 4 | Chino | Grant, NM | do. | do. | 140 |
| 5 | Sierrita | Pima, AZ | do. | do. | 110 |
| 6 | Pinto Valley | Gila, AZ | Capstone Mining Corp. | do. | 75 |
| 7 | Robinson | White Pine, NV | Robinson Nevada Mining Co. ⁵ | Copper-molybdenum ore, concentrated | 65 |
| 8 | Safford | Graham, AZ | Freeport-McMoRan Inc. | Copper ore, leached | 110 |
| 9 | Mission | Pima, AZ | ASARCO LLC ⁶ | Copper-molybdenum ore, concentrated | 65 |
| 10 | Ray | Pinal, AZ | do. | Copper ore, concentrated and leached | 135 |
| 11 | Tyrone | Grant, NM | Freeport-McMoRan Inc. | Copper ore, leached | 45 |
| 12 | Silver Bell | Pima, AZ | ASARCO LLC ⁶ | do. | 25 |
| 13 | Phoenix | Lander, NV | Nevada Gold Mines LLC ⁷ | Gold-copper ore, concentrated and leached | 20 ^e |
| 14 | Eagle | Marquette, MI | Lundin Mining Corp. | Nickel-copper ore, concentrated | 20 |
| 15 | Miami | Gila, AZ | Freeport-McMoRan Inc. | Copper ore, leached | 90 |
| 16 | Carlota | do. | Carlota Copper Co. ⁵ | do. | 35 ^e |
| (8) | Continental Pit | Silver Bow, MT | Montana Resources LLC | Copper-molybdenum ore, concentrated | (8) |

^eEstimated. do. Ditto.

¹Table includes data available through June 28, 2021.

²The mines listed accounted for more than 99% of U.S. mine production of copper in 2019.

³For copper produced from concentrates, capacity was calculated based on the material handling capacity of the mill and the copper content of ore reserves. For copper produced by solvent extraction and electrowinning (SX-EW), capacity was the reported design capacity of the tankhouse.

⁴Wholly owned subsidiary of Rio Tinto Group.

⁵Wholly owned subsidiary of KGHM International Ltd.

⁶Wholly owned subsidiary of Grupo México, S.A.B. de C.V.

⁷A joint venture of Barrick Gold Corp. and Newmont Corp. The mine was operated by Barrick.

⁸The rank order and capacity are not shown because public data were not available.

TABLE 3
MINE PRODUCTION OF COPPER-BEARING ORES AND RECOVERABLE COPPER CONTENT OF ORES
PRODUCED IN THE UNITED STATES¹

(Metric tons)

| Source and treatment process | 2018 | | 2019 | |
|---|--------------------------|--------------------|--------------|--------------------|
| | Gross weight | Recoverable copper | Gross weight | Recoverable copper |
| Mined copper ore: | | | | |
| Concentrated | 154,000,000 [†] | 659,000 | 165,000,000 | 706,000 |
| Leached | NA | 532,000 | NA | 527,000 |
| Total | NA | 1,190,000 | NA | 1,230,000 |
| Copper precipitates shipped, leached from tailings, dumps, and in-place material | NA | W | NA | W |
| Other copper-bearing ores, concentrated ² | 4,550,000 | 30,700 | 4,210,000 | 24,100 |
| Grand total | XX | 1,220,000 | XX | 1,260,000 |

[†]Revised. NA Not available. W Withheld to avoid disclosing company proprietary data; included with "Other copper-bearing ores, concentrated."

XX Not applicable.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes gold ore, lead ore, and nickel ore.

TABLE 4
CONSUMPTION OF COPPER AND BRASS MATERIALS IN THE UNITED STATES¹

(Metric tons, gross weight)

| Item | Brass mills | Wire-rod mills | Foundries, chemical plants, miscellaneous users | Smelters, refiners, ingot makers | Total |
|-----------------------------|----------------------|----------------------|---|--|----------------------|
| 2018: | | | | | |
| Copper scrap | 645,000 ^r | 104,000 ^r | 42,900 | 123,000 | 915,000 ^r |
| Refined copper | 419,000 | 1,330,000 | 60,900 ^r | 4,550 | 1,820,000 |
| Hardeners and master alloys | W | -- | 3,550 ^e | -- | 3,550 |
| Brass ingots | -- | -- | 60,900 ^r | -- | 60,900 ^r |
| Slab zinc | W | -- | 465 | W | 43,800 |
| 2019: | | | | | |
| Copper scrap | 646,000 | 107,000 | 48,700 | 130,000 | 931,000 |
| Refined copper | 413,000 | 1,330,000 | 54,900 | 8,740 | 1,810,000 |
| Hardeners and master alloys | W | -- | 3,550 ^e | -- | 3,550 |
| Brass ingots | -- | -- | 56,400 | -- | 56,400 |
| Slab zinc | W | -- | 413 | W | 42,400 |

^eEstimated. ^rRevised. W Withheld to avoid disclosing company proprietary data; included with "Slab zinc" under "Total." -- Zero.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 5
CONSUMPTION OF REFINED COPPER SHAPES IN THE UNITED STATES¹

(Metric tons)

| Class of consumer | Cathodes | Ingots and ingot bars | Cakes and slabs | Wirebar, billets, other | Total |
|------------------------------|-----------|--------------------------|--------------------|----------------------------|---------------------|
| 2018: | | | | | |
| Wire-rod mills | 1,330,000 | -- | -- | (2) | 1,330,000 |
| Brass mills | 323,000 | W | 43,800 | 51,600 | 419,000 |
| Chemical plants ^e | W | -- | -- | 236 | 236 |
| Ingot makers | W | W | -- | 4,550 | 4,550 |
| Foundries | W | 4,280 | -- | 29,800 ^r | 34,100 ^r |
| Miscellaneous ³ | W | W | -- | 26,600 | 26,600 |
| Total | 1,650,000 | 4,280 | 43,800 | 113,000 | 1,820,000 |
| 2019: | | | | | |
| Wire-rod mills | 1,330,000 | -- | -- | (2) | 1,330,000 |
| Brass mills | 317,000 | W | 43,900 | 51,600 | 413,000 |
| Chemical plants ^e | W | -- | -- | 236 | 236 |
| Ingot makers | W | W | -- | 8,740 | 8,740 |
| Foundries | W | 3,860 | -- | 26,800 | 30,700 |
| Miscellaneous ³ | W | W | -- | 23,900 | 23,900 |
| Total | 1,650,000 | 3,860 | 43,900 | 111,000 | 1,810,000 |

^eEstimated. ^rRevised. W Withheld to avoid disclosing company proprietary data; included with "Wirebar, billets, other." -- Zero.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

²Withheld to avoid disclosing company proprietary data; included with "Cathodes."

³Includes consumers of copper powder and copper shot, iron and steel plants, and other manufacturers.

TABLE 6
COPPER RECOVERED FROM SCRAP PROCESSED IN THE UNITED STATES¹

(Metric tons)

| | 2018 | 2019 |
|--|----------------------|---------|
| Kind of scrap: | | |
| New: | | |
| Copper-base | 672,000 | 662,000 |
| Aluminum-base | 40,500 | 38,300 |
| Nickel-base ^e | 20 ^r | 20 |
| Total | 712,000 | 700,000 |
| Old: | | |
| Copper-base | 117,000 ^r | 141,000 |
| Aluminum-base | 23,700 ^r | 23,000 |
| Nickel- and zinc-base | 263 | 286 |
| Total | 141,000 ^r | 164,000 |
| Grand total, new and old scrap | 853,000 ^r | 864,000 |
| Form of recovery: | | |
| As unalloyed copper | 41,300 | 44,400 |
| In brass and bronze | 746,000 | 759,000 |
| In aluminum alloys | 65,200 ^r | 61,300 |
| In alloy iron and steel and other alloys | 707 ^r | 304 |
| In chemical compounds ^e | 1,800 | 1,800 |
| Total | 853,000 ^r | 864,000 |

^eEstimated. ^rRevised.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 7
COPPER RECOVERED AS REFINED COPPER AND IN ALLOYS AND OTHER FORMS
FROM COPPER-BASE SCRAP PROCESSED IN THE UNITED STATES¹

(Metric tons)

| Type of operation | From new scrap | | From old scrap | | Total | |
|---|---------------------|---------------------|----------------------|---------|---------|---------|
| | 2018 | 2019 | 2018 | 2019 | 2018 | 2019 |
| Ingot makers | 9,110 ^r | 5,840 | 48,800 ^r | 58,000 | 57,900 | 63,900 |
| Refineries ² | 20,100 ^e | 20,100 ^e | 21,000 | 24,200 | 41,200 | 44,400 |
| Brass and wire-rod mills | 617,000 | 617,000 | 35,800 | 36,500 | 652,000 | 653,000 |
| Foundries and miscellaneous manufacturers | 25,800 | 19,300 | 11,000 | 22,100 | 36,700 | 41,400 |
| Total | 672,000 | 662,000 | 117,000 ^r | 141,000 | 788,000 | 803,000 |

^eEstimated. ^rRevised.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

²Electrolytically refined and fire refined from scrap based on source of material at smelter or refinery level.

TABLE 8
PRODUCTION OF SECONDARY COPPER AND COPPER-ALLOY PRODUCTS
IN THE UNITED STATES¹

(Metric tons, gross weight)

| Item produced from scrap | 2018 | 2019 |
|--|----------------------|---------|
| Unalloyed copper products ² | 41,300 | 44,400 |
| Alloyed copper products: | | |
| Brass and bronze ingots: | | |
| Tin bronzes | 6,240 ^r | 6,830 |
| Leaded red brass and semi-red brass | 35,900 ^r | 39,600 |
| High leaded tin bronze | 6,600 ^r | 8,830 |
| Yellow brass | 1,620 ^r | 1,710 |
| Manganese bronze | 6,570 ^r | 7,260 |
| Aluminum bronze | 5,090 ^r | 5,360 |
| Nickel silver | 1,150 ^r | 1,320 |
| Silicon bronze and brass | 4,020 ^r | 4,930 |
| Copper-base hardeners and master alloys ^e | 4,480 | 4,480 |
| Miscellaneous | 8,510 ^r | 7,500 |
| Total | 80,200 ^r | 87,800 |
| Brass mill and wire-rod mill products | 735,000 | 739,000 |
| Brass and bronze castings | 33,800 | 33,900 |
| Copper in chemical products ^e | 1,800 | 1,800 |
| Grand total | 893,000 ^r | 907,000 |

^eEstimated. ^rRevised.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes electrolytically refined copper, fire-refined copper, and copper castings.

