



2011 Minerals Yearbook

SILVER

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In 2011, the United States produced 1,120 metric tons (t) of silver, which was 12% less than production in 2010. Silver was produced in 11 States in 2011, 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 \$35.26 per troy ounce in 2011, a 75% increase compared with the 2010 average price of \$20.20 (table 1). The principal reason for the increased silver price was investor interest owing to worldwide financial instability.

Traditional use categories for silver included coin and medal fabrication; industrial applications, including electrical and electronics components; jewelry and silverware; and photography. In 2011, global use of silver in all applications declined, with the exception of coin and medal fabrication, which rose by nearly 19% from that in 2010 (Silver Institute, *The*, 2012, p. 49). Consumption of silver in the United States of 6,140 t was slightly lower than that of 2010. High silver prices and weak economic growth contributed to the decline. Consumption patterns in the United States mirrored global consumption patterns with declines in all applications except coin and medal fabrication.

U.S. imports of silver bullion and dore increased by 18%, to 6,320 t in 2011. The principal import sources of bullion and dore were, in descending order, Mexico, Canada, and Poland. Exports of silver bullion and dore increased by 17% to 732 t in 2011. Principal destinations were, in descending order, Mexico, Japan, and Canada.

In 2011, silver was mined in approximately 55 countries; global production was slightly lower than that in 2010. Mexico was the leading producer, followed by China, Peru, and Australia. The United States ranked ninth in world silver mine production in 2011.

Legislation and Government Programs

On September 30, 2011, the amount and value of Deep Storage and Working Stock custodial silver reserves in the U.S. Mint were 498,000 kilograms (kg) with a total market value of \$487 million at \$30.45 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, 2012, p. 39). 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.

Fiscal year (FY) 2011 was a record revenue year for the U.S. Mint. Revenue from sales of 41.3 million American Eagle silver bullion coins increased by 122% to \$1.46 billion. The West Point Mint continued to improve its productivity and efficiency, which allowed for expanded American Eagle silver bullion coin production. In May, the Mint began fulfilling orders for American Eagle silver bullion with coins minted at the San Francisco Mint; the West Point Mint had been the sole producer of these coins for several years. In December 2010, the Coinage Modernization, Oversight and Continuity Act of 2010 (Public Law 111-302) granted the Mint authority to issue American Eagle gold and silver coins in qualities and quantities the Secretary of the Treasury deems appropriate. This amended the bullion program's statutory priority and allowed the bureau to make the numismatic versions of American Eagle coins available for sale, even as bullion demand remained at record highs. Consequently, the Mint was able to offer both 2010 and 2011 American Eagle gold and silver products for sale in FY 2011 (U.S. Mint, 2012, p. 2, 13-14, 17).

Production

Domestic mine production data were requested from 39 operations. Of these operations, 36 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 was 1,120 t in 2011, which was 12% less than that in 2010.

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 Rochester Mine, near Winnemucca, in northwestern Nevada. The Rochester Mine produced about 44 t of silver in 2011, and its proven and probable reserves at yearend were 921 t of silver. The company completed construction of a new leach pad and related infrastructure in the fourth quarter of 2011 (Coeur d'Alene Mines Corp., 2012, p. 7).

The Nevada District Court in Pershing County, NV, issued a preliminary restraining order on December 20 that prohibited Rye Patch Gold Corp. from entering Coeur d'Alene's active mining areas of the Rochester Mine. The restraining order did allow Rye Patch to explore some claims, but not those adjacent to the mine for safety reasons. The decision came after hearings in which Coeur d'Alene Mines admitted to not paying 541 claim maintenance fees in areas surrounding the Rochester Mine. Legal action was ongoing with a trial expected to begin in 2012. The disputed claims may have involved up to 20% of Rochester Mine reserves (Coeur d'Alene Mines Corp., 2011a, b; Kosich, 2011b).

