



2010 Minerals Yearbook

SILVER

SILVER

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In 2010, the United States produced 1,280 metric tons (t) of silver, which was slightly more than the 2009 domestic silver production, and accounted for approximately 6% of world mine production of 23,100 t of silver. Silver was produced in 11 States in 2010, and Alaska remained the country's leading silver-producing State, followed by Nevada and Idaho. Approximately 99% of domestic silver was produced from base-metal ores at 11 mines and from precious-metal ores at 14 mines.

The Handy & Harman price of silver averaged \$20.20 per troy ounce in 2010, a 37% increase compared with the 2009 average price of \$14.69 (table 1). The price of silver peaked at \$30.64 per troy ounce on December 31, but was still below the high price of \$50.35 per troy ounce in 1980. Increased use of silver for industrial applications and investor interest in silver owing to financial instability worldwide and the relatively low price of silver compared with that of gold were important factors in the increased silver price.

Traditional use categories for silver included coin and medal fabrication; industrial applications, including electrical and electronics components; jewelry and silverware; and photography. In 2010, the global use of silver for photographic applications continued to decline and the use of silver for jewelry and silverware increased slightly. The use of silver in electronics and industrial applications increased in 2010 owing to silver's biocidal and conductive properties. Silver is used in electronics applications, including flat-screen televisions and radio-frequency identification devices (RFIDs), which are used in barcodes, some high-denomination casino chips, passports, and speedpasses. Nanosilver (silver particles in the range of 1 to 100 nanometers) was widely used in food packaging, medical applications, and textiles. Global minting of bullion coins increased in 2010 owing to the surge in investment-related coin purchases; especially in the United States and Europe. The U.S. Mint led the way with a 21% increase to 1,300 t of silver used in 2010 from 1,100 t in 2009, and the global use of silver for coin and medal fabrication increased to 3,150 t in 2010 from 2,460 t in 2009 (Silver Institute, The, 2011, p. 23).

U.S. imports for consumption of refined silver in 2010 increased by 58% compared with those in 2009. U.S. exports of silver bullion increased to 523 t in 2010 compared with 167 t exported in 2009. In 2010, Mexico was the leading source of imported refined silver into the United States, followed by Canada, the United Kingdom, and Poland. Mexico was the leading destination for exported silver, followed by Canada, Australia, and Germany. In 2010, silver was mined in approximately 65 countries; global production was slightly higher than that in 2009, and Mexico was the leading producer, followed by Peru, China, and Australia. The United States ranked seventh in world silver mine production in 2010.

Legislation and Government Programs

On September 30, 2010, the amount and value of Deep Storage and Working Stock custodial silver reserves in the U.S. Mint were 498,000 kilograms (kg) of silver with a total market value of \$353 million at \$22.07 per fine troy ounce and a statutory value of \$20.7 million. As custodian, the U.S. Mint is responsible for safeguarding much of the Nation's gold and silver. In accordance with 31 U.S. Code section 5117 (b) and 31 U.S. Code section 5116 (b) (2), a statutory rate of no less than \$1.292929292 per fine troy ounce was used to value the custodial silver held by the U.S. Mint (U.S. Mint, 2011, p. 59). The U.S. Mint's six facilities are in Denver, CO; Fort Knox, KY; Philadelphia, PA; San Francisco, CA; Washington, DC; and West Point, NY.

Production

Domestic mine production data was solicited from 36 operations. Of these operations, 33 responded to the U.S. Geological Survey (USGS) canvass, representing 100% of U.S. mine production listed in table 1. Domestic mine production of silver totaled 1,280 t in 2010, which was slightly more than that in 2009.

Silver in the United States was mainly produced as a byproduct from gold and base-metal ores, although silver was produced as a principal product at Coeur d'Alene Mines Corp.'s (Coeur d'Alene, ID) Rochester Mine, near Winnemucca, in northwestern Nevada. Coeur announced preparations to mine new ore zones at Rochester that were expected to extend mine life by 6 years and produce an average of 78 metric tons per year (Coeur d'Alene Mines Corp., 2010b). However, silver production decreased at the Rochester Mine by 7%, to 63 t in 2010 from 68 t in 2009 (Coeur d'Alene Mines Corp., 2011, p. 7).

Increased silver prices in 2010 generated increased mining interest. For example, in the Silver Valley, ID, United Mining Group (UMG) (Vancouver, British Columbia, Canada) announced that at its Crescent silver mine, it was completing a new portal and rehabilitating sections of the Hooper tunnel, which was expected to provide access to the south vein (United Mining Group, 2010b). The company completed a claims purchase agreement to increase its contiguous land holdings in the Silver Valley (United Mining Group, 2010a). The Crescent Mine had been closed more than a dozen years ago when the price of silver was \$5 per troy ounce (Cui and Matthews, 2010).

Silver production at Kennecott Utah Copper Corp.'s (a subsidiary of Rio Tinto plc, London, United Kingdom) Bingham Canyon Mine in Utah decreased by 23% owing to a 20% decrease in silver grade (Silver Institute, The, 2011, p. 25). At Teck Resources Ltd.'s (Vancouver) Red Dog Mine in Alaska,

silver production decreased by 15% owing to the impact of lower grades and recoveries, a direct result of processing weathered ore from the Aqqaluk deposit (Silver Institute, The, 2011, p. 25). However, Teck's silver production from all its mines rose by 23%, and Teck provided the gold, silver, and copper, which included recycled metals reclaimed from e-waste, that were used to produce the medals awarded at the 2010 Winter Olympic Games (Teck Resources, Ltd., 2011, p. 16).

In 2010, Hecla Mining Co. (Coeur d'Alene, ID) produced silver from two mines, the Lucky Friday Mine in Idaho and the Greens Creek Mine in Alaska, which was the world's eighth leading silver mine. Production at Lucky Friday decreased by 5% in 2010 compared with that of 2009, and production at Greens Creek Mine decreased slightly compared with that of 2009 (Hecla Mining Co., 2011). U.S. Silver Corp. (Toronto, Ontario, Canada) produced 71 t of silver in 2010, a 5% decrease compared with 2009 silver production of 75 t. The company indicated that the decrease was owing to mining of lower grade ore (U.S. Silver Corp., 2011).