TABLE 9
ESTIMATED COMPOSITION OF SECONDARY COPPER-ALLOY PRODUCTION IN THE UNITED STATES¹

(Metric tons)

| | Copper | Tin | Lead | Zinc | Nickel | Aluminum | Total |
|--|---------------------|--------------------|--------------------|--------------------|------------------|-----------------|---------------------|
| Brass and bronze ingots: | | | | | | | |
| 2018 | 65,900 ^r | 2,880 ^r | 4,180 ^r | 7,130 ^r | 131 ^r | 11 ^r | 80,200 ^r |
| 2019 | 77,800 | 1,960 | 2,860 | 5,120 | 135 | 9 | 87,800 |
| Brass mill and wire-rod mill products: | | | | | | | |
| 2018 | 652,000 | 412 | 1,670 | 79,900 | 1,140 | 16 | 735,000 |
| 2019 | 655,000 | 414 | 1,680 | 80,200 | 1,150 | 16 | 739,000 |
| Brass and bronze castings: | | | | | | | |
| 2018 | 32,900 | 136 | 143 | 638 | 47 | 27 | 33,800 |
| 2019 | 32,900 | 137 | 145 | 642 | 47 | 27 | 33,900 |

^rRevised.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 10
CONSUMPTION AND YEAREND STOCKS OF COPPER-BASE SCRAP IN THE UNITED STATES¹

(Metric tons, gross weight)

| Scrap type and processor | 2018 | | 2019 | |
|---|----------------------|---------------------|-------------|--------|
| | Consumption | Stocks | Consumption | Stocks |
| Unalloyed scrap: | | | | |
| No. 1 wire and heavy: | | | | |
| Smelters, refiners, and ingot makers | 9,910 ^r | W | 14,300 | W |
| Brass and wire-rod mills | 393,000 | (2) | 387,000 | (2) |
| Foundries and miscellaneous manufacturers | 20,600 | (2) | 21,900 | (2) |
| No. 2 mixed heavy and light: | | | | |
| Smelters, refiners, and ingot makers | 58,900 ^r | W | 57,000 | W |
| Brass and wire-rod mills | 92,300 | (2) | 95,000 | (2) |
| Foundries and miscellaneous manufacturers | 12,000 | (2) | 14,600 | (2) |
| Total unalloyed scrap: | | | | |
| Smelters, refiners, and ingot makers | 68,800 ^r | 68,400 ^r | 71,300 | 68,000 |
| Brass and wire-rod mills | 486,000 | 1,260 | 482,000 | 700 |
| Foundries and miscellaneous manufacturers | 32,600 | 3,290 | 36,600 | 3,040 |
| Alloyed scrap: | | | | |
| Red brass: ³ | | | | |
| Smelters, refiners, and ingot makers | 12,200 ^r | 1,710 ^r | 13,000 | 1,610 |
| Brass mills | W | (2) | W | (2) |
| Foundries and miscellaneous manufacturers | W | (2) | W | (2) |
| Leaded yellow brass: | | | | |
| Smelters, refiners, and ingot makers | 8,730 ^r | 998 ^r | 9,070 | 628 |
| Brass mills | W | (2) | W | (2) |
| Foundries and miscellaneous manufacturers | 640 | (2) | 739 | (2) |
| Yellow and low brass, all plants | 65,400 | 902 | 72,800 | 885 |
| Cartridge cases and brass, all plants | W | (2) | W | (2) |
| Auto radiators: | | | | |
| Smelters, refiners, and ingot makers | 15,000 ^r | 708 ^r | 16,600 | 621 |
| Foundries and miscellaneous manufacturers | W | (2) | W | (2) |
| Bronzes: | | | | |
| Smelters, refiners, and ingot makers | 8,570 ^r | 808 ^r | 10,100 | 1,220 |
| Brass mills and miscellaneous manufacturers | 408 | (2) | 198 | (2) |
| Nickel-copper alloys, all plants | 9,670 | 186 | 10,900 | 171 |
| Low grade and residues; smelters, refiners, miscellaneous manufacturers | 8,890 | 620 | 3,460 | 477 |
| Other alloy scrap: ⁴ | | | | |
| Smelters, refiners, and ingot makers | W | 531 ^r | W | 233 |
| Brass mills and miscellaneous manufacturers | W | (2) | W | (2) |
| Total alloyed scrap: | | | | |
| Smelters, refiners, and ingot makers | 54,100 ^r | 6,960 ^r | 58,300 | 6,520 |
| Brass mills | 263,000 | 501 | 270,000 | 385 |
| Foundries and miscellaneous manufacturers | 10,300 | 1,160 | 12,200 | 1,110 |
| Grand total, scrap: | | | | |
| Smelters, refiners, and ingot makers | 123,000 ^r | 75,400 ^r | 130,000 | 74,500 |
| Brass and wire-rod mills | 749,000 | 1,760 | 752,000 | 1,090 |
| Foundries and miscellaneous manufacturers | 42,900 | 4,450 | 48,700 | 4,150 |

^rRevised. W Withheld to avoid disclosing company proprietary data; included in totals.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

²Individual breakdown is not available; included in totals.

³Includes cocks and faucets, commercial bronze, composition turnings, gilding metal, railroad car boxes, and silicon bronze.

⁴Includes aluminum bronze, beryllium copper, and refinery brass.

TABLE 11
CONSUMPTION OF PURCHASED COPPER-BASE SCRAP IN THE UNITED STATES¹

(Metric tons, gross weight)

| Type of operation | New scrap | | Old scrap | | Total | |
|---|------------------------|---------------------|---------------------|---------|----------------------|---------|
| | 2018 | 2019 | 2018 | 2019 | 2018 | 2019 |
| Ingot makers | 24,200 ^r | 15,500 | 57,300 ^r | 68,200 | 81,500 ^r | 83,700 |
| Smelters and refineries | 20,800 ^{r, c} | 20,800 ^c | 20,700 ^r | 25,100 | 41,400 ^r | 45,900 |
| Brass and wire-rod mills ² | 712,000 | 714,000 | 36,800 | 38,800 | 749,000 | 752,000 |
| Foundries and miscellaneous manufacturers | 30,800 | 22,700 | 12,100 | 26,000 | 42,900 | 48,700 |
| Total | 788,000 ^r | 773,000 | 127,000 | 158,000 | 915,000 ^r | 931,000 |

^cEstimated. ^rRevised.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

²Consumption at brass and wire-rod mills assumed equal to receipts.

TABLE 12
FOUNDRIES AND MISCELLANEOUS MANUFACTURERS CONSUMPTION OF BRASS
INGOT, REFINED COPPER, AND COPPER SCRAP IN THE UNITED STATES¹

(Metric tons, gross weight)

| Ingot type or material consumed | 2018 | 2019 |
|--|---------------------|--------------------|
| Brass ingot: | | |
| Tin bronzes | 6,370 ^r | 3,160 |
| Leaded red brass and semi-red brass | 26,200 ^r | 20,900 |
| Yellow, leaded, low brass ² | 14,000 | 15,500 |
| Manganese bronze | 2,390 | 2,830 |
| Nickel silver ³ | 4,720 | 5,560 |
| Aluminum bronze | 3,340 ^r | 4,600 |
| Hardeners and master alloys ⁴ | 3,550 | 3,550 ^c |
| Lead free alloys ⁵ | 3,880 | 3,880 ^c |
| Total | 64,400 ^r | 59,900 |
| Refined copper | 60,900 ^r | 54,900 |
| Copper scrap | 42,900 | 48,700 |

^cEstimated. ^rRevised.

¹Table includes data available through June 28, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes brass and silicon bronze.

³Includes brass, copper nickel, and nickel bronze.

⁴Includes special alloys.

⁵Includes copper-bismuth and copper-bismuth-selenium alloys.

TABLE 13
AVERAGE BUYING PRICES FOR COPPER SCRAP
IN THE UNITED STATES¹

(Cents per pound)

| Year | Brass mills no. 1 scrap | Refiners no. 2 scrap | New York dealers | |
|------|----------------------------|-------------------------|------------------|-----------------------------------|
| | | | No. 2 scrap | Red brass turnings and borings |
| 2018 | 283.19 | 254.90 | 200.31 | 150.76 |
| 2019 | 262.76 | 233.19 | 185.19 | 136.53 |

¹Table includes data available through June 28, 2021.

Source: Fastmarkets-AMM.