Hecla Mining Co.'s Lucky Friday Mine, near Mullan, ID, was expected to close at the beginning of 2012 for removal of

built-up material in the Silver Shaft, which is the mine's main access shaft. The closure, which was expected to last for 1 year, was in response to an investigation by safety inspectors after an accident in November that killed two miners and a rock burst in December that injured seven (Hecla Mining Co., 2011a; 2012b). Silver production at Lucky Friday was 93 t in 2011, about 11% less than production in 2010. At yearend, proven and probable silver reserves at the Lucky Friday Mine were the highest in its 70-year history at 1,530 t. Silver production in 2011 at Hecla Mining's Greens Creek Mine on Admiralty Island near Juneau, AK, was 202 t, compared with 224 t in 2010. Lower silver ore grade and reduced ore volume as a result of sequencing of mine production according to the mine plan resulted in decreased silver production (Hecla Mining Co., 2012a, p. 7–8, 16).

Hecla initiated studies to evaluate reopening three closed mines that had operated in the past 25 years—the Star Valley Mine in the Silver Valley, ID; the San Juan Mine, specifically the Bulldog zone, in Creede, CO; and the Hugh zone at Hecla's San Sebastian project in Mexico. These mines were closed when silver was less than \$10 per troy ounce. Hecla also was working on a mine optimization study for its Lucky Friday Mine to determine mill expansion feasibility and was developing plans to rehabilitate the 29 Ramp at the Greens Creek Mine, which could increase silver production and extend the mine's life (Hecla Mining Co., 2011b).

Revett Minerals Inc. produced 40 t of silver from its Troy Mine in Montana, a 28% increase from that in 2010. The company also reported proven and probable reserves of 387 t of silver at yearend. In addition to the Troy Mine, Revett Minerals was developing the Rock Creek deposit in Montana. Because the property is beneath U.S. Forest Service land and in the Cabinet Mountains Wilderness Area, it required both Federal and State approvals before it could be developed. Revett expected to complete a supplementary environmental impact statement in 2012 (Revett Minerals Inc., 2012).

In July, Sunshine Silver Mines Corp., the new owners of the Sunshine Mine in northern Idaho, planned an initial public offering to raise money to reopen the mine. The mine was staked in the 1880s and produced silver until 2001. The mine briefly returned to production in 2008 before being closed by a Federal bankruptcy court in 2009 (Platts Metals Week, 2011).

In May, Ohio Precious Metals LLC, one of four major refiners of silver, was in the process of doubling its refining capacity in Jackson, OH, to meet increased demand. The refinery reportedly was unable to keep up with the inflow of silver scrap caused by the surge in silver prices. Despite increasing operations to 24 hours per day, 7 days per week, the refinery reportedly had a 6-month waiting list and was turning away customers (Tang, 2011).

Consumption

Fabrication demand for silver in the United States declined slightly compared with that of 2010 to 6,140 t. High silver prices and weak economic growth contributed to the decline (Silver Institute, The, 2012, p. 52).

Coin and Medal Fabrication.—Approximately 1,490 t of silver was used for coins and medals in the United States in 2011, a 15% increase from the 1,300 t of silver used in 2010

(Silver Institute, The, 2012, p. 23). The increase in coin sales in the United States resulted from increased investment in precious metals as a result of the sluggish economy and the choice of silver instead of gold as an investment because of gold's even higher price. The use of silver in circulating coins has been mostly phased out.

Industrial Applications.—Approximately 3,730 t of silver was used in the United States in 2011 for industrial applications, a 5% decrease from the 3,930 t of silver that was used for those applications in 2010 (Silver Institute, The, 2012, p. 54).

The principal components of industrial demand for silver were brazing alloys and solders, catalysts, electrical, electronic (including photovoltaics), and other applications. Adding silver to the process of soldering (joining metals at less than 600 °C) or brazing (joining metals at more than 600 °C) helps produce smooth, leak-tight and corrosion-resistant joints. Silver brazing alloys were used widely in a variety of applications including air conditioning and refrigeration and electric power distribution. They also were important in the automobile and aerospace industries.

As a catalyst, silver can be used in the form of mesh screens or crystals to produce ethylene oxide and formaldehyde, both of which are essential ingredients in plastics. Approximately 90% of the silver used as an industrial catalyst was for the production of ethylene oxide from ethylene.

One of silver's electric applications is in batteries. The most common silver oxide battery was the small button-cell battery used in calculators, cameras, hearing aids, toys, and watches, which contains about 35% silver by weight. Because of environmental and safety concerns, silver oxide batteries also were beginning to replace lithium-ion batteries in mobile phones and laptop computers. Silver-zinc batteries featured a water-based chemistry and contained no lithium or flammable liquids. Some larger silver-oxide and silver-zinc batteries were used in military applications. Silver also was used in conductors, contacts, fuses, switches, and timers.

