

COPPER

(Data in thousand metric tons of copper content unless otherwise noted)

Domestic Production and Use: U.S. mine production of copper in 2016 increased slightly, to about 1.41 million tons, and was valued at about \$6.8 billion. Arizona, New Mexico, Utah, Nevada, Montana, and Michigan, in descending order of production, accounted for more than 99% of domestic mine production; copper also was recovered in Missouri. Twenty-four mines recovered copper, 17 of which accounted for about 99% of production. Three primary smelters, 3 electrolytic and 4 fire refineries, and 15 electrowinning facilities operated during 2016. Refined copper and scrap were used at about 30 brass mills, 13 rod mills, and 500 foundries and miscellaneous consumers. Copper and copper alloy products were used in building construction, 44%; transportation equipment, 19%; electric and electronic products, 18%; consumer and general products, 12%; and industrial machinery and equipment, 7%.¹

Salient Statistics—United States:	2012	2013	2014	2015	2016^e
Production:					
Mine, recoverable	1,170	1,250	1,360	1,380	1,410
Refinery:					
Primary	962	993	1,050	1,090	1,160
Secondary	39	47	46	49	50
Copper from old scrap	164	166	173	167	170
Imports for consumption:					
Ores and concentrates	6	3	(2)	(2)	(2)
Refined	630	734	620	686	670
General imports, refined	628	729	614	664	660
Exports:					
Ores and concentrates	301	348	410	392	340
Refined	169	111	127	86	100
Consumption:					
Reported, refined	1,760	1,830	1,760	1,810	1,790
Apparent, unmanufactured ³	1,760	1,750	1,780	1,820	1,800
Price, average, cents per pound:					
Domestic producer, cathode	367.3	339.9	318.1	256.2	220.0
London Metal Exchange, high-grade	360.6	332.3	311.1	249.5	216.0
Stocks, yearend, refined, held by U.S. producers, consumers, and metal exchanges	236	258	190	209	160
Employment, mine and mill, thousands	11.4	12.0	12.1	11.2	10.0
Net import reliance ⁴ as a percentage of apparent consumption (refined copper)	36	34	32	32	34

Recycling: Old scrap, converted to refined metal and alloys, provided 170,000 tons of copper, equivalent to 9% of apparent consumption. Purchased new scrap, derived from fabricating operations, yielded 640,000 tons of contained copper. Of the total copper recovered from scrap (including aluminum- and nickel-based scrap), brass mills recovered 73%; copper smelters, refiners, and ingot makers, 21%; and miscellaneous manufacturers, foundries, and chemical plants, 6%. Copper in all scrap contributed about 31% of the U.S. copper supply.

Import Sources (2012–15): Unmanufactured (ore and concentrates, blister and anodes, refined, etc.): Chile, 50%; Canada, 28%; Mexico, 16%; and other, 6%. Refined copper accounted for 86% of unmanufactured copper imports.

Tariff: Item	Number	Normal Trade Relations⁵ 12–31–16
Copper ores and concentrates	2603.00.0000	1.7¢/kg on lead content.
Unrefined copper anode	7402.00.0000	Free.
Refined and alloys; unwrought	7403.00.0000	1.0% ad val.
Copper wire (rod)	7408.11.6000	3.0% ad val.

Depletion Allowance: 15% (Domestic), 14% (Foreign).

Government Stockpile: None.

Events, Trends, and Issues: In the first 10 months of 2016, the monthly average COMEX spot copper price fluctuated between \$2.01 per pound (January) and \$2.23 per pound (May), and was projected to average \$2.15 per pound for the full year, a decrease from \$2.51 per pound in 2015. The decrease in the average copper price compared with that of 2015 was in large part attributed to lower consumption growth in China. At the end of July,

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domestic stocks of refined copper were 26% lower than those at yearend 2015.