TABLE 14
U.S. EXPORTS OF UNMANUFACTURED COPPER (COPPER CONTENT), BY COUNTRY OR LOCALITY¹

| Country or locality | Ore and concentrates ² | | Matte, ash, and precipitates ³ | | Blister and anodes ⁴ | | Refined ⁵ | | Unalloyed copper scrap ⁶ | | Total | |
|---------------------|-----------------------------------|--------------------------------|---|--------------------------------|---------------------------------|--------------------------------|------------------------|--------------------------------|-------------------------------------|--------------------------------|------------------------|--------------------------------|
| | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) |
| 2018 | 253,000 | \$1,650,000 | 27,500 | \$57,500 | 6,970 | \$42,600 | 190,000 | \$1,270,000 | 509,000 | \$2,350,000 | 987,000 | \$5,360,000 |
| 2019: | | | | | | | | | | | | |
| Belgium | 161 | 655 | 3,290 | 4,020 | 359 | 1,040 | 129 | 690 | 23,600 | 117,000 | 27,600 | 123,000 |
| Brazil | 5,370 | 29,100 | -- | -- | 39 | 258 | 1 | 17 | 416 | 2,150 | 5,830 | 31,600 |
| Bulgaria | 15,900 | 87,900 | -- | -- | -- | -- | -- | -- | 636 | 3,040 | 16,500 | 90,900 |
| Canada | 14,400 | 79,300 | 14,300 | 29,000 | 2,600 | 12,600 | 32,300 | 200,000 | 48,900 | 264,000 | 113,000 | 584,000 |
| China | 7 | 37 | 97 | 157 | 200 | 1,320 | 13 | 153 | 74,800 | 377,000 | 75,200 | 379,000 |
| Germany | 2,600 | 13,300 | 597 | 2,110 | 286 | 1,890 | 1 | 8 | 29,400 | 125,000 | 32,900 | 142,000 |
| Greece | -- | -- | -- | -- | -- | -- | -- | -- | 8,180 | 48,600 | 8,180 | 48,600 |
| Hong Kong | -- | -- | 19 | 21 | 279 | 1,900 | 20 | 80 | 19,900 | 82,200 | 20,200 | 84,200 |
| India | -- | -- | -- | -- | 259 | 1,490 | 36 | 220 | 14,400 | 60,600 | 14,700 | 62,300 |
| Italy | -- | -- | -- | -- | 208 | 1,280 | 26 | 247 | 836 | 3,530 | 1,070 | 5,060 |
| Japan | 47,700 | 267,000 | 48 | 20 | 26 | 178 | 11 | 143 | 22,600 | 119,000 | 70,300 | 386,000 |
| Korea, Republic of | 20,400 | 109,000 | 74 | 117 | 1,520 | 10,300 | 682 | 4,640 | 46,900 | 240,000 | 69,700 | 363,000 |
| Malaysia | 35 | 173 | -- | -- | 188 | 1,210 | 1 | 7 | 65,300 | 211,000 | 65,500 | 213,000 |
| Mexico | 183,000 | 1,240,000 | 1,210 | 4,110 | 32 | 219 | 92,100 | 588,000 | 3,100 | 18,500 | 280,000 | 1,850,000 |
| Montenegro | 1,400 | 6,630 | -- | -- | -- | -- | -- | -- | -- | -- | 1,400 | 6,630 |
| Philippines | 11,900 | 63,600 | -- | -- | 56 | 413 | 2 | 3 | 1,750 | 5,130 | 13,700 | 69,200 |
| Poland | -- | -- | -- | -- | -- | -- | 1 | 14 | 5,450 | 28,200 | 5,450 | 28,300 |
| Slovakia | -- | -- | 1,080 | 4,430 | -- | -- | -- | -- | 1,070 | 4,630 | 2,140 | 9,070 |
| Spain | 49,200 | 259,000 | 259 | 295 | 61 | 401 | -- | -- | 1,510 | 6,950 | 51,000 | 267,000 |
| Sweden | -- | -- | -- | -- | 463 | 1,060 | (8) | 28 | 3,220 | 15,700 | 3,680 | 16,800 |
| Taiwan | -- | -- | 48 | 140 | 40 | 196 | -- | -- | 20,300 | 91,200 | 20,300 | 91,500 |
| Other | 548 | 3,280 | 715 | 1,250 | 651 | 3,520 | 179 | 1,630 | 29,500 | 139,000 | 31,600 | 149,000 |
| Total | 353,000 | 2,150,000 | 21,800 | 45,600 | 7,270 | 39,200 | 125,000 | 795,000 | 422,000 | 1,960,000 | 929,000 | 5,000,000 |

-- Zero.

¹Table includes data available through July 6, 2021. Data are rounded to no more than three significant digits; may not add to totals shown.

²Schedule B of the United States code 2603.00.0010. Includes copper ore and concentrates only; excludes copper contained in ore and concentrates of other metals.

³Schedule B codes 2620.30.0000, 7401.00.0010, and 7401.00.0050. Includes copper matte, ash, and precipitates only; excludes the copper content of mattes and ashes of other metals.

⁴Schedule B code 7402.00.0000.

⁵Schedule B codes 7403.11.0000, 7403.12.0000, 7403.13.0000, and 7403.19.0000.

⁶Schedule B codes 7404.00.0010, 7404.00.0015, 7404.00.0025, and 7404.00.0030.

⁷Free alongside ship value.

⁸Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 15
U.S. EXPORTS OF COPPER SEMIMANUFACTURES (GROSS WEIGHT), BY COUNTRY OR LOCALITY^{1,2}

| Country or locality | Pipes and tubing ³ | | Plates, sheets, foil, bars ⁴ | | Bare wire, including wire rod ⁵ | | Wire and cable, stranded ⁶ | | Copper sulfate ⁷ | |
|----------------------|-------------------------------|--------------------------------|---|--------------------------------|--|--------------------------------|---------------------------------------|--------------------------------|-----------------------------|--------------------------------|
| | Quantity (metric tons) | Value ⁸ (thousands) | Quantity (metric tons) | Value ⁸ (thousands) | Quantity (metric tons) | Value ⁸ (thousands) | Quantity (metric tons) | Value ⁸ (thousands) | Quantity (metric tons) | Value ⁸ (thousands) |
| 2018 | 15,600 | \$136,000 | 27,400 | \$278,000 | 163,000 | \$1,110,000 | 44,300 | \$368,000 | 8,080 | \$44,800 |
| 2019: | | | | | | | | | | |
| Brazil | 534 | 4,010 | 76 | 1,050 | 9 | 167 | 8 | 126 | (9) | 13 |
| Canada | 2,430 | 23,000 | 6,200 | 53,000 | 33,700 | 218,000 | 12,400 | 90,900 | 3,070 | 6,160 |
| China | 514 | 3,070 | 1,510 | 36,200 | 329 | 2,840 | 125 | 3,490 | 476 | 5,900 |
| Dominican Republic | 40 | 383 | 3 | 37 | 71 | 343 | 99 | 928 | 129 | 306 |
| France | 4 | 27 | 16 | 783 | 5 | 25 | 134 | 5,320 | 21 | 379 |
| Germany | 68 | 626 | 371 | 4,030 | 66 | 661 | 17 | 995 | 20 | 85 |
| Hong Kong | 9 | 320 | 1,070 | 26,900 | 49 | 216 | 31 | 958 | -- | -- |
| Ireland | (9) | 4 | 33 | 112 | 10 | 96 | 13 | 130 | 1,400 | 8,180 |
| Israel | 8 | 44 | 55 | 396 | 37 | 303 | 25 | 717 | 862 | 3,100 |
| Japan | 5 | 46 | 508 | 12,400 | 4 | 96 | 59 | 923 | 117 | 1,350 |
| Jordan | 192 | 1,740 | -- | -- | -- | -- | (9) | 6 | -- | -- |
| Korea, Republic of | 18 | 286 | 337 | 5,030 | 401 | 2,750 | 21 | 775 | 699 | 6,820 |
| Malaysia | 12 | 127 | 338 | 5,800 | 391 | 3,770 | 209 | 729 | 240 | 460 |
| Mexico | 5,930 | 51,500 | 12,000 | 98,900 | 123,000 | 789,000 | 20,200 | 166,000 | 18 | 40 |
| Morocco | -- | -- | -- | -- | -- | -- | 107 | 6,880 | -- | -- |
| Saudi Arabia | 1,610 | 11,700 | 11 | 198 | -- | -- | 299 | 1,520 | -- | -- |
| Singapore | 58 | 533 | 198 | 1,820 | 564 | 3,950 | 39 | 394 | 72 | 1,260 |
| Taiwan | 29 | 402 | 240 | 4,240 | 2 | 23 | 141 | 697 | 1,030 | 11,900 |
| Thailand | 2 | 76 | 442 | 4,090 | 13 | 46 | 75 | 474 | -- | -- |
| United Arab Emirates | 569 | 4,970 | 6 | 83 | 19 | 101 | 9 | 113 | -- | -- |
| United Kingdom | 35 | 438 | 119 | 864 | 94 | 401 | 11 | 429 | -- | -- |
| Vietnam | 437 | 2,670 | 17 | 788 | 1 | 16 | 3 | 70 | -- | -- |
| Other | 536 | 4,810 | 557 | 6,460 | 410 | 3,350 | 522 | 12,500 | 225 | 1,080 |
| Total | 13,000 | 111,000 | 24,100 | 263,000 | 159,000 | 1,030,000 | 34,500 | 295,000 | 8,380 | 47,000 |

-- Zero.

¹Table includes data available through October 1, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

²With the exception of copper sulfate, all categories include refined copper only; copper-alloy products are excluded.

³Includes all products listed under the Schedule B of the United States heading 7411.10 (tubes and pipes of refined copper), whether or not seamless.

⁴Includes all products listed under the Schedule B headings 7407.10 (bars, rods, and profiles of refined copper); 7409.11 and 7409.19 (plates, sheets, and strip of refined copper), whether or not coiled; and 7410.11 (foil of refined copper, not backed).

⁵Includes all products listed under the Schedule B headings 7408.11 and 7408.19 (wire of refined copper), regardless of the maximum cross-sectional dimension. Exports of wire rod (wire with a maximum cross-sectional dimension of more than 6 millimeters) were 153,000 metric tons (t) valued at \$1.04 billion in 2018 and 149,000 t valued at \$951 million in 2019.

⁶Includes all products listed under the Schedule B heading 7413 (stranded wire and cables of refined copper, not electrically insulated), excluding those with fittings or made into articles.

⁷Schedule B code 2833.25.0000.

⁸Free alongside ship value.