Silver membrane switches were used in buttons on electronics such as computer keyboards, microwave ovens, telephones, televisions, and toys. Silver-based inks and films were applied to composite boards to create electrical pathways in printed circuit boards. Silver-based inks also were used in radio frequency identification (RFID) tags used in hundreds of millions of products to prevent theft and allow easy inventory control. Silver paste was used in 90% of all crystalline silicon photovoltaic cells, the most common type of solar cell; this has been a growth market in the United States for the past several years.

Dental amalgam, although in declining use because of its mercury content, may contain 34% to 38% silver (Lawrence, 1995). Owing to silver's antibacterial properties, silver also was used in such products as clothing, 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 2011, the U.S. consumption of silver for jewelry and silverware was 370 t, an 8% decrease

compared with the 401 t used in 2010. Although silver consumption for jewelry increased initially in 2010 when the gold price surged, as the price of silver increased during 2011, its use diminished with the introduction of alternative metals. For silverware, the 7% decrease in silver consumption marked the 16th year that this market has declined. Since 2004, consumption of silver in silverware has halved (Silver Institute, The, 2012, p. 68–69, 76).

Photography.—Silver was one of the essential materials used in the manufacture of films and photographic papers. 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. Domestic use of silver for photographic use declined by 11% to 556 t in 2011 from 628 t in 2010, which was less than the average annual decline of 18% since 2006. The slower decline resulted from a slow switch by motion picture theaters from film to digital format, although the use of silver film and paper in consumer applications declined more rapidly (Silver Institute, The, 2012, p. 64–65). Other broad photographic-use categories included commercial photography, dental and industrial x rays, graphic arts, and medical x rays.

Prices and Stocks

The Handy and Harman silver price began the year at \$30.98 per troy ounce, reached its high for the year of \$48.55 per troy ounce on April 29, and then declined to end 2011 at \$28.26 per troy ounce, near its low for the year. The average price for 2011 of \$35.26 per troy ounce was 75% higher than the 2010 average (table 1). Investment demand was cited as the principal reason for the dramatic silver price increase in early 2011. According to the CPM Group, silver investment demand was near record highs at 4,140 t in 2011, a 3% increase from the 2010 level. Annual investment demand has only exceeded 2011 levels on four other occasions between 1950 and 2010. Investor concerns regarding fiscal, monetary, and political issues in Europe and the United States as well as inflation concerns and slowing growth in developing countries kept investors interested in silver (CPM Group, 2012, p. 4–8).

Global silver inventories in various Exchange Traded Funds (ETF) including iShares Silver Trust, ETF Securities, and other ETFs decreased by 4%, to approximately 17,920 t at yearend 2011, compared with 18,670 t at yearend 2010 (Silver Institute, The, 2012, p. 21).

Foreign Trade

U.S. imports of bullion and dore increased by 18%, to 6,320 t in 2011. The principal import sources of bullion and dore were Mexico (44%), Canada (20%), and Poland (12%). Exports of silver bullion and dore increased by 17% to 732 t in 2011. Principal destinations were Mexico (40%), Japan (20%), and Canada (14%) (tables 4–7).

World Review

World mine production of silver was 23,300 t in 2011, a slight decrease from production in 2010 (table 8). Silver production in the top 10 producing countries decreased in 2011, with the

exception of China, with a 6% increase in production, and Chile with a slight increase.

According to the Silver Institute (2012, p. 8), world silver consumption decreased slightly to 27,300 t in 2011. Industrial applications, with 56% of the total, was the leading end use of silver followed by jewelry (18%), coins and medals (13%), photography (8%), and silverware (5%).

Argentina.—Total silver production was about 3% less than 2010 production despite increases at several of the country's leading mines. The principal reason for the overall decline was a decrease of 66% in silver production at Coeur d'Alene's Martha Mine in 2011, which was approximately 16 t compared with 49 t in 2010. The decrease was primarily because of a decrease in ore grade in 2011 (Coeur d'Alene Mines Corp., 2012, p. 31–33).

