COPPER

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

Domestic Production and Use: Domestic mine production in 2000 declined to 1.45 million metric tons and was valued at about $2.8 billion. The principal mining States, in descending order, Arizona, Utah, New Mexico, and Montana, accounted for 99% of domestic production; copper was also recovered at mines in three other States. Although copper was recovered at about 30 mines operating in the United States, 15 mines accounted for about 99% of production. At yearend, 4 primary smelters and 1 secondary smelter, 4 electrolytic and 4 fire refineries, and 15 solvent extraction-electrowinning facilities were operating. Refined copper and direct melt scrap were consumed at about 35 brass mills; 15 rod mills; and 600 foundries, chemical plants, and miscellaneous consumers. Copper and copper alloy products consumed[1] in building construction totaled 41%; electric and electronic products, 27%; transportation equipment, 12%; industrial machinery and equipment, 10%; and consumer and general products, 10%.

Salient Statistics—United States:	1996	1997	1998	1999	2000[e]
Production: Mine	1,920	1,940	1,860	1,600	1,450
Refinery: Primary[2]	2,010	2,070	2,140	1,890	1,610
Secondary[3]	345	396	349	230	210
Copper from all old scrap	428	498	466	381	360
Imports for consumption:					
Ores and concentrates	72	44	217	143	1
Refined	543	632	[4]725	[4]915	[4]970
Unmanufactured	961	999	1,190	1,280	1,320
Exports: Ores and concentrates	195	127	37	64	220
Refined	169	93	86	25	110
Unmanufactured	748	628	412	395	740
Consumption: Reported refined	2,610	2,790	2,890	2,990	3,000
Apparent unmanufactured[5]	2,830	2,950	3,020	3,130	3,120
Price, average, cents per pound:					
Domestic producer, cathode	109.0	107.0	78.6	75.9	89
London Metal Exchange, high-grade	104.0	103.2	75.0	71.3	83
Stocks, yearend, refined[6]	146	314	532	564	280
Employment, mine and mill, thousands	13.3	13.2	13.0	11.6	10
Net import reliance[7] as a percent of apparent consumption	14	13	14	27	37

Recycling: Old scrap, converted to refined metal and alloys, provided 360,000 tons of copper, equivalent to 12% of apparent consumption. Purchased new scrap, derived from fabricating operations, yielded 970,000 tons of contained copper; about 90% of the copper contained in new scrap was consumed at brass or wire-rod mills. Of the total copper recovered from scrap, brass mills recovered 67%; copper smelters and refiners,18%; ingot makers, 11%; and miscellaneous manufacturers, foundries, and chemical plants, 4%. Copper in all old and new, refined or remelted scrap contributed 33% of the U.S. copper supply.

Import Sources (1996-99): Unmanufactured: Canada, 38%; Chile, 24%; Mexico, 14%; and other, 24%. Refined copper accounted for 61% of imports of unwrought copper.

Tariff: Item	Number	Normal Trade Relations[8] 12/31/00
Unrefined copper; anodes	7402.00.0000	Free
Refined and alloys; unwrought	7403.00.0000	1.0% ad val.
Copper powder	7406.10.0000	Free
Copper wire (rod)	7408.11.6000	3.0% ad val.

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

Government Stockpile: The stockpile of about 20,000 tons of refined copper was liquidated in 1993. The stockpile of about 8,100 tons of brass was liquidated in 1994. For details on inventories of beryllium-copper master alloys (4% beryllium), see the section on beryllium.

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COPPER

Events, Trends, and Issues: World mine capacity continued its upward trend, rising about 300,000 tons, or 2%, in 2000. World mine production kept pace with the increased capacity, rising by about 300,000 tons. Though world refined copper production was projected to rise by about 400,000 tons owing to increases in primary and secondary production, the increase was not sufficient to keep pace with the projected growth in world refined consumption. According to the International Copper Study Group,[9] world consumption of refined copper for the first half of 2000 rose by almost 600,000 tons, and reported global inventories of refined copper, which had risen by 800,000 tons during the previous 3 years, declined significantly. Prices trended upward with declining stocks; the U.S. producer price averaged almost $0.96 per pound in September.

