COPPER

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

Domestic Production and Use: Domestic mine production in 2001 declined to 1.34 million metric tons and was valued at about $2.2 billion. The principal mining States, in descending order, Arizona, Utah, and New Mexico, accounted for 99% of domestic production; copper was also recovered at mines in three other States. Although copper was recovered at about 25 mines operating in the United States, 15 mines accounted for about 99% of production. Four primary smelters and 1 secondary smelter, 4 electrolytic and 3 fire refineries, and 14 solvent extraction-electrowinning facilities operated during the year. Refined copper and direct melt scrap were consumed at about 35 brass mills; 13 rod mills; and 600 foundries, chemical plants, and miscellaneous consumers. Copper and copper alloy products consumed[1] in building construction totaled 39%; electric and electronic products, 28%; transportation equipment, 11%; industrial machinery and equipment, 11%; and consumer and general products, 11%.

Salient Statistics—United States:	1997	1998	1999	2000	2001e
Production:					
Mine	1,940	1,860	1,600	1,440	1,340
Refinery:					
Primary	2,070	2,140	1,890	1,590	1,600
Secondary	396	349	230	209	170
Copper from all old scrap	498	466	381	353	310
Imports for consumption:					
Ores and concentrates	44	217	143	(2)	20
Refined	632	683	837	1,060	1,200
Unmanufactured	999	1,190	1,280	1,350	1,550
Exports:					
Ores and concentrates	127	37	64	116	50
Refined	93	86	25	94	20
Unmanufactured	628	412	395	661	600
Consumption:					
Reported refined	2,790	2,890	2,980	3,030	2,710
Apparent unmanufactured[3]	2,940	3,030	3,130	3,100	2,770
Price, average, cents per pound:					
Domestic producer, cathode	107.0	78.6	75.9	88.2	76
London Metal Exchange, high-grade	103.2	75.0	71.3	82.2	72
Stocks, yearend, refined, held by U.S. producers, consumers, and metal exchanges	314	532	565	334	800
Employment, mine and mill, thousands	13.2	13.0	11.6	10.2	10
Net import reliance[4] as a percentage of apparent consumption	13	14	27	37	31

Recycling: Old scrap, converted to refined metal and alloys, provided 310,000 tons of copper, equivalent to 11% of apparent consumption. Purchased new scrap, derived from fabricating operations, yielded 910,000 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 (including aluminum- and nickel-base scrap), brass mills recovered 65%; copper smelters and refiners,13%; ingot makers, 11%; and miscellaneous manufacturers, foundries, and chemical plants, 11%. Copper in all old and new, refined or remelted scrap contributed 33% of the U.S. copper supply.

Import Sources (1997-2000): Unmanufactured: Canada, 34%; Chile, 24%; Peru, 16%; Mexico, 14%; and other, 12%. Refined copper accounted for 67% of imports of unwrought copper.

Tariff: Item	Number	Normal Trade Relations[5] 12/31/01
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.

Prepared by **Daniel L. Edelstein [(703) 648-4978, dedelste@usgs.gov, fax: (703) 648-7757]**

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Events, Trends, and Issues: World mine production of copper rose by about 300,000 tons (2%), despite a significant drop in U.S. production. World mine capacity rose by only about 100,000 tons (1%), representing a break from the rapid expansion in capacity over the preceding 5 years. Although, according to preliminary data compiled by the International Copper Study Group,[6] world refinery production increased by about 450,000 tons (5%) for the first 7 months of 2000, world copper use declined by 2.6% for the corresponding period. As a result, a calculated global production surplus of about 200,000 developed and reported stocks increased by more than 350,000 tons. This contrasts with an inventory draw-down for the first 7 months of 2000 of about 275,000 tons. Copper prices trended downward throughout the year with rising inventories, and by September the average monthly COMEX and U.S. producer price had fallen to $0.654 and $0.696 per pound, respectively.

U.S. production cutbacks continued into 2001. The Continental Mine in Montana, which had expected to reopen in late 2000, remained closed. Phelps Dodge Corp. completed conversion of its Morenci, AZ, mine to an all-leach operation by the end of the first quarter and curtailed concentrate production at Chino, NM. (For details, see USGS Mineral Industry Surveys, Copper in March 2001.) With falling copper prices, rising inventories, and a weak demand outlook, several companies announced additional reductions in the second half of the year. Kennecott Utah Copper Corp. closed its higher cost North concentrator at its Bingham Canyon Mine at midyear. (For details, see USGS Mineral Industry Surveys, Copper in April 2001.) In October, citing further deterioration in the near-term economic outlook following the September 11 terrorist attacks, Phelps Dodge announced that it would curtail an additional 220,000 tons per year of U.S. production by mid-January 2002. Phelps Dodge planned to close the Chino (NM) and Miami (AZ) leach operations and halve production at the Sierrita (AZ) and Bagdad (AZ) mines. It also planned to close its Chino smelter and Miami refinery.[7] U.S. refined consumption was projected to decline by 10% in 2001.

World Mine Production, Reserves, and Reserve Base:

	Mine production		Reserves[8]	Reserve base[8]
	2000	2001[e]		
United States	1,440	1,340	45,000	90,000
Australia	829	900	9,000	23,000
Canada	634	620	10,000	23,000
Chile	4,600	4,650	88,000	160,000
China	590	620	18,000	37,000
Indonesia	1,012	1,080	19,000	25,000
Kazakhstan	430	470	14,000	20,000
Mexico	365	370	15,000	27,000
Peru	554	560	19,000	40,000
Poland	456	450	20,000	36,000
Russia	570	550	20,000	30,000
Zambia	240	320	12,000	34,000
Other countries	1,480	1,570	50,000	105,000
World total (may be rounded)	13,200	13,200	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. In the United States, discovered copper resources are estimated to contain 350 million tons and undiscovered deposits to contain 290 million tons of copper.

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]Less than ½ unit

[3]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, 1999, 2000, and 2001, general imports of 725,000 tons, 915,000 tons, 1,020,000 tons, and 1,350,000 tons, respectively, were used to calculate apparent consumption.

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

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

[6]International Copper Study Group, 2001, Copper Bulletin: Lisbon, Portugal, International Copper Study Group, v. 8, no. 10, 48 p.

[7]Phelps Dodge Corp., 2001, Phelps Dodge addresses current economic environment: Phoenix, Phelps Dodge news release, October 23, 3 p.

[8]See Appendix C for definitions.