Silver Standard Resources Inc.'s Piriquitas Mine produced 219 t of silver during 2011, which was 12% more than production in 2010. Production increased even though the mine was shut down for more than 2 months while additional crushing capacity was installed (Silver Standard Resources Inc., 2012).

Hochschild Mining plc produced 183 t of silver equivalent at its 51%-owned San Jose mine, 10% more than production in 2010. The increase resulted from an increase in silver ore grade combined with a 5% increase in silver recovery (Hochschild Mining plc, 2012, p. 10–11).

Silver production at Pan American Silver Corp.'s Manantial Espejo Mine in Santa Cruz was 117 t in 2011, 5% less than 2010 production. The company also continued to develop its Navidad silver project in Chubut Province. In January, Pan American filed a National Instrument (NI) 43–101-compliant preliminary assessment and at yearend was working on the preparation of an environmental impact study. In 2003, Chubut Province passed legislation that prohibited open pit mining and the use of cyanide in mineral processing in the entire Province; the Navidad project may not be developed until changes are made to the law (Pan American Silver Corp., 2012a).

Australia.—Silver production in Australia was 7% less than that in 2010, mainly because silver production at BHP Billiton Ltd.'s Cannington Mine of 1,000 t was nearly 17% less than 2010 production. Heavy rainfall from cyclones led to flooding, which disrupted mining activities in the first quarter, and production was lower for the year because of lower average ore grades (BHP Billiton Ltd., 2011, p. 9; 2012, p. 8).

Production at Coeur d'Alene's Endeavor Mine in 2011 increased by 8% to 19 t of silver compared with production in 2010. The increase in silver production resulted from an increase in tonnage milled but was partially offset by a decrease in ore grade (Coeur d'Alene Mines Corp., 2012, p. 33–35).

Bolivia.—Silver production decreased by 4% to 1,214 t in 2011 from that in 2010 owing to production decreases at several operations, most notably a reduction of 20% at Sumitomo Corp.'s San Cristóbal Mine (Silver Institute, The, 2012, p. 28). Offsetting part of the decrease, the country's leading silver-producing mine, Coeur d'Alene's San Bartolomé Mine near Potosi, produced 233 t of silver in 2011, a 12% increase from 2010 production. In December, a new area in the deposit, known as Huacajchi Sur, was confirmed to be open for mining. Access to the Huacajchi deposit and its higher grade material

led to increased production and lower costs (Coeur d'Alene Mines Corp., 2012, p. 2, 6). Production at Pan American Silver's San Vicente Mine of 97 t in 2011 was a 3% increase from 2010 production (Pan American Silver Corp., 2012b).

Canada.—Alexco Resource Corp. began commercial operation on January 1, at its 100% owned Bellekeno silver-lead-zinc mine and mill complex in the Keno Hill Silver District, Yukon Territory. Commissioning of the Bellekeno flotation plant and underground mine was completed at the end of December with both the mine and mill operating at initial design throughput of 250 metric tons per day (t/d) of ore for 30 days. In 2011, Alexco produced 63 t of silver in 2011 from the Bellekeno Mine and was developing other mines in the district (Alexco Resource Corp., 2011; 2012).

Copper Mountain Mining Corp. started concentrate production at its Copper Mountain Mine in southern British Columbia on June 30. By yearend, the mine had produced 5 t of silver in addition to its principal product, copper. In 2012, silver production was expected to be 18 to 19 t (Copper Mountain Mining Corp., 2012).

Chile.—Silver production was about the same as that in 2010, although production at BHP Billiton's 57.5%-owned Escondida mine decreased by 30% to 119 t, mainly because of lower ore grade and a 2-week labor strike during July and August (BHP Billiton Ltd., 2012, p. 2; Reuters, 2012). Offsetting some of the decrease was the restart of Mandalay Resources Corp.'s Cerro Bayo Mine that had been purchased from Coeur d'Alene Mines in 2010. The Cerro Bayo Mine produced 41 t of silver in 2011 (Mandalay Resources Corp., 2012, p. 19).

China.—Silver production from China, the world's second ranked silver producer, increased by 6% to 3,700 t in 2011. Silver was produced mainly as a byproduct of copper or lead and zinc mining. Silvercorp Metals Inc., the leading silver producer in China, operated several silver-lead-zinc properties, projects, and mines in China and one property in northern British Columbia, Canada. Production from the company was 173 t, a 4% increase from production in 2010. The increase resulted from acquisition of the BYP and XBG Mines in Henan Province and greater mine and mill throughputs (Silvercorp Metals Inc., 2012a, p. 4; b, p. 14).

