COPPER

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

Domestic Production and Use: In 2017, U.S. mine production of recoverable copper decreased by 11% to an estimated 1.27 million tons and was valued at an estimated $8 billion, an increase of 13% from $7.09 billion in 2016. Arizona was the leading copper-producing State and was responsible for about 68% of domestic output, followed by Utah, New Mexico, Nevada, Montana, Michigan, and Missouri. Twenty-three mines recovered copper, 16 of which accounted for 99% of production. Three smelters, 3 electrolytic refineries, 4 fire refineries, and 15 electrowinning facilities operated during 2017. Refined copper and scrap were used at about 30 brass mills, 15 rod mills, and 500 foundries and miscellaneous consumers. Copper and copper alloy products were used in building construction, 43%; electrical and electronic products, 19%; transportation equipment, 19%; consumer and general products, 12%; and industrial machinery and equipment, 7%.[1]

Salient Statistics—United States:	**2013**	**2014**	**2015**	**2016**	**2017[e]**
Production:					
Mine, recoverable	1,250	1,360	1,380	1,430	1,270
Refinery:					
Primary	993	1,050	1,090	1,180	1,090
Secondary	47	46	49	46	40
Copper recovered from old scrap	166	173	166	150	145
Imports for consumption:					
Ores and concentrates	3	(2)	(2)	(2)	13
Refined	734	620	686	708	750
General imports, refined	730	614	664	701	760
Exports:					
Ores and concentrates	348	410	392	331	235
Refined	111	127	86	134	105
Consumption:					
Reported, refined	1,830	1,760	1,810	1,810	1,800
Apparent, unmanufactured[3]	1,760	1,780	1,820	1,880	1,850
Price, average, cents per pound:					
Domestic producer, cathode	339.9	318.1	256.2	224.9	285.0
London Metal Exchange, high-grade	332.3	311.1	249.5	220.6	280.0
Stocks, yearend, refined, held by U.S. producers, consumers, and metal exchanges	259	190	209	223	260
Employment, mine and mill, thousands	12.0	12.1	11.3	10.1	10.5
Net import reliance[4] as a percentage of apparent consumption (refined copper)	34	31	31	29	33

Recycling: Old scrap, converted to refined metal and alloys, provided an estimated 145,000 tons of copper, equivalent to 8% of apparent consumption. Purchased new scrap, derived from fabricating operations, yielded an estimated 715,000 tons of contained copper. Of the total copper recovered from scrap (including aluminum- and nickel-base scrap), brass and wire-rod mills recovered approximately 80%; copper smelters, refiners, and ingot makers, 15%; and miscellaneous manufacturers, foundries, and chemical plants, 5%. Copper in all scrap contributed about 35% of the U.S. copper supply.[5]

Import Sources (2013–16): Unmanufactured copper (blister and anodes; matte, ash, and precipitates; ore and concentrates; refined; unalloyed and alloyed scrap): Chile, 46%; Canada, 30%; Mexico, 16%; and other, 8%. Refined copper accounted for 85% of unmanufactured copper imports.

Tariff: Item	**Number**	**Normal Trade Relations[6] 12–31–17**
Copper ores and concentrates, copper content	2603.00.0010	1.7¢/kg on lead content.
Unrefined copper anodes	7402.00.0000	Free.
Refined and alloys, unwrought	7403.00.0000	1.0% ad val.
Copper wire (rod)	7408.11.0000	1.0% or 3.0% ad val.

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

Government Stockpile: None.

Prepared by **Daniel M. Flanagan [(703) 648–7726, dflanagan@usgs.gov]**

COPPER

Events, Trends, and Issues: The International Copper Study Group projected that global refined copper consumption would be approximately 24 million tons in 2017, slightly more than global refined production. Production and consumption of refined copper were expected to rise slightly compared with those in 2016, whereas mine production was estimated to decline slightly owing to supply disruptions at multiple leading copper mines, lower ore grades, and a general lack of new projects and mine expansions.[7]

In the United States, copper output declined at most mines during 2017 as a result of lower ore grades, reduced mining rates early in the year when copper prices were lower, and (or) disruptions caused by poor weather conditions and technical complications. Total U.S. refined production fell by an estimated 8% because of planned smelter maintenance shutdowns and a 6-week suspension of operations at one smelter following a fatal accident.

Through November 2017, the monthly average COMEX spot copper price fluctuated between $2.55 per pound (May) and $3.10 per pound (October). It was projected to average about $2.80 per pound for the full year, an increase of 27% from $2.20 per pound in 2016. This increase was in part attributed to lower global mine production resulting from supply disruptions, depreciation of the United States dollar, and continued copper consumption growth in China.

World Mine Production and Reserves: Reserves for Australia, Chile, China, the United States, and several other countries were revised based on reported company data and (or) information from the Governments of those countries.

	Mine production		Reserves[8]
	2016	2017[e]	
United States	1,430	1,270	45,000
Australia	948	920	[9]88,000
Canada	708	620	11,000
Chile	5,550	5,330	170,000
China	1,900	1,860	27,000
Congo (Kinshasa)	846	850	20,000
Indonesia	727	650	26,000
Mexico	752	755	46,000
Peru	2,350	2,390	81,000
Zambia	763	755	20,000
Other countries	4,160	4,300	260,000
World total (rounded)	20,100	19,700	790,000

World Resources: A 1998 U.S. Geological Survey (USGS) assessment estimated that 550 million tons of copper were contained in identified and undiscovered resources in the United States.[10] A 2014 USGS global assessment of copper deposits indicated that identified resources contained 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.[11]

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.

[e]Estimated.
[1]Distribution reported by the Copper Development Association. Some electrical components are included in each end use.
[2]Less than ½ unit.
[3]Defined as primary refined production + copper from old scrap converted to refined metal and alloys + refined imports (general) – refined exports (domestic) ± changes in refined stocks.
[4]Defined as imports – exports ± adjustments for industry stock changes of refined copper.
[5]Copper supply is defined as apparent consumption + copper recovered from new scrap.
[6]No tariff for certain countries owing to special trade agreements. See the Harmonized Tariff Schedule of the United States.
[7]International Copper Study Group, 2017, Copper market forecast 2017/2018: Lisbon, Portugal, International Copper Study Group press release, October 24, 2 p.
[8]See Appendix C for resource and reserve definitions and information concerning data sources.
[9]For Australia, Joint Ore Reserves Committee-compliant reserves were about 24 million tons.
[10]U.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., https://pubs.er.usgs.gov/publication/cir1178.
[11]Johnson, 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.*