New Jersey Mining Co. (Kellogg, ID) started shipping ore from its Silver Strand Mine, in the Silver Valley, ID, in May and began processing the ore in June (New Jersey Mining Co., 2010b). The company also announced a joint venture with Marathon Gold Corp. (Toronto), which resulted in the formation of Golden Chest LLC (New Jersey Mining Co., 2010a). New Jersey also planned to expand its flotation mill in Kellogg, ID, in order to process silver ore from the nearby Crescent Mine, which was owned by UMG, as well as ore from the New Jersey's mine. New Jersey had an agreement with UMG in which UMG would pay \$2.3 million in costs and process 10,000 metric tons per month of silver ore (New Jersey Mining Co., 2011).

Revett Minerals Inc. (Spokane Valley, WA) announced that a 950-meter (m) ramp, which was initiated in February 2010 and provided access to the "C-Bed" area of its Troy Mine, in northwestern Montana, had been completed on time and on budget. Limited output from the C-Bed area began in September, and more ore was included in the production mix at the beginning of the fourth quarter. Approximately 60 t of silver was in the C-Bed reserves (Revett Minerals Inc., 2010). The company announced record mill throughput of 1.3 million metric tons of ore in 2010 and production of 31 t of silver, an 11% decrease compared with 35 t of silver produced in 2009. Silver recovery was lower than that in 2009 owing to continued exploration of I-Bed targets beneath and adjacent to the existing mine, which temporarily reduced production. The mine life of Troy was extended by 7 years (Revett Minerals Inc., 2011).

The Montana Tunnels Mine, west of Jefferson City, MT, has produced gold, lead, silver, and zinc. The mine was purchased by Elkhorn Goldfields LLC (Denver, CO) from Apollo Gold Corp. (Denver, CO) in February 2010, and Montana Tunnels Mining Inc. became a 100%-owned subsidiary of Elkhorn Goldfields. The plan of operations for the L-Pit at the mine was completed in December 2008, and stockpiled ore was milled until April 2009, at which time all mine operations were placed on care-and-maintenance status (Elkhorn Goldfields LLC, 2010).

Consumption

Domestic consumption of silver increased by 14% and fabrication demand increased by 13% in 2010 compared with that of 2009; however, this was somewhat less than the overall 21% increase in the global consumption of silver during the same period (Silver Institute, The, 2011, p. 52).

Coin and Medal Fabrication.—Approximately 1,300 t of silver was used for coins and medals in the United States in 2010, a 21% increase from the 1,100 t of silver used in 2009 (Silver Institute, The, 2011, p. 23). The United States was the leading coin fabricator, and Silver Eagle bullion coin sales rose by 19% in 2010. Rationing of Eagle coin sales in the first three quarters of 2010 increased demand for Australia's Kookaburra, Koala, and Lunar coins; Austria's Philharmoniker coin; and Canada's Maple Leaf coin (Silver Institute, The, 2011, p. 23). The use of silver in circulating coins has been mostly phased out.

Industrial Applications.—Approximately 3,570 t of silver was used in the United States in 2010 for industrial applications, a 19% increase from the 3,000 t of silver that was used for those applications in 2009 (Silver Institute, The, 2011, p. 54). Owing to silver's electrical- and thermal-conducting properties, silver was used in conductors, contacts, fuses, switches, and timers. Other industrial applications of silver included uses in conductive adhesives; in the preparation of thick-film, silver-palladium pastes for use as silkscreen circuit paths in multilayer ceramic capacitors; in the manufacture of membrane switches; in food packaging; in flat-screen televisions with plasma display panels; in silver-backed solar mirrors; as a film in electrically heated automobile windows; in smart cards; and in photovoltaic cells. Silver consumption for photovoltaic cells increased to 1,500 t in 2010, an increase of 72% compared with consumption of 870 t in 2009. There are two types of photovoltaic cells—thick- and thin-film. Thick-film technology is silver intensive using 0.15 to 0.25 gram per cell, whereas silver use in thin-film cells is negligible. The leading solar-cell markets, in terms of installations, are in Germany and Italy (Silver Institute, The, 2011, p. 62). Solar markets are booming in the United States owing to consumer demand, rising energy prices, and financial incentives. More than 107,000 new solar cooling, electric, and heating installations were completed in 2009, an increase of 18% compared to the number of systems installed in 2008 and California remains the largest market in the United States (Sherwood, 2010). A small amount of silver was used as a miniature antenna in RFIDs, or radio frequency identification devices.

In 2010, other industrial applications for silver included its use in batteries, bearings, brazing and soldering, catalysts, disinfectants, mirrors, printed electronics, and water purification. Silver is also used as a coating material for compact disks and digital video disks. Dental amalgam, though in declining use because of its mercury content, may contain 34% to 38% silver (Lawrence, 1995). Owing to silver's antibacterial properties, silver was also used in classroom notebooks, clothing, dental amalgam, laundry machines, shoes, and toothbrushes. Silver embedded in locker room surfaces was used to reduce staph

infections, and silver-based disinfectants have been introduced as a low-cost, environmentally sensitive option for use in care centers and food processing facilities.

Jewelry and Silverware.—In 2010, the U.S. demand for silver for jewelry and silverware was 400 t, an 11% increase compared with the 360 t used in 2009. World consumption of silver for jewelry and silverware increased slightly, to 6,760 t in 2010, from 6,750 t in 2009. Jewelry and silverware accounted for approximately 33% of fabrication demand a decade ago, however, this category now accounts for 25% of fabrication demand (Silver Institute, The, 2011, p. 68).

In 2010, the rise in gold prices caused jewelers to reduce the amount of gold in their products, in some cases using silver as a substitute. Other alternatives to gold in jewelry include cobalt, platinum, and tungsten (Pleven and Zimmerman, 2010).