⁹Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 16
U.S. IMPORTS FOR CONSUMPTION OF UNMANUFACTURED COPPER (COPPER CONTENT), BY COUNTRY OR LOCALITY¹

| Country or locality | Ore and concentrates ² | | Matte, ash, and precipitates ³ | | Blister and anodes ⁴ | | Refined ⁵ | | Unalloyed scrap ⁶ | | Total | |
|---------------------|-----------------------------------|--------------------------------|---|--------------------------------|---------------------------------|--------------------------------|------------------------|--------------------------------|------------------------------|--------------------------------|------------------------|--------------------------------|
| | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) | Quantity (metric tons) | Value ⁷ (thousands) |
| 2018 | 32,200 | \$89,800 | 1,820 | \$5,870 | 372 | \$2,940 | 778,000 | \$5,130,000 | 34,400 | \$163,000 | 847,000 | \$5,400,000 |
| 2019: | | | | | | | | | | | | |
| Belgium | -- | -- | 228 | 1,060 | -- | -- | 2,300 | 14,800 | -- | -- | 2,530 | 15,900 |
| Bolivia | -- | -- | 13 | 45 | -- | -- | 1,510 | 9,110 | 77 | 297 | 1,600 | 9,450 |
| Canada | (8) | 13 | 451 | 1,900 | (8) | 10 | 138,000 | 834,000 | 16,700 | 82,000 | 155,000 | 918,000 |
| Chile | -- | -- | -- | -- | -- | -- | 422,000 | 2,550,000 | -- | -- | 422,000 | 2,550,000 |
| Colombia | 25 | 125 | -- | -- | -- | -- | -- | -- | 251 | 949 | 276 | 1,070 |
| Costa Rica | -- | -- | -- | -- | -- | -- | -- | -- | 473 | 1,550 | 473 | 1,550 |
| Dominican Republic | -- | -- | -- | -- | -- | -- | -- | -- | 610 | 2,550 | 610 | 2,550 |
| Finland | -- | -- | -- | -- | 191 | 1,140 | 38 | 241 | -- | -- | 229 | 1,380 |
| Germany | -- | -- | (8) | 8 | -- | -- | 2,010 | 13,600 | 188 | 142 | 2,200 | 13,700 |
| Japan | -- | -- | 295 | 518 | (8) | 46 | 2,540 | 24,100 | 1,040 | 3,750 | 3,880 | 28,500 |
| Mexico | 27,000 | 148,000 | 138 | 353 | (8) | 3 | 82,300 | 492,000 | 11,400 | 46,000 | 121,000 | 687,000 |
| Netherlands | -- | -- | 120 | 121 | 4 | 36 | (8) | 2 | 76 | 217 | 200 | 376 |
| Panama | -- | -- | -- | -- | -- | -- | -- | -- | 736 | 3,690 | 736 | 3,690 |
| Peru | (8) | 4 | -- | -- | -- | -- | 10,000 | 59,500 | 56 | 217 | 10,100 | 59,700 |
| Saudi Arabia | -- | -- | 98 | 474 | -- | -- | -- | -- | 19 | 66 | 117 | 540 |
| Spain | -- | -- | 540 | 530 | 1 | 5 | (8) | 3 | -- | -- | 541 | 538 |
| Zambia | -- | -- | -- | -- | -- | -- | 689 | 4,440 | -- | -- | 689 | 4,440 |
| Other | 2 | 3 | 76 | 382 | 40 | 607 | 1,160 | 8,060 | 788 | 3,360 | 2,060 | 12,400 |
| Total | 27,000 | 149,000 | 1,960 | 5,390 | 236 | 1,850 | 663,000 | 4,010,000 | 32,500 | 143,000 | 724,000 | 4,310,000 |

-- Zero.

¹Table includes data available through October 1, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

²Harmonized Tariff Schedule of the United States (HTS) code 2603.00.0010. Includes copper ore and concentrates only; excludes copper contained in ore and concentrates of other metals.

³HTS codes 2620.30.0010 and 7401.00.0000. Includes copper matte, ash, and precipitates only; excludes the copper content of mattes and ashes of other metals.

⁴HTS code 7402.00.0000.

⁵HTS codes 7403.11.0000, 7403.12.0000, 7403.13.0000, and 7403.19.0000.

⁶HTS codes 7404.00.3020 and 7404.00.6020.

⁷U.S. Customs value.

⁸Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 17
U.S. IMPORTS FOR CONSUMPTION OF COPPER SEMIMANUFACTURES (GROSS WEIGHT), BY COUNTRY OR LOCALITY^{1,2}

| Country or locality | Pipes and tubing ³ | | Plates, sheets, foil, bars ⁴ | | Bare wire, including wire rod ⁵ | | Wire and cable, stranded ⁶ | | Copper sulfate ⁷ | |
|---------------------|-------------------------------|--------------------------------|---|--------------------------------|--|--------------------------------|---------------------------------------|--------------------------------|-----------------------------|--------------------------------|
| | Quantity (metric tons) | Value ⁸ (thousands) | Quantity (metric tons) | Value ⁸ (thousands) | Quantity (metric tons) | Value ⁸ (thousands) | Quantity (metric tons) | Value ⁸ (thousands) | Quantity (metric tons) | Value ⁸ (thousands) |
| 2018 | 62,900 | \$520,000 | 65,300 | \$632,000 | 181,000 | \$1,270,000 | 3,510 ^r | \$29,800 | 42,700 | \$94,700 |
| 2019: | | | | | | | | | | |
| Bahrain | 1,100 | 7,890 | -- | -- | -- | -- | -- | -- | -- | -- |
| Brazil | 1,160 | 8,150 | 2,220 | 16,000 | 30 | 276 | 3 | 17 | 171 | 327 |
| Bulgaria | -- | -- | 1,140 | 8,070 | -- | -- | -- | -- | -- | -- |
| Canada | 13,400 | 120,000 | 455 | 4,830 | 176,000 | 1,130,000 | 757 | 4,930 | 2,330 | 4,620 |
| Chile | -- | -- | 148 | 777 | -- | -- | -- | -- | 1,990 | 3,710 |
| China | 606 | 4,930 | 1,790 | 16,000 | 472 | 4,250 | 67 | 711 | 22 | 66 |
| Finland | 414 | 5,190 | 5,370 | 47,700 | 807 | 6,920 | 4 | 42 | -- | -- |
| France | 36 | 442 | 2,170 | 18,500 | 223 | 6,350 | 73 | 1,340 | -- | -- |
| Germany | 1,990 | 19,500 | 20,800 | 173,000 | 1,090 | 10,900 | 57 | 1,400 | (9) | 24 |
| Greece | 2,880 | 20,900 | 11 | 105 | -- | -- | -- | -- | -- | -- |
| India | 833 | 6,470 | 344 | 2,700 | 9 | 79 | 96 | 1,420 | 244 | 462 |
| Italy | 1,660 | 14,800 | 684 | 5,490 | 7 | 145 | 400 | 3,470 | 57 | 208 |
| Japan | 84 | 870 | 9,940 | 152,000 | 725 | 9,100 | 2 | 28 | 264 | 273 |
| Korea, Republic of | 9,810 | 71,300 | 1,950 | 21,500 | 1,950 | 13,600 | 3 | 64 | -- | -- |
| Malaysia | 2,460 | 18,400 | 24 | 96 | -- | -- | (9) | 6 | -- | -- |
| Mexico | 4,950 | 40,600 | 2,100 | 15,100 | 12,800 | 78,900 | 599 | 4,240 | 31,800 | 67,800 |
| Peru | -- | -- | 8,920 | 64,200 | 2,300 | 15,000 | -- | -- | 1,990 | 3,690 |
| Russia | -- | -- | (9) | 5 | (9) | 7 | -- | -- | 3,360 | 7,490 |
| Taiwan | 44 | 480 | 3,190 | 38,500 | 113 | 1,530 | 9 | 169 | 1,040 | 2,320 |
| Turkey | -- | -- | 11 | 74 | 122 | 959 | 1,510 | 11,700 | 59 | 107 |
| Vietnam | 20,200 | 146,000 | -- | -- | 1 | 15 | -- | -- | -- | -- |
| Other | 1,660 | 15,200 | 1,730 | 17,700 | 339 | 3,650 | 174 | 2,850 | 272 | 3,020 |
| Total | 63,300 | 502,000 | 62,900 | 603,000 | 197,000 | 1,280,000 | 3,760 | 32,400 | 43,600 | 94,100 |

^rRevised. -- Zero.

¹Table includes data available through October 1, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

²With the exception of copper sulfate, all categories include refined copper only; copper-alloy products are excluded.

³Includes all products listed under the Harmonized Tariff Schedule of the United States (HTS) heading 7411.10 (tubes and pipes of refined copper), whether or not seamless and (or) coiled.

⁴Includes all products listed under the HTS headings 7407.10 (bars, rods, and profiles of refined copper), whether or not hollow; 7409.11 and 7409.19 (plates, sheets, and strip of refined copper), whether or not coiled; and 7410.11 (foil of refined copper, not backed).

⁵Includes all products listed under the HTS headings 7408.11 and 7408.19 (wire of refined copper), regardless of the maximum cross-sectional dimension. Imports of wire rod (wire with a maximum cross-sectional dimension of more than 6 millimeters) were 168,000 metric tons (t) valued at \$1.17 billion in 2018 and 178,000 t valued at \$1.15 billion in 2019.

⁶Includes all products listed under the HTS heading 7413 (stranded wire and cables of refined copper, not electrically insulated), excluding those with fittings or made into articles.

⁷HTS code 2833.25.0000.

⁸U.S. Customs value.

⁹Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 18
U.S. EXPORTS OF COPPER SCRAP, BY COUNTRY OR LOCALITY¹

| Country or locality | Unalloyed copper scrap ² | | Copper-alloy scrap ³ | | |
|---------------------|-------------------------------------|-----------------------------------|---------------------------------|--|-----------------------------------|
| | Quantity (metric tons) | Value ⁴ (thousands) | Gross weight (metric tons) | Copper content ^{4,5} (metric tons) | Value ⁴ (thousands) |
| 2018 | 509,000 | \$2,350,000 | 404,000 | 262,000 | \$807,000 |
| 2019: | | | | | |
| Austria | 3,610 | 19,000 | 350 | 228 | 1,410 |
| Belgium | 23,600 | 117,000 | 14,300 | 9,290 | 43,500 |
| Canada | 48,900 | 264,000 | 41,900 | 27,200 | 35,700 |
| China | 74,800 | 377,000 | 13,100 | 8,510 | 28,200 |
| Germany | 29,400 | 125,000 | 14,300 | 9,310 | 57,300 |
| Greece | 8,180 | 48,600 | 973 | 632 | 2,820 |
| Hong Kong | 19,900 | 82,200 | 30,500 | 19,800 | 69,300 |
| India | 14,400 | 60,600 | 45,500 | 29,600 | 113,000 |
| Japan | 22,600 | 119,000 | 20,300 | 13,200 | 74,800 |
| Korea, Republic of | 46,900 | 240,000 | 25,000 | 16,200 | 81,700 |
| Malaysia | 65,300 | 211,000 | 156,000 | 102,000 | 197,000 |
| Mexico | 3,100 | 18,500 | 582 | 378 | 2,120 |
| Netherlands | 4,300 | 25,300 | 1,010 | 657 | 3,210 |
| Pakistan | 882 | 4,160 | 19,800 | 12,800 | 12,000 |
| Poland | 5,450 | 28,200 | 45 | 29 | 121 |
| Singapore | 2,370 | 9,790 | 3,350 | 2,180 | 6,000 |
| Spain | 1,510 | 6,950 | 8,510 | 5,530 | 23,000 |
| Sweden | 3,220 | 15,700 | 3,430 | 2,230 | 12,300 |
| Taiwan | 20,300 | 91,200 | 20,300 | 13,200 | 42,400 |
| Thailand | 4,120 | 14,900 | 16,300 | 10,600 | 20,500 |
| Other | 18,900 | 84,200 | 13,600 | 8,860 | 26,700 |
| Total | 422,000 | 1,960,000 | 449,000 | 292,000 | 853,000 |

⁶Estimated.