Reorganization of the U.S. copper industry was completed by yearend 1999; Phelps Dodge Corp. acquired the assets of Cyprus Amax Minerals Corp., and Grupo Mexico, S.A. de C.V. acquired the assets of ASARCO Incorporated. The Broken Hill Propriety Ltd. mine, smelter, and refinery operations closed in 1999 and remained shuttered. (For details, see USGS Mineral Industry Surveys, Copper in June 1999 and Copper in August 1999.) Previously announced cutbacks contributed to a decline in mine, smelter, and refinery production in 2000. In May, Southwire Company closed its secondary smelter and associated refinery in Georgia (For details see USGS Mineral Industry Surveys, Copper in February 2000.) Power disruptions and high energy costs resulted in production losses by at least one producer and led to the temporary closure of one mine in Montana during the third quarter. One new leaching operation in Nevada began commercial production during the second quarter. Consumption of refined copper was essentially unchanged in 2000. Growing industrial demand for wire-rod was met by increased imports. The shortfall in domestic refined production was met by imports and a drawdown in metal exchange inventories. U.S. mine production is expected to decline further in 2001 as one major mine converts to an all leach operation. The U.S. import dependance for refined copper and wire-rod is expected to increase with growing industrial demand.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[10]	Reserve base[10]
	1999	2000[e]		
United States	1,600	1,450	45,000	90,000
Australia	735	760	9,000	23,000
Canada	614	650	10,000	23,000
Chile	4,382	4,500	88,000	160,000
China	500	510	18,000	37,000
Indonesia	740	850	19,000	25,000
Kazakhstan	374	380	14,000	20,000
Mexico	362	390	15,000	27,000
Peru	536	530	19,000	40,000
Poland	460	480	20,000	36,000
Russia	530	520	20,000	30,000
Zambia	260	260	12,000	34,000
Other countries	1,500	1,600	50,000	110,000
World total (may be rounded)	12,600	12,900	340,000	650,000

World Resources: Land-based resources are estimated to be 1.6 billion tons of copper, and resources in deep-sea nodules are estimated to be 700 million tons.

Substitutes: Aluminum substitutes for copper in various products, such as electrical power cables, electrical equipment, automobile radiators, and cooling/refrigeration tubing. Titanium and steel are used in heat exchangers, and steel is used for artillery shell casings. Optical fiber substitutes for copper in some telecommunications applications. Plastics also substitute for copper in water pipe, plumbing fixtures, and many structural applications.

[e]Estimated.

[1]Some electrical components are included in each end use. Distribution by Copper Development Association, 2000.

[2]From domestic and imported ores and concentrates.

[3]From primary and secondary refineries.

[4]General imports of refined copper.

[5]Defined as primary refined production + copper from old scrap converted to refined metal and alloys + refined imports - refined exports ± changes in refined stocks. In 1998 and 1999, general imports of 725,000 tons and 915,000 tons, respectively, were used to calculate apparent consumption.

[6]Held by industry, COMEX, and London Metal Exchange warehouses in the United States.

[7]Defined as imports - exports + adjustments for Government and industry stock changes for refined copper.

[8]No tariff for Canada and Mexico for items shown.

[9]International Copper Study Group, 2000, Copper Bulletin: Lisbon, Portugal, International Copper Study Group September, 48 p.

[10]See Appendix C for definitions.

SILVER

(Data in metric tons[1] of silver content, unless otherwise noted)

Domestic Production and Use: In 2000, U.S. mine production of silver was about 2,100 tons with an estimated value of $338 million. Nevada was the largest producer, with more than 590 tons. Precious metal ores accounted for approximately one-half of domestic silver production; the other one-half was recovered as a byproduct from processing of copper, lead, and zinc ores. There were 22 principal refiners of commercial-grade silver with an estimated output of approximately 4,000 tons. About 30 fabricators accounted for more than 90% of the silver consumed in arts and industry. The remainder was consumed mostly by small companies and artisans. Aesthetic uses of silver for decorative articles, jewelry, tableware, and coinage were overshadowed by industrial and technical uses. Industrial and technical uses include photographic materials, electrical products, catalysts, brazing alloys, dental amalgam, and bearings.