Photography.—Silver was one of the essential materials used in the manufacture of films and photographic papers, and Eastman Kodak Co. (Rochester, NY) purchased silver from numerous suppliers. The decline in the use of silver for photography began in 2000 in response to digital camera technology and the decline in the production of color film and paper. Total net sales from Kodak's Film, Photofinishing, and Entertainment Group declined by 22%, to \$1.8 billion in 2010 from \$2.3 billion in 2009 (Eastman Kodak Co., 2011, p. 26). Domestic use of silver for photographic use declined by 14% to 630 t in 2010 from 730 t in 2009, and had declined by 71% compared with 2,180 t of silver used in 2000 (Silver Institute, The, 2011, p. 64).

The overall decline in silver use in the photographic industry was reflected in film sales. In 2010, 547 million rolls of silver-bearing film were sold globally, compared with 751 million rolls sold in 2009, a 27% decrease. World silver-bearing photographic paper consumption declined by 12%, to 850 million square meters in 2010 from 961 million square meters in 2009 (Silver Institute, The, 2011, p. 64). Other broad photographic-use categories included commercial photography, dental and industrial x rays, graphic arts, and medical x rays.

Prices and Stocks

In 2010, compilation of price data from Handy & Harman, and published in Platts Metals Week, indicated that the average price of silver was \$20.20 per troy ounce (table 1). This price was 37% higher than the 2009 average price of \$14.69 as indicated by Handy & Harman. On December 31, the price of silver listed by Handy & Harman peaked at \$30.64 per troy ounce.

Global silver inventories in various Exchange Traded Funds (ETF) including iShares Silver Trust, ETF Securities, and other ETFs increased by 25%, to approximately 18,120 t at yearend 2010, compared with 14,540 t at yearend 2009 (Silver Institute, The, 2011, p. 100).

Global X Funds (New York, NY) opened its Global X Silver Miners Exchange Traded Fund, the only ETF in the world targeting silver mining companies. This ETF is focused on the performance of companies involved in silver exploration, mining, and refining and began trading on April 20 (Global X Funds, 2010b). In its first 2 weeks, Global X traded nearly 1

million shares and raised \$35 million in assets (Global X Funds, 2010a).

In 2010, a five-member commission began investigations into allegations of price manipulation in the silver futures market in 2008. In October, at a hearing in Washington, DC, a commissioner of the Commodity Futures Trading Commission (CFTC) indicated that they had determined that there had been violations of the Commodity Exchange Act as well as repeated attempts to influence silver prices; the commissioner indicated that any violators would be prosecuted. The CFTC commissioner spoke at a hearing on the implementation of the Dodd-Frank Wall Street Reform and Consumer Protection Act, which became law in July (Loder and Nguyen, 2010).

Foreign Trade

U.S. imports of refined silver increased by 58%, to 5,680 t in 2010 from 3,590 t in 2009. Exports of refined silver increased by 200% to 714 t in 2010 from 356 t in 2009. In 2010, principal import sources of silver ores and concentrates, ash and residues, bullion, and dore were Mexico (2,580 t), Canada (1,590 t), and the United Kingdom (454 t) (table 6). Principal export destinations in 2010 were Mexico (220 t), Canada (105 t), and Australia (97 t) (table 4).

World Review

World mine production of silver was 23,100 t in 2010, a 5% increase from the revised 22,000 t of silver produced in 2009 (table 8). In Mexico, the world's leading silver-producing country in 2010, silver production increased by 24%, to 4,411 t in 2010 from 3,554 t in 2009. Silver production decreased in Peru (6%) and in China (21%), the world's second and third ranked silver producers, respectively. Regionally, in 2010, silver production increased in Oceania (mainly Australia) by 14%, to 1,880 t from 1,650 t in 2009 and in Africa by 11%, to 432 t from 390 t in 2009. According to data compiled by the Silver Institute (2011, p. 99), silver produced from primary silver mines increased by 5%, to 6,950 t in 2010 from 6,600 t in 2009; silver produced from gold mining decreased by 4%; silver produced from copper mining decreased by 3%; and silver supplied from lead/zinc mining increased by 5%.

Argentina.—Pan American Silver Corp. (Vancouver), the world's second leading primary silver producer, reported a 4% increase in silver production, to 123 t in 2010 from 118 t in 2009 at its Manantial Espejo Mine, in Santa Cruz. At Manantial Espejo, silver was produced at a cash cost of \$1.63 per troy ounce. The company also completed an assessment for its world-class Navidad silver project, which contained 2,100 t of measured and indicated reserves (Pan American Silver Corp., 2011a).

Australia.—Silver production increased by 14% to 1,864 t in 2010 in from an 11-year low of 1,635 t in 2009. BHP Billiton's Cannington Mine became the world's leading producer of silver as a principal product in 2010. Output at Cannington was boosted by an 11% increase in head grade and a return to normal production levels following heavy rainfall and flooding that affected mine output in the first quarter of 2009 (Silver Institute, The, 2011, p. 29).

Bolivia.—Silver production decreased by 4% to 1,259 t in 2010 from 1,326 t in 2009 owing to production decreases at several operations (Silver Institute, The, 2011, p. 26). At Coeur d'Alene Mines Corp.'s San Bartolome Mine, production decreased by 9% to 210 t in 2010 from 230 t in 2009 (Coeur d'Alene Mines Corp., 2011, p. 11). Coeur also began mining silver-rich gravels which are above the 4,400 m level at San Bartolome (Coeur d'Alene Mines Corp., 2010a). Pan American Silver reported proven and probable reserves of 650 t of silver at its San Vincente Mine, and silver production increased by 15% to 94 t in 2010 from 82 t in 2009 (Pan American Silver, 2011a, b). Owing to a strike in August, production at Sumitomo Corp.'s (Tokyo, Japan) Minera San Cristobal S.A. Mine, in the Potosi District of southwestern Bolivia, decreased by 16% (Silver Institute, The, 2011, p. 28).

China.—Silver production from China, the world's third leading silver producer, increased by 21% to 3,500 t in 2010 from 2,900 t in 2009 (table 8). However, other information indicates that production may have increased by only 11% to 3,085 t in 2010 from 2,770 t in 2009 (Silver Institute, The, 2011, p. 24). Silver was produced mainly as a byproduct from copper or lead and zinc mining. Silvercorp Metals Inc. (Vancouver), the leading silver producer in China, has several silver-lead-zinc properties, projects, and mines in China and one property in northern British Columbia, Canada. The company produced 1,660 t of silver through the third quarter (December 31, 2010), an increase of 25% from production in the same period in 2009 (Silvercorp Metals, Inc., 2011).