¹Table includes data available through October 1, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

²Schedule B of the United States codes 7404.00.0010, 7404.00.0015, 7404.00.0025, and 7404.00.0030.

³Schedule B codes 7404.00.0041, 7404.00.0046, 7404.00.0051, 7404.00.0056, 7404.00.0061, 7404.00.0066, 7404.00.0075, 7404.00.0085, and 7404.00.0095.

⁴Free alongside ship value.

⁵Content is estimated by the U.S. Geological Survey to be 65% of gross weight.

Source: U.S. Census Bureau.

TABLE 19
U.S. IMPORTS FOR CONSUMPTION OF COPPER SCRAP, BY COUNTRY OR LOCALITY¹

| Country or locality | Unalloyed copper scrap ² | | Copper-alloy scrap ³ | | |
|---------------------|-------------------------------------|-----------------------------------|---------------------------------|--|-----------------------------------|
| | Quantity (metric tons) | Value ⁴ (thousands) | Gross weight (metric tons) | Copper content ^{5,5} (metric tons) | Value ⁴ (thousands) |
| 2018 | 34,400 | \$165,000 | 123,000 | 88,300 | \$601,000 |
| 2019: | | | | | |
| Bahamas, The | -- | -- | 736 | 530 | 2,000 |
| Bolivia | 77 | 297 | 222 | 160 | 701 |
| Brazil | -- | -- | 429 | 309 | 1,480 |
| Canada | 16,700 | 82,000 | 49,900 | 35,900 | 258,000 |
| Cayman Islands | -- | -- | 241 | 174 | 760 |
| Chile | -- | -- | 1,300 | 934 | 7,300 |
| Colombia | 251 | 949 | 1,050 | 752 | 5,180 |
| Costa Rica | 473 | 1,550 | 1,160 | 838 | 5,100 |
| Dominican Republic | 610 | 2,550 | 2,120 | 1,520 | 6,950 |
| Ecuador | -- | -- | 416 | 300 | 1,320 |
| El Salvador | -- | -- | 695 | 500 | 3,340 |
| Germany | 188 | 142 | 111 | 80 | 494 |
| Guatemala | 17 | 86 | 603 | 434 | 1,660 |
| Honduras | 63 | 307 | 679 | 489 | 2,500 |
| Hong Kong | 16 | 60 | 229 | 165 | 101 |
| Japan | 1,040 | 3,750 | -- | -- | -- |
| Mexico | 11,400 | 46,000 | 42,000 | 30,200 | 152,000 |
| Pakistan | 151 | 496 | -- | -- | -- |
| Panama | 736 | 3,690 | 483 | 348 | 1,790 |
| Peru | 56 | 217 | 472 | 340 | 1,140 |
| Suriname | 124 | 620 | 100 | 72 | 366 |
| Venezuela | 28 | 114 | 554 | 399 | 2,240 |
| Vietnam | 114 | 515 | 17 | 12 | 65 |
| Other | 369 | 1,450 | 1,840 | 1,320 | 6,500 |
| Total | 32,500 | 145,000 | 105,000 | 75,800 | 461,000 |

²Estimated. -- Zero.

¹Table includes data available through October 15, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

²Harmonized Tariff Schedule of the United States (HTS) codes 7404.00.3020 and 7404.00.6020.

³HTS codes 7404.00.3045, 7404.00.3055, 7404.00.3065, 7404.00.3090, 7404.00.6045, 7404.00.6055, 7404.00.6065, and 7404.00.6090.

⁴U.S. Customs value.

⁵Content is estimated by the U.S. Geological Survey to be 72% of gross weight.

Source: U.S. Census Bureau.

TABLE 20
COPPER: WORLD MINE PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Metric tons, copper content)

| Country or locality | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|------------------------|------------------------|------------------------|--------------------------|-----------------------|
| Albania, concentrates | 1,900 ^{e,3} | 200 ^{e,3} | -- | 2,600 ^r | 3,600 |
| Argentina, concentrates | 61,766 | 81,902 | 33,303 | 17,435 ^r | -- |
| Armenia, concentrates | 75,700 | 95,079 | 95,793 | 68,928 | 88,000 |
| Australia: | | | | | |
| Concentrates | 956,000 ⁴ | 918,000 | 823,000 ^r | 888,000 ^r | 909,000 |
| Leaching, electrowon | 40,000 ⁴ | 30,000 | 26,000 | 23,000 ^r | 25,000 |
| Total | 996,000 ⁴ | 948,000 | 849,000 ^r | 911,000 ^r | 934,000 |
| Azerbaijan, concentrates | 969 | 1,947 | 2,063 | 1,650 | 2,213 |
| Bolivia: | | | | | |
| Concentrates | 7,690 | 6,519 | 4,450 ^r | 2,102 ^r | 1,400 ^e |
| Leaching, electrowon | 1,789 | 2,199 | 2,269 ^r | 3,114 ^r | 3,100 ^e |
| Total | 9,479 | 8,718 | 6,719 ^r | 5,216 ^r | 4,500 ^e |
| Botswana, concentrates | 9,126 | 12,415 | 1,239 | 1,462 ^r | -- |
| Brazil, concentrates | 350,940 | 338,921 | 384,542 | 385,762 ^r | 381,000 |
| Bulgaria, concentrates ⁵ | 71,748 | 70,573 | 73,003 | 69,841 | 70,927 |
| Burma, leaching, electrowon | 46,900 | 75,000 | 115,100 | 153,000 | 153,100 |
| Canada: | | | | | |
| Concentrates | 714,647 | 693,059 | 594,994 | 542,932 ^r | 572,705 |
| Leaching, electrowon | 500 | -- | -- | -- | -- |
| Total | 715,147 | 693,059 | 594,994 | 542,932 ^r | 572,705 |
| Chile: | | | | | |
| Concentrates | 3,993,700 | 3,892,300 | 3,917,300 | 4,256,300 | 4,207,200 |
| Leaching, electrowon | 1,778,400 | 1,660,300 | 1,586,200 | 1,575,300 | 1,580,200 |
| Total | 5,772,100 | 5,552,600 | 5,503,500 | 5,831,600 | 5,787,400 |
| China: | | | | | |
| Concentrates | 1,670,000 | 1,850,700 | 1,656,400 ^r | 1,569,900 ^r | 1,628,000 |
| Leaching, electrowon | 44,900 | 49,500 | 50,000 | 55,000 | 55,700 |
| Total | 1,714,900 | 1,900,200 | 1,706,400 ^r | 1,624,900 ^r | 1,683,700 |
| Colombia, concentrates | 5,463 | 8,493 | 9,355 | 9,920 | 7,644 |
| Congo (Brazzaville), leaching, electrowon | -- | -- | 15,400 | 15,000 ^e | 15,000 ^e |
| Congo (Kinshasa): | | | | | |
| Concentrates ^{e,6} | 168,000 ^r | 212,000 ^r | 276,000 | 280,000 | 224,000 |
| Leaching, electrowon | 870,589 | 811,274 | 818,730 | 945,607 | 1,066,500 |
| Total | 1,038,589 ^r | 1,023,274 ^r | 1,094,730 | 1,225,607 | 1,290,500 |
| Cyprus, leaching, electrowon | 2,121 | 1,754 | 1,293 | 908 | 703 |
| Dominican Republic, concentrates | 7,324 | 9,725 | 9,618 | 8,588 ^r | 10,500 |
| Ecuador, concentrates ^{e,3} | 1,400 | 40,000 | 8,200 | 42,000 ^r | 50,000 |
| Eritrea, concentrates | 61,600 | 25,300 | 7,900 | 17,000 | 16,008 |
| Finland, concentrates | 41,805 | 47,488 | 53,144 | 46,674 | 32,861 |
| Georgia, concentrates ^e | 6,500 | 7,700 | 9,500 | 9,200 | 10,000 |
| India, concentrates | 29,900 | 29,600 ^{e,3} | 30,300 ^{e,3} | 35,300 ^{r, e,3} | 29,200 ^{e,3} |
| Indonesia: | | | | | |
| Concentrates | 577,300 | 716,200 | 598,800 | 634,000 | 344,000 |
| Leaching, electrowon | 1,226 | 11,760 | 23,160 | 17,071 | 16,777 |
| Total | 578,526 | 727,960 | 621,960 | 651,071 | 360,777 |
| Iran: | | | | | |
| Concentrates | 233,400 | 275,900 | 288,900 | 300,800 | 295,800 |
| Leaching, electrowon | 13,000 | 13,400 | 13,200 | 15,700 | 16,400 |
| Total | 246,400 | 289,300 | 302,100 | 316,500 | 312,200 |
| Kazakhstan: | | | | | |
| Concentrates | 458,100 | 432,400 | 515,600 | 592,800 ^r | 522,600 |
| Leaching, electrowon | 15,500 | 35,100 | 42,200 | 42,700 | 39,500 |
| Total | 473,600 | 467,500 | 557,800 | 635,500 ^r | 562,100 |
| Korea, North, concentrates ^e | 20,000 | 25,000 | 10,000 | 10,000 | 10,000 |
| Korea, Republic of, concentrates | -- | 108 | 7 | -- | -- |
| Kyrgyzstan, concentrates | 3,100 | 8,300 | 8,000 | 7,600 | 7,400 |

See footnotes at end of table.

