

SILVER

(Data in metric tons¹ of silver content unless otherwise noted)

Domestic Production and Use: In 2011, the United States produced approximately 1,160 tons of silver with an estimated value of \$1.27 billion. Silver was produced as a byproduct from 35 domestic base- and precious-metal mines. Alaska continued as the country's leading silver-producing State, followed by Nevada. There were 21 U.S. refiners of commercial-grade silver, with an estimated total output of 6,500 tons from domestic and foreign ores and concentrates, and from old and new scrap. Silver's traditional use categories include coins and medals, industrial applications, jewelry and silverware, and photography. The physical properties of silver include ductility, electrical conductivity, malleability, and reflectivity. The demand for silver in industrial applications continues to increase and includes use of silver in bandages for wound care, batteries, brazing and soldering, in catalytic converters in automobiles, in cell phone covers to reduce the spread of bacteria, in clothing to minimize odor, electronics and circuit boards, electroplating, hardening bearings, inks, mirrors, solar cells, water purification, and wood treatment to resist mold. Silver was used for miniature antennas in Radio Frequency Identification Devices (RFIDs) that were used in casino chips, freeway toll transponders, gasoline speed purchase devices, passports, and on packages to keep track of inventory shipments. Mercury and silver, the main components of dental amalgam, are biocides, and their use in amalgam inhibits recurrent decay.

Salient Statistics—United States:	2007	2008	2009	2010	2011^e
Production:					
Mine	1,280	1,250	1,250	1,270	1,160
Refinery:					
Primary	791	779	796	819	820
Secondary (new and old scrap)	1,220	1,530	1,340	1,590	1,700
Imports for consumption ²	4,830	4,680	3,590	5,680	6,600
Exports ²	797	685	478	796	1,000
Consumption, apparent	5,250	6,300	4,600	7,220	7,850
Price, dollars per troy ounce ³	13.41	15.00	14.69	20.20	34.50
Stocks, yearend:					
Treasury Department ⁴	220	220	220	220	220
COMEX, NYSE Liffe ⁵	4,200	3,900	3,480	3,260	3,000
Exchange Traded Fund ⁶	5,350	8,240	12,400	18,100	19,600
Employment, mine and mill, ⁷ number	900	900	900	900	850
Net import reliance ⁸ as a percentage of apparent consumption	64	68	59	72	75

Recycling: In 2011, approximately 1,700 tons of silver was recovered from new and old scrap. This includes 60 to 90 tons of silver that is reclaimed and recycled annually from photographic wastewater.

Import Sources (2007–10):² Mexico, 56%; Canada, 25%; Peru, 10%; Chile, 3%; and other, 6%.

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

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

Government Stockpile: None.

Events, Trends, and Issues: Through September 2011, silver prices averaged \$36.39 per troy ounce. The overall rise in silver prices corresponded to continued investment interest and the surge in fabrication demand for industrial applications. Holdings in silver exchange traded funds (ETF), including an ETF that began in 2010 and was focused on the performance of companies involved in silver exploration, mining, and refining, have continued to increase since the first silver ETF was established in April 2006. Silver ETF inventories totaled 17,730 metric tons at the end of October.

Industrial demand for silver in photography continued to decline, and in the United States, demand for silver in photography fell to slightly more than 600 tons, compared with a high of slightly more than 2,000 tons in 2000. Although silver is still used in x-ray films, many hospitals have begun to use digital imaging systems. Approximately 99% of the silver in photographic wastewater may be recycled. Silver demand for use in photographic applications declined; however, the use of silver for jewelry and silverware increased slightly. Owing to silver's biocidal and conductive properties, the use of silver for electronics, industrial, and medical applications increased. Silver was used

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as a replacement metal for platinum in catalytic converters in automobiles. Silver also was used in clothing to help regulate body heat and to control odor in shoes and in sports and everyday clothing. The use of trace amounts of silver in bandages for wound care and minor skin infections is also increasing.

World silver mine production increased to a new record of 23,800 tons as a result of increased production at primary silver and lead-zinc mines. Production at the Palmarejo (primary silver) and Peñasquito (lead-zinc) Mines in Mexico contributed to maintaining Mexico as the world's leading silver producer. Production increases also took place in China and Australia—for example, at the Cannington Mine, the world's leading silver-producing mine. Overall domestic silver production declined, with production decreases at the Bingham Canyon Mine, UT, and at the Red Dog Mine in Alaska. Despite higher mill throughput, production also decreased at the Greens Creek Mine, AK, and at the Lucky Friday Mine, ID, owing to lower ore grades. At the Lucky Friday Mine, mine exploration and mining from new ore zones continued. Production of gold and silver from its leaching operations was expected to extend mine life by 8 years.

World Mine Production and Reserves: Reserve data for Poland were revised based on new information from Government and industry sources.

	Mine production		Reserves ⁹
	2010	2011 ^e	
United States	1,270	1,160	25,000
Australia	1,860	1,900	69,000
Bolivia	1,260	1,350	22,000
Canada	600	700	7,000
Chile	1,280	1,400	70,000
China	3,500	4,000	43,000
Mexico	4,410	4,500	37,000
Peru	3,640	4,000	120,000
Poland	1,180	1,200	85,000
Russia	1,150	1,400	NA
Other countries	2,950	2,200	50,000
World total (rounded)	23,100	23,800	530,000

World Resources: Silver was obtained as a byproduct from lead-zinc mines, copper mines, and gold mines, in descending order of production. The polymetallic ore deposits from which silver is recovered account for more than two-thirds of U.S. and world resources of silver. Most recent silver discoveries have been associated with gold occurrences; however, copper and lead-zinc occurrences that contain byproduct silver will continue to account for a significant share of future reserves and resources.

Substitutes: Digital imaging, film with reduced silver content, silverless black-and-white film, and xerography substitute for silver that has traditionally been used in black-and-white as well as color printing applications. Surgical pins and plates may be made with tantalum and titanium in place of silver. Stainless steel may be substituted for silver flatware, and germanium added to silver flatware will make it tarnish resistant. Nonsilver batteries may replace silver batteries in some applications. Aluminum and rhodium may be used to replace silver that was traditionally used in mirrors and other reflecting surfaces. Silver may be used to replace more costly metals in catalytic converters for off-road vehicles.

^eEstimated. NA Not available.

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

²Ores and concentrates, refined bullion, doré, and other unwrought silver; excludes coinage, and waste and scrap material.

³Handy & Harman quotations.

⁴Balance in U.S. Mint only.

⁵NYSE Liffe: formerly Chicago Board of Trade.

⁶Held in the United Kingdom by ETF Securities and iShares Silver Trust and in Switzerland by Zürcher Kantonalbank.

⁷Source: U.S. Department of Labor, Mine Safety and Health Administration.

⁸Defined as imports – exports + adjustments for Government and industry stock changes.

⁹[See Appendix C for resource/reserve definitions and information concerning data sources.](#)