Mexico.—In 2010, Mexico was the world's leading producer of silver, and silver production increased by 24% to 4,410 t from 3,550 t in 2009 (table 8). Fresnillo plc's (London, United Kingdom) namesake mine, in Zacatecas, was the second leading producer of silver after BHP Billiton's Cannington Mine in Australia (Silver Institute, The, 2011). Total Fresnillo silver production increased slightly to 1,310 t in 2010 from 1,280 t in 2009, mainly from the Fresnillo Mine in Zacatecas. (Fresnillo plc, 2011, p. 17). The Fresnillo Mine has produced silver for more than 450 years and mineralization is hosted in epithermal veins that were emplaced 29 to 30 million years ago in a Jurassic-Late Cretaceous volcanoclastic sequence (Velador and others, 2010). Coeur d'Alene Mines' Palmarejo Mine began production of gold and silver in the second quarter of 2009. Production at Palmarejo increased by 89% to 180 t in 2010 from 95 t in 2009 (Coeur d'Alene Mines Corp., 2011, p. 8).

Peru.—Peru was the world's second ranked silver producer in 2010. Three Peruvian mines, in order of decreasing production, Hochchild Mining's Pallancanta Mine, Compañia de Minas Buenaventura's Uchucchacua Mine, and Hochchild's Arcata Mine, are among the 10 leading silver mines in the world (Silver Institute, The, 2011, p. 24, 99). Peru's Ministry of Energy and Mines reported that Peru was the world leader in silver resources with reserves of more than 120,000 t of silver (Kosich, 2010). However, in 2010, overall production in Peru decreased by 6% to 3,640 t in 2010 from 3,854 t in 2009 (table 8). At Pan American Silver's Huraron Mine, production decreased by 16%; at the company's Morococha Mine, production decreased by 5%; and at the company's Quiruvilca Mine, production decreased by 13%. The overall Pan American decrease in 2010

was largely a result of lower silver grades, lower throughput, and lower recovery. In 2002, Pan American acquired the silver-rich pyrite stockpiles near Cerro de Pasco, and the ore had been shipped to the La Oroya smelter, where the ore was used as a process flux, and the silver was recovered. There was no silver production from Pan American's pyrite stockpiles in 2010, however, owing to closure of the La Oroya smelter, which had been the only buyer of this material (Pan American Silver, 2011a, p. 33). Production at Hochschild Mining plc's (London, United Kingdom) Pallancanta Mine increased by 19% to 310 t in 2010 from 260 t in 2009; however, production at the company's Arcata Mine decreased by 17% to 250 t in 2010 from 300 t in 2009, and production at the company's Ares Mine decreased by 14% to 24 t in 2010 from 28 t in 2009 (Hochschild Mining plc, 2011, p. 161). The decrease in the company's production was owing to geotechnical problems and a reduction in grades to extend mine life (Silver Institute, The, 2011, p. 27). Production also decreased at Compañia Minas Buenaventura's (Lima, Peru) Uchucchacua Mine, the world's sixth leading silver mine, by 12% to 290 t in 2010 from 330 t in 2009 owing to a worker strike and lower silver grades and recoveries (Silver Institute, The, 2011, p. 27, 99).

Outlook

World silver consumption increased by 15% to 32,900 t in 2010 from 28,700 t in 2009 (Silver Institute, The, 2011, p. 79) and investor interest in silver was overridden by the industrial demand for silver. The photovoltaic industry has emerged as a significant industrial-use sector for silver and was expected to become an even more substantial user of silver in the future. The use of silver in photographic application continues to decrease; however, this decrease has begun to level off as silver-containing paper was still used for high-quality paper prints from digital sources.

The use of RFIDs for tracking stocks and shipments, including silver-base high-data-capacity tags, readers, and computer systems, was expected to increase. Silver oxide batteries and conductive inks were increasingly being used in the electronics field. Owing to its antibacterial qualities, silver was expected to see increased use in medical applications. Nanoparticle silver is also expected to see increased use in industrial applications, and antimicrobial silver technology is expected to be used in keyboards, paper, pens, and telephones. Silver-based biocides were expected to be increasingly used and indicate a new generation of safe and environmentally friendly uses of silver for the control of bacterial, viral, and fungal infections, on hard surfaces and in water systems, and as a wood preservative. ETF inventories continued to increase year-on-year and indicated continued investor interest. Mine production increased owing to new projects in Argentina and Mexico.

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TABLE 1
SALIENT SILVER STATISTICS¹

		2006	2007	2008	2009	2010
United States:						
Mine production:						
Quantity	metric tons	1,160	1,280	1,250	1,250	1,280
Value	thousands	\$431,000	\$554,000	\$600,000	\$588,000	\$829,000
Refinery production:						
Domestic and foreign ores and concentrates	metric tons	2,210	791	779	796	819
Scrap (old and new)	do.	1,110	1,130	1,210	1,340	1,340
Exports:						
Ore and concentrate	kilograms	3,150	15,800	130,000	122,000	82,100
Refined ²	do.	1,670,000	781,000	555,000	356,000	714,000
Waste and scrap	metric tons	2,240	238	2,570	2,480	3,760
Imports for consumption:						
Ore and concentrate	kilograms	--	381	32	87	3,230
Refined	do.	4,830,000	4,980,000	4,680,000	3,590,000	5,680,000
Waste and scrap	do.	2,240,000	3,420,000	5,190,000	4,760,000	6,510,000
Stocks, December 31:						
Industry	metric tons	600 ^r	570 ^r	570 ^r	570 ^r	570
Futures exchanges	do.	3,460 ^r	4,120 ^r	3,980 ^r	3,480 ^r	3,260
U.S. Department of the Treasury	do.	220	220	220	220	220
Price, average ³	dollars per troy ounce	11.57 ^r	13.41 ^r	15.00 ^r	14.69	20.20
Employment, mine and mill workers ⁴		900	900	900	850	850
World, mine production	metric tons	20,100 ^r	20,800 ^r	21,400 ^r	22,000 ^r	23,100

^rRevised. do. Ditto. -- Zero.