TABLE 20—Continued
COPPER: WORLD MINE PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Metric tons, copper content)

| Country or locality | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|----------------------|------------------------|------------------------|------------------------|------------------------|
| Laos: | | | | | |
| Concentrates | 78,449 | 89,187 | 90,363 | 83,680 | 69,284 |
| Leaching, electrowon | 89,253 | 78,492 | 62,941 | 68,200 | 72,000 |
| Total | 167,702 | 167,679 | 153,304 | 151,880 | 141,284 |
| Macedonia: | | | | | |
| Concentrates | 8,834 | 9,032 | 8,008 | 6,950 | 6,512 |
| Leaching, electrowon | 2,268 | 1,396 | 958 | 768 | 719 |
| Total | 11,102 | 10,428 | 8,966 | 7,718 | 7,231 |
| Mauritania, concentrates | 45,001 | 32,818 | 28,791 | 28,137 | 29,620 |
| Mexico: | | | | | |
| Concentrates | 386,400 ⁴ | 555,800 ^{r,4} | 539,200 ^r | 529,400 ^{r,4} | 535,000 ^e |
| Leaching, electrowon | 208,100 ⁴ | 238,200 ^{r,4} | 203,000 ^r | 167,200 ^{r,4} | 180,000 ^e |
| Total | 594,500 ⁴ | 794,000 ^{r,4} | 742,200 ^r | 696,600 ^{r,4} | 715,000 ^e |
| Mongolia: | | | | | |
| Concentrates | 311,745 | 332,000 ^{e,3} | 303,000 ^{e,3} | 301,000 ^{e,3} | 290,000 ^{e,3} |
| Leaching, electrowon | 14,990 | 15,010 | 14,689 | 14,175 ^r | 11,758 |
| Total | 326,735 | 347,000 ^e | 318,000 ^e | 315,000 ^{r,e} | 302,000 ^e |
| Morocco, concentrates ^{e,3} | 24,000 | 28,000 | 30,000 | 29,000 ^r | 25,000 |
| Namibia: | | | | | |
| Concentrates | 3,351 | 262 | 68 | -- | -- |
| Leaching, electrowon | 10,659 | 16,391 | 15,466 | 15,177 | 14,940 |
| Total | 14,010 | 16,653 | 15,534 | 15,177 | 14,940 |
| Oman, concentrates | 8,700 | -- | -- | -- | -- |
| Pakistan, concentrates | 13,056 | 14,136 | 10,052 | 12,538 | 13,049 |
| Panama, concentrates | -- | -- | -- | -- | 147,480 |
| Papua New Guinea, concentrates | 45,185 | 80,022 | 105,000 | 97,300 ^r | 99,400 |
| Peru: | | | | | |
| Concentrates | 1,627,727 | 2,280,005 | 2,383,163 | 2,370,778 ^r | 2,389,145 |
| Leaching, electrowon | 73,091 | 73,854 | 62,421 | 66,257 | 66,295 |
| Total | 1,700,818 | 2,353,859 | 2,445,584 | 2,437,035 ^r | 2,455,440 |
| Philippines, concentrates | 83,835 | 83,649 | 68,156 | 69,933 | 71,892 |
| Poland, concentrates | 425,870 ^r | 424,300 ^r | 419,300 ^r | 401,300 ^r | 398,900 |
| Portugal, concentrates | 83,081 | 74,352 | 63,812 | 49,064 ^r | 41,553 |
| Romania, concentrates | 8,100 ^r | 8,600 ^r | 8,700 ^r | 8,700 ^r | 9,200 |
| Russia: | | | | | |
| Concentrates | 710,000 | 701,000 | 761,000 ^r | 784,000 ^r | 800,000 ^e |
| Leaching, electrowon | 1,400 | 1,300 | 1,300 ^r | 1,300 ^r | 1,300 ^e |
| Total | 711,400 | 702,300 | 762,300 ^r | 785,300 ^r | 801,000 ^e |
| Saudi Arabia, concentrates ^{e,3} | 11,600 ^r | 27,500 ^r | 16,800 ^r | 17,600 ^r | 16,000 |
| Serbia, concentrates | 36,410 | 41,312 | 44,750 | 42,500 | 43,550 |
| South Africa, concentrates | 77,400 | 65,300 | 65,500 | 46,900 ^r | 52,500 |
| Spain: | | | | | |
| Concentrates | 51,492 | 94,093 | 124,689 | 116,976 ^r | 122,300 |
| Leaching, electrowon | 70,029 | 73,643 | 73,664 | 70,738 | 48,090 |
| Total | 121,521 | 167,736 | 198,353 | 187,714 ^r | 170,390 |
| Sweden, concentrates | 75,113 | 79,247 | 104,594 | 106,140 ^r | 98,600 |
| Tanzania, concentrates | 16,800 | 17,400 | 15,800 | 10,000 | 10,000 |
| Turkey, concentrates | 108,000 | 100,000 | 83,000 | 79,600 | 73,500 |
| Uganda, concentrates | -- | 550 ^e | -- ^e | -- | -- |
| United States: | | | | | |
| Concentrates ⁷ | 795,000 | 815,000 | 702,000 | 690,000 | 730,000 |
| Leaching, electrowon | 588,000 | 615,000 | 557,000 | 532,000 | 527,000 |
| Total | 1,380,000 | 1,430,000 | 1,260,000 | 1,220,000 | 1,260,000 |
| Uzbekistan, concentrates ^e | 101,000 | 100,000 | 100,000 | 115,000 ^r | 130,000 |
| Vietnam, concentrates ^e | 23,200 ⁶ | 22,300 ⁶ | 21,000 ³ | 26,200 ^{r,3} | 30,600 ³ |

See footnotes at end of table.

TABLE 20—Continued
 COPPER: WORLD MINE PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Metric tons, copper content)

| Country or locality | 2015 | 2016 | 2017 | 2018 | 2019 |
|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------|
| Zambia: | | | | | |
| Concentrates | 558,600 | 595,500 | 628,400 | 677,300 | 655,500 |
| Leaching, electrowon | 158,700 | 167,300 | 165,700 | 176,800 | 141,900 |
| Total | 717,300 | 762,800 | 794,100 | 854,100 | 797,400 |
| Zimbabwe, concentrates | 8,218 | 9,101 | 8,839 | 9,077 | 9,100 ^e |
| Grand total | 19,300,000 ^r | 20,500,000 ^r | 20,000,000 ^r | 20,500,000 ^r | 20,400,000 |
| Of which: | | | | | |
| Concentrates | 15,300,000 ^r | 16,500,000 ^r | 16,100,000 | 16,500,000 ^r | 16,300,000 |
| Leaching, electrowon | 4,030,000 | 3,970,000 ^r | 3,850,000 | 3,960,000 ^r | 4,040,000 |

^eEstimated. ^rRevised. -- Zero.

¹Table includes data available through October 27, 2020. All data are reported unless otherwise noted. Grand totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²For some countries, the copper content of concentrates may include copper precipitates.

³Estimate based on reported production of ore and (or) concentrates.

⁴Total mine production is reported, but the distribution between concentrates and electrowon output is estimated.

⁵Copper content of concentrates produced in Bulgaria and then processed to produce anodes and cathodes within Bulgaria. Total output is higher, as the copper content of concentrates produced in and then exported from Bulgaria is not reported.

⁶Estimate based on a combination of reported copper production for some companies and reported production of concentrates for other companies.

⁷Recoverable copper content.

TABLE 21
COPPER: WORLD SMELTER PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Metric tons, copper content)

| Country or locality | 2015 | 2016 | 2017 | 2018 | 2019 |
|----------------------------------|----------------------|------------------------|------------------------|------------------------|----------------------|
| Armenia, primary | 11,601 | 12,920 | 12,051 | 8,831 ^r | -- |
| Australia, primary | 433,000 | 445,000 | 360,000 | 361,000 ^r | 401,000 |
| Austria, secondary | 62,100 ^r | 58,600 ^r | 65,900 ^r | 66,700 ^r | 68,500 |
| Belgium, secondary | 141,000 | 143,800 | 126,900 | 140,500 | 139,900 |
| Botswana, primary ³ | 13,888 | 11,348 | -- | -- | -- |
| Brazil: | | | | | |
| Primary | 157,800 | 188,500 | 118,800 | 132,200 | 110,900 |
| Secondary | 42,400 | 27,000 | 24,800 | 15,300 | 45,000 |
| Total | 200,200 | 215,500 | 143,600 | 147,500 | 155,900 |
| Bulgaria: | | | | | |
| Primary | 292,200 | 245,000 | 322,700 | 316,800 ^r | 260,600 ⁴ |
| Secondary | 56,200 | 51,800 | 52,500 | 41,800 ^r | 49,600 ⁴ |
| Total | 348,400 | 296,800 | 375,200 | 358,600 ^r | 310,200 ⁴ |
| Canada: | | | | | |
| Primary | 281,416 | 304,349 | 289,400 | 290,100 | 290,000 ^e |
| Secondary | 28,713 | 29,165 | 31,000 | 30,000 | 30,000 ^e |
| Total | 310,129 | 333,514 | 320,400 | 320,100 | 320,000 ^e |
| Chile, primary | 1,382,000 | 1,365,300 | 1,264,600 | 1,246,100 | 1,011,200 |
| China: | | | | | |
| Primary | 5,500,000 | 6,215,000 ^r | 6,600,000 ^r | 7,035,600 ^r | 7,416,000 |
| Secondary | 1,380,000 | 1,325,400 ^r | 1,380,500 ^r | 1,561,800 ^r | 1,688,400 |
| Total | 6,880,000 | 7,540,400 ^r | 7,980,500 ^r | 8,597,400 ^r | 9,104,400 |
| Finland: | | | | | |
| Primary | 123,700 ^r | 126,900 ^r | 118,300 ^r | 130,000 ^r | 115,500 |
| Secondary ^e | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 |
| Total | 127,700 ^r | 130,900 ^r | 122,300 ^r | 134,000 ^r | 119,500 |
| Germany: | | | | | |
| Primary | 349,700 | 342,800 | 332,600 | 311,200 | 288,600 |
| Secondary | 170,000 | 159,100 | 198,300 | 157,400 | 169,300 |
| Total | 519,700 | 501,900 | 530,900 | 468,600 | 457,900 |
| India: | | | | | |
| Primary | 792,600 | 769,800 | 813,100 | 481,500 | 342,300 |
| Secondary | -- | 3,500 | 10,000 | 10,000 | 2,000 |
| Total | 792,600 | 773,300 | 823,100 | 491,500 | 344,300 |
| Indonesia, primary | 199,700 | 258,800 ^r | 247,176 | 230,924 | 246,100 |
| Iran: | | | | | |
| Primary | 153,500 | 153,400 | 114,200 | 204,100 | 201,100 |
| Secondary | 82,100 | 72,200 | 70,900 | 100,300 | 109,100 |
| Total | 235,600 | 225,600 | 185,100 | 304,400 | 310,200 |
| Japan: | | | | | |
| Primary | 1,175,101 | 1,137,864 | 1,118,626 | 1,169,500 ^r | 1,112,276 |
| Secondary | 296,486 | 358,810 | 369,525 | 421,735 | 394,401 |
| Total | 1,471,587 | 1,496,674 | 1,488,151 | 1,591,235 ^r | 1,506,677 |
| Kazakhstan, primary | 309,355 | 310,001 | 334,844 | 327,314 ^r | 371,359 |
| Korea, North:^e | | | | | |
| Primary | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Secondary | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Total | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 |
| Korea, Republic of: | | | | | |
| Primary | 511,200 | 510,000 | 510,000 | 530,000 | 520,000 |
| Secondary | 125,000 | 125,000 | 125,000 | 140,000 | 160,000 |
| Total | 636,200 | 635,000 | 635,000 | 670,000 | 680,000 |
| Mexico: | | | | | |
| Primary | 256,300 | 267,800 | 270,200 ^r | 286,200 | 285,000 |
| Secondary ^e | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Total | 261,300 | 272,800 | 275,200 ^r | 291,200 | 290,000 |
| Namibia, primary | 45,220 | 40,869 | 45,523 | 48,970 | 45,953 |

See footnotes at end of table.