On June 18, the Hunan South Rare Precious Metals Exchange began trading in China's Hunan Province, with bismuth, indium, silver, and tellurium as the first products listed. Because of its silver reserves, the county of Yongxing, where the exchange was located, was known as the silver capital of China and accounted for approximately one-fourth of China's total annual silver production of 2,050 t (Kosich, 2011a).

Silver exports from China were expected to decline in 2012 as demand from domestic investors was expected to surge. According to a statement from China's Ministry of Commerce, the 2012 export quotas were reduced by 5%, which amounted to a decrease of 280 t from its 2011 export quota of 5,670 t (Seth, 2011).

Guatemala.—Silver production from Goldcorp Inc.'s Marlin Mine, the country's only silver-producing mine, increased by 40% from that in 2010 mainly because of a 26% increase in head grade. The company also began shifting to underground mining from open pit mining. The transition was expected to

be completed in 2012, and silver production at the mine was expected to decrease (Goldcorp Inc., 2012, p. 54–55).

India.—Hindustan Resources Inc. (a subsidiary of Vedanta Resources plc) commissioned a 350-metric-ton-per-year silver refinery in the fourth quarter and was ramping up production at its silver-rich Sindesar Khurd zinc mine. Silver production of 154 t for the last three quarters of 2011 was 19% higher than that of the comparable period in 2010 (Vedanta Resources plc, 2012).

Kazakhstan.—Kazakhmys plc's silver production of 408 t was 7% less than that of 2010. Reduced output from declining grades at the mature mines in the Zhezkazgan complex was partially offset by output from the reopened Akbastau mine in the Karaganda region. Silver production declined at the Artemyevsky mine, but by less than the company had projected, as the modernization of the backfill cement plant allowed access to higher silver grade sections of the ore body (Kazakhmys plc, 2012, p. 5).

Mexico.—In 2011, Mexico was the world's leading producer of silver, but silver production was about 6% lower than that in 2010 (table 8). Fresnillo plc's newest mine, Saucito Mine, began operating in the first half of 2011. The mine was adjacent to the company's Fresnillo Mine, the world's leading primary silver mine, near Zacatecas. Production at Saucito was 184 t of silver in 2011. The mine was projected to have an annual production capacity of 310 t of silver by 2014, and produce gold, lead, and zinc. In 2011, the Fresnillo Mine produced 942 t of silver, 16% less than production in 2010 mainly because of lower ore grades. Fresnillo's three additional mines in Mexico produced 61 t of silver. The company's proven and probable reserves were estimated to be 12,500 t of silver at yearend, most of which were at the Fresnillo Mine (Fresnillo plc, undated).

Coeur d'Alene's Palmarejo Mine completed its second full year of production in 2011 with silver production of 281 t. The company spent \$13 million on exploration at the Palmarejo District in 2011 to discover new silver and gold mineralization and define additional ore reserves. Palmarejo's proven and probable silver reserves were 1,770 t at yearend (Coeur d'Alene Mines Corp., 2012, p. 5). Pan American Silver operated the Alamo Dorado open pit and La Colorada underground mines, with a combined production of 298 t of silver in 2011. Projected production in 2012 was 285 to 300 t (Pan American Silver Corp. 2012c, p. 13–18).

Goldcorp Inc. produced 592 t of silver at its Peñasquito Mine in its first full year of operation, a 37% increase from production in 2010 (Goldcorp Inc., 2012, p. 49).

In its first full year of operation, Gold Resource Corp.'s El Aguila project in Oaxaca produced 68 t of silver. The company was implementing improvements to its mill, including the installation of additional cleaner cells in the flotation circuit and the installation of a third filter press. Mill optimization continued as Gold Resource ramped up daily ore production to an average of 900 t/d for 2012 (Gold Resource Corp., 2012).

In July, SilverCrest Mines Inc. achieved commercial production at its 100%-owned Santa Elena Mine in Sonora. The first full year of production was expected to be 2012 during which the mine was expected to produce 15 t of silver. By 2016, the company expected to increase silver production to an

estimated 23 to 34 metric tons per year (SilverCrest Mines Inc., 2011).