¹Data are rounded to no more than three significant digits, except prices.

²Includes refined bullion, dore, and other unwrought silver.

³Price data are the annual Handy & Harman quotations published in Platts Metals Week.

⁴Employment data are from the U.S. Department of Labor, Mine Safety and Health Administration.

TABLE 2
MINE PRODUCTION OF SILVER IN THE UNITED STATES, BY STATE¹

(Kilograms)

State	2008	2009	2010
Nevada	235,000	203,000	224,000
Other ²	1,020,000	1,040,000	1,050,000
Total	1,250,000	1,250,000	1,280,000

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes Alaska, Arizona, California, Colorado, Idaho, Missouri, Montana, New Mexico, South Dakota, and Utah.

TABLE 3
LEADING SILVER-PRODUCING MINES IN THE UNITED STATES IN 2010, IN ORDER OF OUTPUT¹

Rank	Mine	County and State	Operator	Source of silver
1	Red Dog	Northwest Arctic, AK	Teck Alaska Inc.	Zinc-lead ore.
2	Greens Creek	Juneau, AK	Hecla Mining Co.	Zinc-silver ore.
3	Bingham Canyon	Salt Lake, UT	Kennecott Utah Copper Corp.	Copper-molybdenum ore.
4	Lucky Friday	Shoshone, ID	Hecla Mining Co.	Silver ore.
5	Galena	do.	U.S. Silver Corp.	Do.
6	Mission Complex	Pima, AZ	ASARCO LLC ²	Copper-molybdenum ore.
7	Rochester	Pershing, NV	Coeur d'Alene Mines Corp.	Silver ore.
8	Midas	Elko, NV	Newmont Mining Corp.	Gold ore.
9	Troy	Lincoln, MT	Revett Minerals Inc.	Copper-silver ore.
10	Bagdad	Yavapai, AZ	Freeport-McMoRan Copper & Gold Inc.	Copper-molybdenum ore.
11	Hollister	Elko, NV	Great Basin Gold Ltd.	Gold ore.
12	Continental Pit	Silver Bow, MT	Montana Resources	Copper-molybdenum ore.
13	Smoky Valley Common Operation	Nye, NV	Kinross Gold Corp.	Gold ore.
14	Mineral Park	Mohave, AZ	Mercator Minerals Ltd.	Copper-molybdenum ore.
15	Denton-Rawhide	Mineral, NV	Rawhide Acquisition Holdings	Gold ore.
16	Carlin Mines Operations ³	Elko, Eureka, Humboldt, Lander, NV	Newmont Mining Corp.	Do.
17	Hycroft	Humboldt and Pershing, NV	Allied Nevada Gold Corp.	Do.
18	Ray	Pinal, AZ	ASARCO LLC ²	Copper ore.
19	Wharf	Lawrence, SD	Wharf Resources Inc. ⁴	Gold ore.
20	Goldstrike	Elko and Eureka, NV	Barrick Gold Corp.	Do.
21	Morenci	Greenlee, AZ	Freeport-McMoRan Copper & Gold Inc.	Copper-molybdenum ore.
22	Cresson	Teller, CO	AngloGold Ashanti Ltd.	Gold ore.
23	Brushy Creek	Reynolds, MO	Doe Run Resources Corp.	Lead ore.
24	Fletcher	do.	do.	Do.
25	Meikle	Elko, NV	Barrick Gold Corp.	Gold ore.

do., Do. Ditto.

¹The mines on this list accounted for more than 99% of U.S. mine production in 2010.

²Wholly owned subsidiary of Grupo Mexico, S.A.B. de C.V.

³Includes Carlin East, Deep Post, Gold Quarry, Lone Tree, Mule Canyon, Pete, Rain/Emigrant, and Twin Creeks Mines.

⁴Wholly owned subsidiary of Goldcorp Inc.

TABLE 4
U.S. EXPORTS OF SILVER, BY COUNTRY¹

Year and country	Silver ores and concentrates			Bullion			Dore			Total	
	Silver content (kilograms)	Value (thousands)	Value (\$93,600)	Silver content (kilograms)	Value (thousands)	Value (\$72,700)	Silver content (kilograms)	Value (thousands)	Value (\$72,700)	Silver content (kilograms)	Value (thousands)
2009	122,000	\$55,400	\$93,600	167,000	\$93,600	\$72,700	130,000	\$72,700	\$72,700	419,000 ^r	\$222,000 ^r
2010:											
Argentina	--	--	8	12	8	1,940	3,780	1,940	1,940	3,790	1,950
Australia	29	10	65,700	97,300	65,700	--	--	--	--	97,300	65,700
Belgium	53	22	15	18	15	--	--	--	--	71	37
Brazil	--	--	--	--	--	324	789	324	324	789	324
Canada	220	99	74,800	104,000	74,800	--	--	--	--	105,000	74,900
China	--	--	4	9	4	63	150	63	63	159	67
Dominican Republic	946	515	--	--	--	--	--	--	--	946	515
Finland	--	--	--	--	--	108	243	108	108	243	108
Germany	15,800	9,560	23,100	33,000	23,100	7,810	21,100	7,810	7,810	69,900	40,500
Hong Kong	16	12	2,350	4,320	2,350	--	--	--	--	4,330	2,360
Ireland	337	80	229	514	229	--	--	--	--	851	309
Italy	--	--	24	43	24	228	557	228	228	600	252
Japan	--	--	30,400	38,600	30,400	--	--	--	--	38,600	30,400
Korea, Republic of	61,400	36,200	--	--	--	--	--	--	--	61,400	36,200
Malaysia	98	26	75	124	75	--	--	--	--	222	101
Mexico	1,170	684	115,000	218,000	115,000	24	60	24	24	220,000	115,000
Netherlands	--	--	52	86	52	--	--	--	--	86	52
New Zealand	127	86	132	221	132	774	1,920	774	774	2,270	992
Norway	210	104	21	36	21	1,170	2,650	1,170	1,170	2,890	1,290
Pakistan	--	--	176	418	176	--	--	--	--	418	176
Panama	--	--	--	--	--	264	645	264	264	645	264
Peru	--	--	98	233	98	266	620	266	266	853	364
Singapore	3	3	4,730	8,590	4,730	10,300	22,800	10,300	10,300	31,400	15,000
Switzerland	--	--	1,320	2,070	1,320	9,420	20,700	9,420	9,420	22,800	10,700
Taiwan	183	61	866	1,670	866	--	--	--	--	1,850	927
Thailand	--	--	56	86	56	--	--	--	--	86	56
United Kingdom	1,100	207	7,170	12,100	7,170	13,100	28,200	13,100	13,100	41,400	20,500
Vietnam	--	--	26	78	26	--	--	--	--	78	26
Other	415	103	259	334	259	48	113	48	48	862	410
Total	82,100	47,700	326,000	523,000	326,000	45,900	104,000	45,900	45,900	709,000	420,000

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

Source: U.S. Census Bureau.