The International Copper Study Group (ICSG) projected that in 2016, global refined copper consumption and production would be essentially balanced. Global production of refined copper was projected to increase by 2.2% and consumption was projected to increase by 1.5%.⁶

U.S. mine production increased slightly in 2016. Significant mine production increases occurred at the Bingham Canyon Mine in Utah, the Chino Mine in New Mexico, and the Morenci Mine in Arizona. During the second half of 2015, the two leading domestic producers had announced planned production decreases at mines in Arizona owing to low copper prices, but through the first half of 2016, production cuts had not been as large as expected. Total U.S. refined production increased by about 6% because in 2015, there were smelter maintenance shutdowns and a concentrate shortfall that did not impact 2016 output.

In 2017, according to ICSG projections, global refined copper production was expected to exceed consumption by 160,000 t (1%) owing to production growth of 1.7% outpacing a 1.0% growth in global refined consumption. Mine and refined production were expected to be greater than in earlier projections because previously announced production cuts have not taken place.

World Mine Production and Reserves: Reserves for Australia, China, and Peru were revised based on new information from the Governments of those countries. Reserves for the United States were revised based on reported company data.

	Mine production		Reserves ⁷
	<u>2015</u>	<u>2016^e</u>	
United States	1,380	1,410	35,000
Australia	971	970	⁸ 89,000
Canada	697	720	11,000
Chile	5,760	5,500	210,000
China	1,710	1,740	28,000
Congo (Kinshasa)	1,020	910	20,000
Mexico	594	620	46,000
Peru	1,700	2,300	81,000
Russia	732	710	30,000
Zambia	712	740	20,000
Other countries	<u>3,800</u>	<u>3,800</u>	<u>150,000</u>
World total (rounded)	19,100	19,400	720,000

World Resources: A 1998 U.S. Geological Survey (USGS) assessment estimated 550 million tons of copper were contained in identified and undiscovered resources in the United States.⁹ A 2014 USGS global assessment of copper deposits indicated that identified resources contain about 2.1 billion tons of copper (porphyry deposits accounted for 1.8 billion tons of those resources), and undiscovered resources contained an estimated 3.5 billion tons.¹⁰ (For a listing of USGS regional copper resource assessments, go to <http://minerals.usgs.gov/global>.)

Substitutes: Aluminum substitutes for copper in power cable, electrical equipment, automobile radiators, and cooling and refrigeration tube; titanium and steel are used in heat exchangers; optical fiber substitutes for copper in telecommunications applications; and plastics substitute for copper in water pipe, drain pipe, and plumbing fixtures.

^eEstimated.

¹Some electrical components are included in each end use. Distribution for 2016 by the Copper Development Association, Inc., 2016.

²Less than ½ unit.

³Defined as primary refined production + copper from old scrap converted to refined metal and alloys + refined imports – refined exports ± changes in refined stocks. General imports were used to calculate apparent consumption.

⁴Defined as imports – exports + adjustments for industry stock changes for refined copper.

⁵No tariff for Canada, Chile, Mexico, and Peru for items shown. Tariffs for other countries may be eliminated under special trade agreements.

⁶International Copper Study Group, 2016, Forecast 2016–2017: Lisbon, Portugal, International Copper Study Group press release, October 26, 2 p.

⁷See [Appendix C](#) for resource and reserve definitions and information concerning data sources.

⁸ For Australia, Joint Ore Reserves Committee-compliant reserves were about 24 million tons.

⁹U.S. Geological Survey National Mineral Resource Assessment Team, 2000, 1998 assessment of undiscovered deposits of gold, silver, copper, lead, and zinc in the United States: U.S. Geological Survey Circular 1178, 21 p.

¹⁰Johnson, K.M., Hammarstrom, J.M., Zientek, M.L., and Dicken, C.L., 2014, Estimate of undiscovered copper resources of the world, 2013: U.S. Geological Survey Fact Sheet 2014–3004, 3 p., <http://dx.doi.org/10.3133/fs20143004>.