Salient Statistics—United States:	1996	1997	1998	1999	2000[e]
Production: Mine	1,570	2,180	2,060	1,950	2,060
Refinery: Primary	NA	2,200	2,300	2,000	2,200
Secondary	NA	1,360	1,700	1,500	1,600
Imports for consumption[2]	3,010	2,540	3,330	2,660	4,360
Exports[2]	2,950	3,080	2,250	481	346
Consumption, apparent[e]	NA	6,000	6,200	6,100	7,700
Price, dollars per troy ounce[3]	5.19	4.89	5.54	5.25	5.25
Stocks, yearend: Treasury Department[4]	402	484	582	617	600
COMEX, CBT[5]	4,550	3,430	2,360	2,360	2,400
National Defense Stockpile	1,450	1,220	1,030	778	200
Employment, mine and mill,[6] number	1,400	1,550	1,550	1,600	1,500
Net import reliance[7] as a percent of apparent consumption[e]	NA	E	43	39	52

Recycling: About 1,600 tons of silver was recovered from old and new scrap in 2000.

Import Sources[2] (1996-99): Canada, 36%; Mexico, 31%; Peru, 8%; United Kingdom, 5%; and other, 20%.

Tariff: No duties are imposed on imports of unrefined silver or refined bullion.

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

Government Stockpile: The Government continued to dispose of the silver held in the National Defense Stockpile, using it primarily for the production of commemorative coins and the Eagle silver bullion coins. During the past 18 years, from 1982 through September 30, 2000, the Government has reduced the quantity of silver held in the Stockpile from 4,300 tons to about 496 tons.

Stockpile Status—9-30-00[8]

Material	Uncommitted inventory	Committed inventory	Authorized for disposal	Disposal plan FY 2000	Disposals FY 2000
Silver	496	—	496	311	319

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SILVER

Events, Trends, and Issues: Photographic applications account for about 28% of total silver demand, and digital imaging is considered to be a potential threat to this sector of the market. In contrast to the use of silver halide film in conventional photography, digital technology converts images directly into electronic form, thereby avoiding the need for silver. Silver halide pictures may also be scanned into electronic form, which necessitates the use of silver in taking and printing the picture but eliminates the need for silver halide technology in further processing.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[9]	Reserve base[9]
	1999	2000[e]		
United States	1,950	2,060	33,000	72,000
Australia	1,720	1,850	30,000	36,000
Canada	1,250	1,300	37,000	47,000
Mexico	2,340	2,500	37,000	40,000
Peru	2,220	2,000	25,000	37,000
Other countries	8,230	8,190	120,000	190,000
World total (may be rounded)	17,700	17,900	280,000	420,000

World Resources: More than two-thirds of world silver resources are associated with copper, lead, and zinc deposits, often at great depths. The remainder is in vein deposits in which gold is the most valuable metallic component. Although most recent discoveries have been primarily gold and silver deposits, significant future reserves and resources are expected from major base metal discoveries that contain byproduct silver. Although the price of silver and improved technology may appear to increase the reserves and reserve base, the extraction of silver from these resources will be driven by demand for the primary base metals.

Substitutes: Aluminum and rhodium can be substituted for silver in mirrors and other reflecting surfaces. Tantalum can be used in place of silver for surgical plates, pins, and sutures. Stainless steel is an alternate material used widely in the manufacture of table flatware. Nonsilver batteries being developed may replace silver batteries in some applications. Silverless black and white film, xerography, and film with reduced silver content are alternatives to some uses of silver in photography.

[e]Estimated. E Net exporter. NA Not available.

[1]One metric ton (1,000 kilograms) = 32,150.7 troy ounces.

[2]Refined bullion, plus silver content of ores, concentrates, precipitates, and doré; excludes coinage, waste, and scrap material.

[3]Handy & Harman quotations.

[4]Balance in U.S. Mint only.

[5]COMEX: Commodity Exchange Inc., New York. CBT: Chicago Board of Trade.

[6]Source: Mine Safety and Health Administration.

[7]Defined as imports - exports + adjustments for Government and industry stock changes.

[8]See Appendix B for definitions.

[9]Includes silver recoverable from base metal ores. See Appendix C for definitions.