TABLE 5
U.S. EXPORTS OF SILVER, BY COUNTRY¹

Year and country	Other unwrought silver		Metal powder		Silver nitrate		Semimanufactured forms ²		Waste and scrap	
	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)
2009	59,000	\$21,200	834,000	\$4,340,000	27,900	\$2,690	525,000	\$252,000	2,480,000	\$4,300,000
2010:										
Argentina	--	--	776	365	16	6	227	114	--	--
Australia	459	285	14	10	606	82	1,050	530	783	36,200
Austria	346	79	70	50	--	--	24	12	--	--
Bahrain	101	28	--	--	--	--	55	27	--	--
Belgium	52	11	6,430	3,870	39	6	2,430	1,080	707,000	167,000
Bolivia	183	34	--	--	--	--	37	18	--	--
Brazil	20	4	356	183	--	--	139	70	30	150
Canada	37,800	27,900	33,600	9,440	37,600	1,920	446,000	265,000	155,000	262,000
China	2,290	1,340	381,000	294,000	166	97	5,790	3,040	6,380	15,400
Costa Rica	549	448	--	--	1,340	455	40	23	--	--
Czech Republic	--	--	27	15	--	--	199	104	617	385
Denmark	11	12	--	--	--	--	12	6	4,090	2,980
Dominican Republic	1,200	501	75	50	143	67	699	353	67	31
Egypt	--	--	--	--	--	--	944	472	--	--
Estonia	--	--	--	--	--	--	273	138	--	--
Finland	--	--	250	65	--	--	10	8	--	--
France	76	28	82,000	50,200	--	--	8,580	4,680	15	76
Germany	860	247	82,000	54,600	591	124	10,700	5,850	983,000	223,000
Guatemala	933	598	--	--	--	--	72	51	--	--
Honduras	91	68	59	40	--	--	--	--	--	--
Hong Kong	11,500	6,830	28,500	23,600	--	--	16,100	8,410	1,660	3,240
India	19,300	6,860	--	--	20	6	13,800	7,030	78	274
Indonesia	1,440	916	--	--	58	11	81	46	--	--
Ireland	--	--	36	28	--	--	1,400	805	--	--
Israel	437	83	661	310	51	6	1,320	662	7	14
Italy	308	199	1,010	549	72	5	1,810	889	1,120,000	461,000
Japan	50	11	187,000	130,000	49	9	5,300	2,610	291,000	95,200
Jordan	--	--	--	--	--	--	211	105	--	--
Korea, Republic of	198	77	58,100	35,100	2	3	541	282	2,160	6,100
Malaysia	97	58	1,060	653	269	79	2,370	1,230	--	--
Mexico	1,480	574	4,730	2,210	10,500	1,400	70,100	36,100	443	1,140
Netherlands	14	3	21,600	14,500	--	--	44	37	253	1,350
New Zealand	23	8	--	--	113	12	232	117	--	--
Norway	62	16	--	--	--	--	67	35	--	--
Pakistan	--	--	--	--	--	--	206	103	5,890	3,340
Panama	193	66	--	--	--	--	176	88	15	577
Peru	15	3	--	--	642	23	--	--	--	--
Philippines	111	34	--	--	86	30	1,560	779	--	--
Russia	256	71	16	8	--	--	--	--	--	--

See footnotes at end of table.

TABLE 5—Continued
U.S. EXPORTS OF SILVER, BY COUNTRY¹

Year and country	Other unwrought silver		Metal powder		Silver nitrate		Semimanufactured forms ²		Waste and scrap	
	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)
2010—Continued:										
Saudi Arabia	--	--	--	--	--	--	--	\$823	--	--
Singapore	259	\$48	14,700	\$7,860	--	--	4,470	2,030	2	\$106
South Africa	5	3	--	--	48	\$12	--	--	15,000	3,500
Spain	--	--	6	3	--	--	686	345	--	--
Suriname	--	--	--	--	402	37	--	--	--	--
Sweden	--	--	469	221	183	31	3,350	1,730	260,000	41,700
Switzerland	114	30	224	116	43	8	1,340	687	123,000	4,520,000
Taiwan	260	110	265,000	180,000	105	17	2,140	1,130	18	92
Thailand	3,540	1,250	5,170	3,110	17	3	5,930	3,160	25	105
Trinidad and Tobago	245	165	--	--	--	--	32	22	--	--
Turkey	33	9	--	--	--	--	--	--	--	--
United Arab Emirates	1,060	455	665	407	--	--	317	158	2	50
United Kingdom	1,060	233	104,000	61,700	105	20	3,160	1,720	88,000	152,000
Uruguay	45	14	--	--	--	--	21	11	--	--
Venezuela	--	--	--	--	120	56	308	154	--	--
Vietnam	87	41	--	--	--	--	215	108	6	32
Other	208	67	60	32	52	11	575	310	19	123
Total	87,300	49,800	1,280,000	874,000	53,500	4,540	617,000	353,000	3,760,000	5,990,000

--Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Containing 99.5% or more by weight of silver.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF SILVER, BY COUNTRY¹