Peru.—Peru was the world's third ranked silver producer in 2011, and production was about 6% less than 2010 production. Three of the country's mines, in order of decreasing production, Cia. de Minas Buenaventura S.A.A.'s Uchucchacua, Hochschild's Pallancanta, and Hochschild's Arcata, were among the 15 leading silver mines in the world (Silver Institute, The, 2012, p. 99). Silver production at the Uchucchacua Mine was 314 t in 2011, and production at an additional 11 mines, which were owned or partially owned by Buenaventura, was 311 t. Buenaventura's total silver production was about the same as that in 2010, but production at Uchucchacua increased by about 9% owing in part to increased mill throughput. The company began producing silver and gold at its Tantauhatay Mine (40% ownership) in August (Cia. de Minas Buenaventura S.A.A., 2012).

Production at Hochschild's Arcata Mine of 189 t was 25% less than production in 2010. Because of the high price of silver, the company processed waste material and narrow veins with low silver grade. Production at the company's Pallancanta Mine also was lower in 2011 because of processing lower grade ore; production was 273 t, 13% lower than that in 2010 (Hochschild Mining plc, 2012, p. 7–10).

Pan American Silver operated three underground mines in Peru—Huaron, Morococha (92% ownership), and Quiruvilca, with total production of 171 t of silver in 2011. In 2012, Pan American planned to stop production at the Quiruvilca Mine in the first quarter of 2012 and attempt to sell the mine (Pan American Silver Corp., 2012c, p. 13–18).

Russia.—Silver production at Polymetal International plc's mines in Russia increased in 2011 from that in 2010. Production at the company's Dukat mining complex, was 529 t, 17% more than that produced in 2010 as a result of increased ore mining, although the silver grade declined. At the company's Khakanja Mine, production of 81 t was slightly more than that in 2010 (Polymetal International plc, 2012, p. 26–45).

Outlook

According to the Silver Institute (2012, p. 31), world production of silver is expected to increase in 2012 as producers were investing additional revenue generated by high silver and gold prices in 2011 into exploration and development. Production in Canada and Mexico was projected to have the most substantial increase as newly developed mines in these countries ramp up to their full capacities. Production in Australia and Turkey also was expected to increase.

The use of silver in photographic applications continued to decrease; much of the remaining use was for medical x-ray film. As hospitals convert their x rays to digital systems, silver use in photography is expected to continue to decline until it remains only in niche applications such as artistic photography.

New uses for silver include those that use its biocidal or conductive properties. Antimicrobial silver technology is expected to be used in cooking utensils, food packaging, medical products, textiles, toiletries, and water purification devices. Within the past several years, 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 RFIDs for tracking stocks and shipments, including silver-base high-data-capacity tags, readers, and computer systems, was expected to increase. Although already used in many products, demand for silver-oxide batteries may increase with the proliferation of laptop and tablet computers and cellular telephones with advanced computing capabilities.

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TABLE 1
SALIENT SILVER STATISTICS¹

		2007	2008	2009	2010	2011
United States:						
Mine production:						
Quantity	metric tons	1,280	1,250	1,250	1,280	1,120
Value	thousands	\$554,000	\$600,000	\$588,000	\$829,000	\$1,270,000
Refinery production:						
Domestic and foreign ores and concentrates	metric tons	791	779	796	819	790
Scrap (old and new)	do.	1,130	1,210	1,340	1,330 ^r	1,710
Exports:						
Ore and concentrate	do.	16	130	122	82	172
Bullion and dore	do.	711	507	297	627	732
Waste and scrap	do.	238	2,570	2,480	3,760	4,450
Imports for consumption:						
Ore and concentrate	kilograms	381	32	87	3,230	84,200
Bullion and dore	metric tons	4,760	4,430	3,450	5,370	6,320
Waste and scrap	do.	3,420	5,190	4,760	6,510 ^r	8,820
Stocks, December 31:						
Industry	do.	70 ^r	153 ^r	150 ^r	123 ^r	150
Futures exchanges	do.	4,120	3,970 ^r	3,500 ^r	3,250 ^r	3,650
U.S. Department of the Treasury	do.	220	220	220	220	220
Price, average ²	dollars per troy ounce	13.41	15.00	14.69	20.20	35.26
Employment, mine and mill workers ³		770 ^r	770 ^r	740 ^r	760 ^r	950
World, mine production	metric tons	20,800	21,400	22,200 ^r	23,800 ^r	23,300 ^c

^cEstimated. ^rRevised. do. Ditto.