TABLE 21—Continued
COPPER: WORLD SMELTER PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Metric tons, copper content)

| Country or locality | 2015 | 2016 | 2017 | 2018 | 2019 |
|----------------------------------|------------|-------------------------|-------------------------|-------------------------|----------------------|
| Oman, primary | 26,500 | 11,300 | 5,100 ^r | 6,000 ^r | -- |
| Pakistan, primary ^c | 13,000 | 14,000 | 10,000 | 12,500 ^r | 13,000 |
| Peru, primary | 327,909 | 309,469 | 316,882 | 327,821 | 294,315 |
| Philippines, primary | 189,200 | 215,000 | 240,000 | 170,900 | 217,800 |
| Poland: | | | | | |
| Primary | 514,774 | 446,902 | 457,549 | 461,865 | 489,242 |
| Secondary | 67,624 | 60,369 | 53,024 | 50,001 | 51,904 |
| Total | 582,398 | 507,271 | 510,573 | 511,866 | 541,146 |
| Russia: | | | | | |
| Primary | 661,000 | 665,000 | 730,000 | 789,000 ^r | 790,500 |
| Secondary | 218,900 | 202,000 | 216,000 ^r | 230,000 ^r | 220,000 |
| Total | 879,900 | 867,000 | 946,000 ^r | 1,019,000 ^r | 1,010,500 |
| Serbia: | | | | | |
| Primary | 43,000 | 61,000 | 68,200 | 75,000 ^r | 73,000 ^e |
| Secondary | 1,000 | 1,000 ^e | 1,000 ^e | 1,000 ^e | 1,000 ^e |
| Total | 44,000 | 62,000 | 69,200 | 76,000 ^r | 74,000 ^e |
| Slovakia, secondary | 11,400 | 42,691 | 48,152 | 38,379 | 51,796 |
| South Africa, primary | 71,800 | 68,700 | 70,000 | 70,000 | 75,000 |
| Spain: | | | | | |
| Primary | 286,300 | 292,300 | 272,000 | 284,800 | 255,700 ⁴ |
| Secondary | 6,900 | 4,600 | 11,100 | 10,600 | 16,300 ⁴ |
| Total | 293,200 | 296,900 | 283,100 | 295,400 | 272,000 ⁴ |
| Sweden: | | | | | |
| Primary | 137,400 | 131,500 | 150,000 | 152,100 ^{r,4} | 135,900 |
| Secondary | 61,800 | 62,200 | 60,000 | 65,200 ^{r,4} | 60,000 |
| Total | 199,200 | 193,700 | 210,000 | 217,300 ^{r,4} | 195,900 |
| Turkey: | | | | | |
| Primary | 45,400 | 46,200 | 53,400 ^r | 85,400 ^r | 83,700 |
| Secondary ^c | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Total | 50,400 | 51,200 | 58,400 ^r | 90,400 ^r | 88,700 |
| United States, primary | 527,000 | 563,000 | 470,000 | 536,000 | 464,000 |
| Uzbekistan, primary ^c | 101,000 | 101,000 | 101,000 | 115,000 ^r | 145,000 |
| Vietnam, primary | 11,000 | 11,000 | 15,800 | 15,100 | 19,200 |
| Zambia, primary | 648,800 | 698,100 | 787,900 | 828,700 | 638,500 |
| Grand total | 18,400,000 | 19,100,000 ^r | 19,500,000 ^r | 20,100,000 ^r | 20,000,000 |
| Of which: | | | | | |
| Primary | 15,600,000 | 16,400,000 ^r | 16,600,000 ^r | 17,100,000 ^r | 16,700,000 |
| Secondary | 2,770,000 | 2,750,000 ^r | 2,860,000 ^r | 3,100,000 ^r | 3,280,000 |

^eEstimated. ^rRevised. -- Zero.

¹Table includes data available through October 27, 2020. All data are reported unless otherwise noted. Grand totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²To the extent possible, primary and secondary output of each country and (or) locality is shown separately.

³Copper content of nickel-copper-cobalt matte.

⁴Total smelter production is reported, but the distribution between primary and secondary output is estimated.

TABLE 22
COPPER: WORLD REFINERY PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Metric tons)

| Country or locality | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|----------------------|----------------------|------------------------|------------------------|------------------------|
| Argentina, secondary ^e | 16,000 | 16,000 | 16,000 | 16,000 | 16,000 |
| Australia, primary: | | | | | |
| Leaching, electrowon | 40,000 ³ | 30,000 | 26,000 | 23,000 ^r | 25,000 |
| Other | 435,000 ³ | 445,000 | 360,000 | 354,000 ^r | 401,000 |
| Total | 475,000 ³ | 475,000 | 386,000 | 377,000 ^r | 426,000 |
| Austria, secondary | 102,859 | 103,215 | 109,800 ^r | 107,200 ^r | 128,100 |
| Belgium: | | | | | |
| Primary | 226,100 | 217,900 | 235,500 | 230,800 | 209,600 |
| Secondary | 152,500 | 148,800 | 163,400 | 159,400 | 147,000 |
| Total | 378,600 | 366,700 | 398,900 | 390,200 | 356,600 |
| Bolivia, leaching, electrowon | 1,789 | 2,199 | 2,269 ^r | 3,114 ^r | 3,100 ^e |
| Brazil: | | | | | |
| Primary | 241,469 | 225,558 | 118,300 | 132,200 | 129,000 |
| Secondary | 29,000 | 38,500 | 24,800 | 15,300 | 45,000 |
| Total | 270,469 | 264,058 | 143,100 | 147,500 | 174,000 |
| Bulgaria: | | | | | |
| Primary | 204,700 | 197,300 ^r | 203,500 | 199,000 ^r | 182,000 |
| Secondary | 25,000 | 19,200 | 25,000 | 25,000 ^r | 25,000 |
| Total | 229,700 | 216,500 ^r | 228,500 | 224,000 ^r | 207,000 |
| Burma, leaching, electrowon | 46,900 | 75,000 | 115,100 | 153,000 | 153,100 |
| Canada: | | | | | |
| Primary: | | | | | |
| Leaching, electrowon | 500 | -- | -- | -- | -- |
| Other | 301,300 | 284,400 | 300,700 ^{r,3} | 259,300 ^{r,3} | 253,100 ^{r,3} |
| Total, primary | 301,800 | 284,400 | 300,700 ^{r,3} | 259,300 ^{r,3} | 253,100 ^{r,3} |
| Secondary | 29,100 | 30,000 | 29,700 ^{r,3} | 32,000 ^{r,3} | 28,100 ^{r,3} |
| Total, primary and secondary | 330,900 | 314,400 | 330,400 ^{r,3} | 291,300 ^{r,3} | 281,200 ^{r,3} |
| Chile, primary: | | | | | |
| Leaching, electrowon | 1,778,400 | 1,660,300 | 1,586,200 | 1,575,300 | 1,580,200 |
| Other | 910,000 | 952,200 | 843,300 | 885,900 | 688,900 |
| Total | 2,688,400 | 2,612,500 | 2,429,500 | 2,461,200 | 2,269,100 |
| China: | | | | | |
| Primary: | | | | | |
| Leaching, electrowon | 44,900 | 49,500 | 50,000 | 55,000 | 55,700 |
| Other | 5,627,000 | 6,195,700 | 6,564,300 | 7,001,800 ^r | 7,558,200 |
| Total, primary | 5,671,900 | 6,245,200 | 6,614,300 | 7,056,800 ^r | 7,613,900 |
| Secondary | 2,297,000 | 2,209,000 | 2,300,800 | 2,234,600 | 2,170,800 |
| Total, primary and secondary | 7,968,900 | 8,454,200 | 8,915,100 | 9,291,400 ^r | 9,784,700 |
| Congo (Brazzaville), leaching, electrowon | -- | -- | 15,400 | 15,000 ^e | 15,000 ^e |
| Congo (Kinshasa), primary: | | | | | |
| Leaching, electrowon | 870,589 | 811,274 | 818,730 | 945,607 | 1,066,500 |
| Other | 15,347 | 10,039 | 11,757 | 7,631 | 14,838 |
| Total | 885,936 | 821,313 | 830,487 | 953,238 | 1,081,338 |
| Cyprus, leaching, electrowon | 2,121 | 1,754 | 1,293 | 908 | 703 |
| Egypt, secondary | 98,051 | 95,795 ^r | 100,000 ^e | 100,000 ^e | 100,000 ^e |
| Finland: | | | | | |
| Primary | 127,900 | 125,100 | 129,200 | 135,100 | 116,200 |
| Secondary ^e | 4,000 | 4,000 | 4,000 | 4,000 | 4,200 |
| Total | 131,900 | 129,100 | 133,200 | 139,100 | 120,400 |
| Germany: | | | | | |
| Primary | 400,100 | 396,100 | 413,200 | 396,700 ^r | 353,400 |
| Secondary | 278,000 | 275,300 | 281,200 | 275,700 ^r | 278,300 |
| Total | 678,100 | 671,400 | 694,400 | 672,400 | 631,700 |
| India: | | | | | |
| Primary | 791,900 | 769,300 | 819,000 | 541,000 ^r | 424,200 |
| Secondary | -- | 3,500 | 10,000 | 10,000 | 2,000 |
| Total | 791,900 | 772,800 | 829,000 | 551,000 ^r | 426,200 |

See footnotes at end of table.