Year and country	Silver ores and concentrates			Ash and residues			Bullion			Dore			Total		
	Silver content (kilograms)	Value (thousands)	\$9	Silver content (kilograms)	Value (thousands)	\$151	Silver content (kilograms)	Value (thousands)	\$1,310,000	Silver content (kilograms)	Value (thousands)	\$439,000	Silver content (kilograms)	Value (thousands)	\$1,750,000
2009	87			505			2,800,000			653,000			3,450,000		
2010:															
Argentina	--	--	--	--	--	--	--	--	--	42,000	54,700	54,700	42,000	54,700	54,700
Australia	--	--	--	--	43,500	26,100	43,500	26,100	--	--	--	--	43,500	26,100	26,100
Belgium	--	--	--	--	972	575	972	575	--	--	--	--	972	575	575
Bolivia	--	--	--	--	--	--	--	--	--	115,000	73,300	73,300	115,000	73,300	73,300
Canada	3,230	1,750		--	1,580,000	998,000	1,580,000	998,000	343	595	343	343	1,590,000	1,000,000	1,000,000
Chile	--	--	--	--	80,000	50,500	80,000	50,500	283	155	283	283	80,200	50,800	50,800
Colombia	--	--	--	--	5,990	3,540	5,990	3,540	660	1,000	660	660	6,990	4,200	4,200
Costa Rica	--	--	--	--	--	--	--	--	71	90	71	71	90	71	71
Czech Republic	--	--	--	--	45	44	45	44	--	--	--	--	45	44	44
Dominican Republic	--	--	--	--	--	--	--	--	14	14	15	15	14	15	15
Germany	--	--	--	--	1,740	924	1,740	924	113	246	113	113	1,990	1,040	1,040
Hong Kong	--	--	--	--	87	46	87	46	--	--	--	--	87	46	46
India	--	--	--	--	80	38	80	38	--	--	--	--	80	38	38
Italy	--	--	--	--	--	--	--	--	911	1,620	911	911	1,620	911	911
Japan	--	--	--	10	35,900	31,100	35,900	31,100	--	--	--	--	35,900	31,200	31,200
Lebanon	--	--	--	--	25	23	25	23	--	--	--	--	25	23	23
Malaysia	--	--	--	306	67		--	--	--	--	--	--	306	67	67
Mexico	--	--	--	--	2,040,000	1,310,000	2,040,000	1,310,000	529,000	534,000	529,000	529,000	2,580,000	1,840,000	1,840,000
New Zealand	--	--	--	--	(2)	2	(2)	2	--	--	--	--	(2)	2	2
Panama	--	--	--	--	--	--	--	--	428	725	428	428	725	428	428
Peru	--	--	--	--	38,200	27,000	38,200	27,000	48,600	41,900	48,600	48,600	80,100	75,600	75,600
Poland	--	--	--	--	311,000	191,000	311,000	191,000	--	--	--	--	311,000	191,000	191,000
Switzerland	--	--	--	--	30,200	18,300	30,200	18,300	--	--	--	--	30,200	18,300	18,300
Taiwan	--	--	--	(2)	3		--	--	--	--	--	--	(2)	3	3
United Kingdom	--	--	--	--	454,000	231,000	454,000	231,000	--	--	--	--	454,000	231,000	231,000
Venezuela	--	--	--	--	233	30	233	30	--	--	--	--	233	30	30
Total	3,230	1,750		316	77		4,630,000	2,890,000	708,000	738,000	708,000	708,000	5,370,000	3,600,000	3,600,000

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 7
U.S. IMPORTS FOR CONSUMPTION OF SILVER, BY COUNTRY¹

Year and country	Other unwrought silver		Metal powder		Silver nitrate		Semimanufactured forms ²		Waste and scrap	
	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)
2009	135,000	\$56,100	247,000	\$36,400	835	\$241	476,000	\$176,000	4,760,000	\$372,000
2010:										
Argentina	--	--	--	--	--	--	--	--	25,200	512
Australia	--	--	105	5	--	--	1,150	1,100	33,100	2,920
Bahamas	--	--	--	--	--	--	--	--	37,500	8,000
Belgium	--	--	--	--	--	--	6	4	43,700	1,750
Bolivia	--	--	--	--	--	--	--	--	1,010	567
Brazil	--	--	--	--	--	--	4,430	2,010	217,000	2,860
Burkina Faso	--	--	40	4	--	--	--	--	--	--
Canada	107,000	8,750	30,900	1,370	61	6	380,000	213,000	1,560,000	151,000
Cayman Islands	--	--	--	--	--	--	--	--	9,160	13
Chile	--	--	--	--	--	--	--	--	9,140	332
China	105	19	28,200	1,510	--	--	--	--	546,000	9,850
Colombia	--	--	--	--	--	--	1,310	821	22,900	1,950
Costa Rica	36	21	--	--	--	--	--	--	82,900	1,760
Czech Republic	--	--	--	--	--	--	--	--	1,380	95
Dominican Republic	595	753	417	83	--	--	--	--	6,900	6,510
El Salvador	7	3	--	--	--	--	--	--	679	64
France	--	--	12,700	1,030	531	122	(3)	2	685	72
Germany	246	153	12,300	2,940	220	21	13,300	5,600	2,120,000	163,000
Guatemala	--	--	--	--	--	--	--	--	4,050	869
Honduras	--	--	--	--	--	--	3,440	873	401	7,470
Hong Kong	--	--	--	--	--	--	--	--	20,300	725
Hungary	--	--	100	7	--	--	--	--	--	--
India	37	26	--	--	--	--	--	--	17,800	2,950
Indonesia	106	32	--	--	--	--	--	--	4,840	158
Israel	--	--	--	--	--	--	--	--	17,300	361
Italy	138	185	--	--	--	--	57	35	2,210	1,500
Jamaica	14	10	--	--	--	--	54	27	597	5,160
Japan	1	5	655,000	155,000	--	--	6	3	5,960	2,650
Korea, Republic of	--	--	11	13	--	--	--	--	3,810	269
Malaysia	--	--	4,260	209	--	--	--	--	67,000	6,850
Mexico	208,000	132,000	28,100	816	--	--	178,000	103,000	1,120,000	30,900
Netherlands	--	--	153	15	--	--	281	99	246	46
Nicaragua	--	--	--	--	--	--	--	--	1,450	21
Panama	--	--	--	--	--	--	--	--	822	692
Peru	--	--	--	--	6	2	19	15	3,920	\$58
Philippines	--	--	--	--	--	--	--	--	720	158
Singapore	--	--	--	--	--	--	1,040	214	89,500	5,480
South Africa	--	--	194	33	--	--	--	--	--	--

See footnotes at end of table.