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

²Price data are the annual Handy & Harman quotations published in Platts Metals Week.

³Employment data are from the U.S. Department of Labor, Mine Safety and Health Administration, for mines classified as silver mines.

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

(Kilograms)

State	2009	2010	2011
Nevada	203,000	224,000	209,000
Other ²	1,040,000	1,050,000	913,000
Total	1,250,000	1,280,000	1,120,000

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 2011, 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. ²	Copper-molybdenum ore.
4	Lucky Friday	Shoshone, ID	Hecla Mining Co.	Silver ore.
5	Galena	do.	U.S. Silver Corp.	Do.
6	Midas	Elko, NV	Newmont Mining Corp.	Gold ore.
7	Rochester	Pershing, NV	Coeur d'Alene Mines Corp.	Silver ore.
8	Mission Complex	Pima, AZ	ASARCO LLC ³	Copper ore.
9	Troy	Lincoln, MT	Revet Minerals Inc.	Copper-silver ore.
10	Phoenix	Lander, NV	Newmont Mining Corp.	Gold-copper ore.
11	Hycroft	Humboldt and Pershing, NV	Allied Nevada Gold Corp.	Do.
12	Bagdad	Yavapai, AZ	Freeport-McMoRan Copper & Gold Inc.	Copper-molybdenum ore.
13	Mineral Park	Mohave, AZ	Mercator Minerals Ltd.	Do.
14	Continental Pit	Silver Bow, MT	Montana Resources	Do.
15	Hollister	Elko, NV	Great Basin Gold Ltd.	Gold ore.
16	Denton-Rawhide	Mineral, NV	Rawhide Acquisition Holdings	Do.
17	Carlin Mines Operations ⁴	Elko, Eureka, Humboldt, Lander, NV	Newmont Mining Corp.	Do.
18	Morenci	Greenlee, AZ	Freeport-McMoRan Copper & Gold Inc.	Copper-molybdenum ore.
19	Smoky Valley Common Operation	Nye, NV	Kinross Gold Corp.	Gold ore.
20	Wharf	Lawrence, SD	Wharf Resources (USA) Inc. ⁵	Do.
21	Ray	Pinal, AZ	ASARCO LLC ³	Copper ore.
22	Goldstrike ⁶	Eureka, NV	Barrick Gold Corp.	Gold ore.
23	Cresson	Teller, CO	AngloGold Ashanti Ltd.	Do.
24	Florida Canyon	Pershing, NV	Jipangu Inc.	Do.
25	Fletcher	Reynolds, MO	Doe Run Resources Corp.	Lead ore.

Do., do. Ditto.

¹The mines on this list accounted for more than 99% of U.S. mine production in 2011.

²Wholly owned subsidiary of Rio Tinto plc.

³Wholly owned subsidiary of Grupo México, S.A.B. de C.V.

⁴Includes Carlin East, Deep Post, Gold Quarry, Lone Tree, Mule Canyon, Pete, Rain/Emigrant, and Twin Creeks Mines.

⁵Wholly owned subsidiary of Goldcorp Inc.

⁶Includes Storm Mine.