TABLE 22—Continued
COPPER: WORLD REFINERY PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Metric tons)

| Country or locality | 2015 | 2016 | 2017 | 2018 | 2019 |
|----------------------------------|----------------------|------------------------|------------------------|--------------------------|------------------------|
| Indonesia, primary: | | | | | |
| Leaching, electrowon | 1,226 | 11,760 | 23,160 | 17,071 | 16,777 |
| Other | 197,100 | 249,000 | 245,000 | 242,300 ^r | 254,800 |
| Total | 198,326 | 260,760 | 268,160 | 259,371 ^r | 271,577 |
| Iran: | | | | | |
| Primary: | | | | | |
| Leaching, electrowon | 13,000 | 13,400 | 13,200 | 15,700 | 16,400 |
| Other | 113,900 | 125,700 | 90,000 | 149,600 | 160,400 |
| Total, primary | 126,900 | 139,100 | 103,200 | 165,300 | 176,800 |
| Secondary | 59,900 | 61,700 | 57,000 | 73,300 | 84,700 |
| Total, primary and secondary | 186,800 | 200,800 | 160,200 | 238,600 | 261,500 |
| Italy, secondary | 7,300 | 6,600 | 8,700 | 7,200 ^r | 9,800 |
| Japan: | | | | | |
| Primary | 1,243,072 | 1,259,426 | 1,166,194 | 1,241,100 | 1,152,847 |
| Secondary | 240,059 | 293,707 | 321,886 | 353,417 | 342,512 |
| Total | 1,483,131 | 1,553,133 | 1,488,080 | 1,594,517 | 1,495,359 |
| Kazakhstan, primary: | | | | | |
| Leaching, electrowon | 15,500 | 35,100 | 42,200 | 42,700 | 39,500 |
| Other | 394,641 | 408,435 | 426,191 | 438,115 ^r | 472,327 |
| Total | 410,141 | 443,535 | 468,391 | 480,815 ^r | 511,827 |
| Korea, North:^c | | | | | |
| Primary | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Secondary | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| Total | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 |
| Korea, Republic of: | | | | | |
| Primary | 515,300 | 522,400 | 501,300 | 500,500 | 475,500 |
| Secondary | 134,400 | 124,800 | 163,000 | 174,000 | 189,400 |
| Total | 649,700 | 647,200 | 664,300 | 674,500 | 664,900 |
| Laos, leaching, electrowon | 89,253 | 78,492 | 62,941 | 68,200 | 72,000 |
| Macedonia, leaching, electrowon | 2,268 | 1,396 | 958 | 768 | 719 |
| Mexico: | | | | | |
| Primary: | | | | | |
| Leaching, electrowon | 208,100 ³ | 238,200 ^{r,3} | 203,000 ^r | 167,200 ^{r,3} | 180,000 ^e |
| Other | 272,400 ³ | 247,800 ^{r,3} | 255,300 ^r | 301,400 ^{r,3} | 292,000 ^e |
| Total, primary | 480,500 ³ | 486,000 ³ | 458,300 | 468,600 ^{r,3} | 472,000 ^e |
| Secondary | 5,000 ³ | 5,000 ³ | 5,000 ^e | 5,000 ³ | 5,000 ^e |
| Total, primary and secondary | 485,500 ³ | 491,000 ³ | 463,300 | 473,600 ^{r,3} | 477,000 ^e |
| Mongolia, leaching, electrowon | 14,990 | 15,010 | 14,689 | 14,175 ^r | 11,758 |
| Namibia, leaching, electrowon | 10,659 | 16,391 | 15,466 | 15,177 | 14,940 |
| Norway, primary | 35,500 | 28,100 | 22,700 | 20,600 | 22,000 |
| Oman, primary | 26,500 | 11,300 | 5,100 ^r | 6,000 ^r | -- |
| Peru, primary: | | | | | |
| Leaching, electrowon | 73,091 | 73,854 | 62,421 | 66,257 | 66,295 |
| Other | 279,869 | 257,470 | 272,996 | 270,541 | 241,567 |
| Total | 352,960 | 331,324 | 335,417 | 336,798 | 307,862 |
| Philippines, primary | 153,000 | 185,100 | 205,000 | 170,800 | 217,300 |
| Poland: | | | | | |
| Primary | 470,900 ³ | 429,000 | 429,600 | 423,600 | 463,600 |
| Secondary | 103,400 ³ | 106,600 | 92,400 | 78,200 | 102,000 |
| Total | 574,300 ³ | 535,600 | 522,000 | 501,800 | 565,600 |
| Russia: | | | | | |
| Primary: | | | | | |
| Leaching, electrowon | 1,400 ⁴ | 1,300 ⁴ | 1,300 ^{r,4} | 1,300 ^{r,4} | 1,300 ^e |
| Other | 655,700 ⁴ | 662,300 ⁴ | 730,700 ^{r,4} | 799,000 ^{r,4} | 800,000 ^e |
| Total, primary | 657,100 ⁴ | 663,600 ⁴ | 732,000 ^{r,4} | 800,300 ^{r,4} | 801,000 ^e |
| Secondary | 218,600 ⁴ | 197,800 ⁴ | 218,300 ^{r,4} | 240,000 ^{r,4} | 246,000 ^e |
| Total, primary and secondary | 875,700 ⁴ | 861,400 ⁴ | 950,300 ^{r,4} | 1,040,300 ^{r,4} | 1,050,000 ^e |

See footnotes at end of table.

TABLE 22—Continued
COPPER: WORLD REFINERY PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Metric tons)

| Country or locality | 2015 | 2016 | 2017 | 2018 | 2019 |
|------------------------------|----------------------|------------------------|------------------------|------------------------|---------------------|
| Serbia: | | | | | |
| Primary | 42,729 | 61,309 | 67,752 | 66,000 ³ | 73,000 ³ |
| Secondary | 1,917 | 1,000 | 1,469 | 1,000 ³ | 1,000 ³ |
| Total | 44,646 | 62,309 | 69,221 | 67,000 ³ | 74,000 ³ |
| South Africa, primary | 70,900 ^r | 68,800 ^r | 70,000 ^r | 70,000 ^r | 75,000 |
| Spain: | | | | | |
| Primary: | | | | | |
| Leaching, electrowon | 70,029 | 73,643 | 73,664 | 70,738 | 48,090 |
| Other | 278,300 | 281,600 | 260,700 | 273,200 | 252,900 |
| Total, primary | 348,329 | 355,243 | 334,364 | 343,938 | 300,990 |
| Secondary | 71,600 | 74,200 | 80,800 | 79,900 | 85,300 |
| Total, primary and secondary | 419,929 | 429,443 | 415,164 | 423,838 | 386,290 |
| Sweden: | | | | | |
| Primary | 144,200 | 145,100 | 153,600 | 157,100 | 140,900 |
| Secondary | 61,800 | 62,200 | 65,800 | 67,300 | 60,400 |
| Total | 206,000 | 207,300 | 219,400 | 224,400 | 201,300 |
| Turkey: | | | | | |
| Primary | 74,000 | 47,400 | 88,000 | 116,300 | 106,000 |
| Secondary | 10,000 ^c | 5,000 | 7,000 | 10,000 | 10,000 |
| Total | 84,000 | 52,400 | 95,000 | 126,300 | 116,000 |
| Ukraine, secondary | 18,485 ^r | 21,973 | 25,186 | 24,901 ^r | 20,409 |
| United States: | | | | | |
| Primary: | | | | | |
| Leaching, electrowon | 588,000 | 615,000 | 557,000 | 532,000 | 527,000 |
| Other | 503,000 | 561,000 | 482,000 | 538,000 | 457,000 |
| Total, primary | 1,090,000 | 1,180,000 | 1,040,000 | 1,070,000 | 985,000 |
| Secondary | 48,800 | 46,300 | 40,100 | 41,200 | 44,400 |
| Total, primary and secondary | 1,140,000 | 1,220,000 | 1,080,000 | 1,110,000 | 1,030,000 |
| Uzbekistan, primary | 101,000 ^c | 101,000 ^c | 101,000 ^c | 117,000 ^r | 147,250 |
| Vietnam, primary | 11,000 | 11,000 | 15,800 | 15,100 | 19,200 |
| Zambia: | | | | | |
| Leaching, electrowon | 158,700 | 167,300 | 165,700 | 176,800 | 141,900 |
| Other | 312,800 | 230,600 | 264,800 | 248,200 | 120,100 |
| Total | 471,500 | 397,900 | 430,500 | 425,000 | 262,000 |
| Grand total | 23,200,000 | 23,600,000 | 23,900,000 | 24,400,000 | 24,500,000 |
| Of which: | | | | | |
| Primary: | | | | | |
| Leaching, electrowon | 4,030,000 | 3,970,000 ^r | 3,850,000 | 3,960,000 ^r | 4,040,000 |
| Other | 15,200,000 | 15,700,000 | 15,900,000 | 16,300,000 | 16,300,000 |
| Total | 19,200,000 | 19,700,000 | 19,700,000 | 20,300,000 | 20,300,000 |
| Secondary | 4,020,000 | 3,960,000 | 4,160,000 ^r | 4,140,000 | 4,150,000 |

^cEstimated. ^rRevised. -- Zero.

¹Table includes data available through October 27, 2020. All data are reported unless otherwise noted. Grand totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²To the extent possible, primary and secondary output of each country and (or) locality is shown separately. The “primary,” “primary, other,” and “secondary” categories consist of electrolytic and fire-refined copper, and the “leaching, electrowon” category consists of refined copper produced by solvent extraction and electrowinning.

³Total refined production is reported, but the distribution between primary (electrowon), primary (other), and (or) secondary output is estimated.

⁴Total refined production and electrowon production are reported, but the distribution between primary (other) and secondary output is estimated.