TABLE 7—Continued
U.S. IMPORTS FOR CONSUMPTION OF SILVER, BY COUNTRY¹

Year and country	Other unwrought silver		Metal powder		Silver nitrate		Semimanufactured forms ²		Waste and scrap	
	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)	Gross weight (kilograms)	Value (thousands)
2010—Continued:										
Spain	9	\$10	--	--	--	--	1,250	\$331	--	--
Sweden	--	--	--	--	--	--	--	--	29,200	\$97
Switzerland	--	--	11,900	\$6,290	5	\$2	47	41	--	--
Taiwan	--	--	300	8	--	--	460	39	4,960	9,160
Thailand	--	--	129	22	--	--	--	--	--	--
Turks and Caicos Islands	--	--	--	--	--	--	--	--	2,830	71
United Arab Emirates	--	--	--	--	--	--	--	--	245	60
United Kingdom	101	19	3,130	444	610	237	53,200	26,700	396,000	6,930
Venezuela	--	--	--	--	--	--	--	--	2,200	8
Other	(3)	3	--	--	--	--	--	--	121	781
Total	316,000	142,000	788,000	170,000	1,430	390	638,000	354,000	6,510,000	435,000

-- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Containing 99.5% or more by weight of silver.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 8
SILVER: WORLD MINE PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

Country	2006	2007	2008	2009	2010
Algeria	(3)	(3)	(3)	(3)	(3)
Argentina	245	256	356	415 ^r	420 ^e
Armenia	40 ^r	37 ^r	40 ^r	53 ^r	68
Australia	1,727	1,879	1,926	1,635	1,864
Bolivia	472	525	1,114	1,326 ^r	1,259
Brazil ⁴	30	36	36 ^r	35 ^r	35 ^p
Bulgaria ^c	65	55	55	55	55
Burma	1	(3)	--	(3)	--
Canada	995	860	728	631 ^r	596 ^p
Chile	1,607	1,936 ^r	1,405	1,301	1,276
China ^c	2,600	2,700	2,800	2,900	3,500
Colombia	8	10	9	11 ^r	15
Congo (Kinshasa)	68	76	34	--	7 ^e
Ecuador	(3)	(3)	(3)	(3) ^e	(3) ^e
Ethiopia	1	1	3 ^r	1 ^r	2 ^e
Finland ^c	50	50	70 ⁵	70	70
France ^c	1	1	1	1	--
Ghana	3	3	3	4 ^r	4 ^e
Greece	25	26	28	30 ^e	30 ^e
Guatemala	50	88	100	128	130 ^e
Honduras	55	54 ^r	60 ^r	49 ^r	48 ^e
India	31	82	96	95	92
Indonesia	261	269	226	215	200
Iran ^c	25	20 ^r	15 ^r	15 ^r	20
Ireland ^c	4 ⁵	4	4	4	4
Italy ^{e,6}	(3)	(3)	(3)	(3)	(3)
Japan	11	5	2	2	1
Kazakhstan	806	723	646	618 ^r	551
Korea, North ^c	20	20	20	20	20
Korea, Republic of	2	1	1	-- ^r	2 ^e
Malaysia	(3)	(3)	(3)	(3)	(3) ^e
Mexico	2,970	3,135	3,236	3,554	4,411
Mongolia	20	20 ^r	20 ^r	20 ^r	20 ^e
Morocco ^c	195 ⁵	195	190	195	195
Namibia ^c	31 ⁵	30	30	30	30
New Zealand	27	11	18	14	15
Nicaragua	3	3 ^r	4 ^r	4 ^r	5
Oman	(3)	(3)	(3)	(3)	(3)
Papua New Guinea	51	49 ^r	48 ^r	55 ^r	50 ^e
Peru	3,471	3,494	3,686	3,854	3,640
Philippines	24	28	14	34 ^r	41
Poland	1,266	1,199	1,161	1,207 ^r	1,181
Portugal	20	24	29 ^r	22 ^r	23 ^p
Romania ^c	18	18	18	18	18
Russia	974 ^r	911 ^r	1,132 ^r	1,313 ^r	1,145
Saudi Arabia	9 ^e	9	8	10 ^e	9 ^e
Serbia ^c	2	4 ⁵	4	4	4
South Africa	87	70	75	78 ^r	79
Spain	2	3	3	4	4 ^e
Sudan ^c	2 ⁵	2 ⁵	-- ^r	(3) ^r	1 ^e
Sweden	268	270	265	265 ^e	270 ^e
Tajikistan ^c	3 ^r	3 ^r	3 ^r	3 ^r	3

See footnotes at end of table.

TABLE 8—Continued
SILVER: WORLD MINE PRODUCTION, BY COUNTRY^{1, 2}

(Metric tons)

Country	2006	2007	2008	2009	2010
Tanzania	15	12	10	8 ^r	9 ^e
Turkey	167	198	294 ^r	352 ^r	350 ^e
United States	1,160	1,280	1,250	1,250	1,280
Uzbekistan	62 ^r	78 ^r	75 ^r	53 ^r	59
Zimbabwe ^e	1 ^s	1 ^r	(3) ^r	(3) ^r	1
Total	20,100 ^r	20,800 ^r	21,400 ^r	22,000 ^r	23,100

^eEstimated. ^pPreliminary. ^rRevised. -- Zero.

¹World totals, U.S. data, and estimated data have been rounded to no more than three significant digits; may not add to totals shown.

²Recoverable content of ores and concentrates produced unless otherwise specified. Table includes data available through August 19, 2011.

³Less than ½ unit.

⁴Includes the following quantities, in kilograms, identified as secondary silver: 2006—39,000; 2007—32,000; 2008—32,500 (revised); 2009—32,500 (revised); and 2010—32,500 (estimated).

⁵Reported figure.

⁶Includes production from imported ores.