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

Year and country	Silver ores and concentrates			Bullion			Dore			Total		
	Silver content (kilograms)	Value (thousands)		Silver content (kilograms)	Value (thousands)		Silver content (kilograms)	Value (thousands)		Silver content (kilograms)	Value (thousands)	
2010	82,100	\$47,700		523,000	\$326,000		104,000	\$45,900		709,000	\$420,000	
2011:												
Argentina	--	--		2,660	2,480		1,300	1,300		3,970	3,780	
Australia	41	29		20,700	22,300		26	23		20,800	22,300	
Austria	--	--		1,420	1,730		1,190	1,170		2,610	2,900	
Belgium	599	121		5,590	2,410		--	--		6,190	2,530	
Canada	3	4		98,400	102,000		795	243		99,200	102,000	
China	16,400	9,510		50	59		4	3		16,500	9,570	
Dominican Republic	1,420	277		--	--		--	--		1,420	277	
Germany	3,870	3,550		6,030	7,240		2,180	1,310		12,100	12,100	
Hong Kong	9	8		8,830	8,820		--	--		8,840	8,830	
Indonesia	18	3		10,300	9,460		--	--		10,300	9,460	
Italy	--	--		237	190		86	43		323	233	
Japan	7,450	8,690		148,000	171,000		17	15		156,000	180,000	
Korea, Republic of	129,000	68,900		--	--		--	--		129,000	68,900	
Malaysia	343	103		563	605		326	266		1,230	974	
Mexico	8	6		288,000	307,000		6,270	22,500		294,000	330,000	
New Zealand	115	23		254	259		6,050	5,160		6,420	5,440	
Norway	62	20		62	75		1,620	1,590		1,740	1,680	
Pakistan	--	--		1,460	1,340		--	--		1,460	1,340	
Philippines	12,000	2,590		--	--		--	--		12,000	2,590	
Poland	--	--		--	--		--	--		--	--	
Singapore	112	31		9,700	9,700		1,750	1,700		1,750	1,700	
Switzerland	3	3		823	1,330		7,830	7,430		17,600	17,200	
Taiwan	239	47		711	681		38,600	41,500		39,500	42,800	
Turkey	--	--		65	76		187	150		252	226	
United Arab Emirates	--	--		1,100	977		1,570	1,470		2,670	2,440	
United Kingdom	26	5		19,500	22,000		36,900	46,400		56,400	68,400	
Other	411	231		955	901		357	319		1,720	1,450	
Total	172,000	94,200		625,000	673,000		107,000	133,000		904,000	900,000	

-- 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)
2010	87,300	\$49,800	1,280,000	\$874,000	53,500	\$4,540	617,000	\$353,000	3,760,000	\$5,990,000
2011:										
Australia	46	22	1,110	1,360	502	123	3,560	2,250	--	--
Belgium	--	--	3,930	4,490	117	12	10,100	3,030	792,000	227,000
Brazil	--	--	3,720	3,680	--	--	73	46	11	55
Canada	113,000	119,000	38,100	15,100	34,500	2,970	814,000	676,000	223,000	401,000
China	6,040	2,910	156,000	138,000	762	178	8,980	4,890	26,400	49,500
Costa Rica	2,320	2,300	--	--	4,390	964	706	407	--	--
Czech Republic	--	--	88	48	55	6	1,640	924	1,050	1,160
France	1,800	796	69,200	77,400	--	--	7,650	4,550	--	--
Germany	6,150	3,320	104,000	125,000	283	65	10,400	6,750	1,440,000	567,000
Guatemala	1,090	1,300	--	--	--	--	5	4	--	--
Hong Kong	10,000	5,230	163,000	197,000	294	72	20,600	15,100	812	2,990
India	16,400	8,090	3	3	172	23	7,510	4,900	888	785
Indonesia	954	623	--	--	80	18	140	107	--	--
Israel	222	75	711	73	46	10	2,720	1,450	--	--
Italy	95	105	2,500	2,180	36	3	1,420	838	1,250,000	694,000
Japan	208	126	114,000	129,000	--	--	3,990	2,010	208,000	174,000
Korea, Republic of	2,880	1,680	49,800	52,600	141	21	466	244	52,100	14,000
Malaysia	77	89	2,210	2,200	241	43	3,550	1,910	--	--
Mexico	6,540	3,620	5,270	4,650	8,240	1,890	91,000	50,600	8,280	22,100
Netherlands	384	95	24,800	29,100	--	--	62	35	37	275
Peru	--	--	45	51	1,200	46	754	507	--	--
Philippines	248	114	--	--	103	38	1,180	588	--	--
Russia	697	105	27	41	--	--	--	--	--	--
Saudi Arabia	35	12	--	--	--	--	4,260	2,130	4	19
Singapore	171	52	29,200	21,700	43	29	8,940	4,630	17	92
South Africa	15	20	--	--	49	18	21	10	107,000	28,700
Spain	--	--	41	39	--	--	52,900	8,130	--	--
Sweden	--	--	2	3	90	23	4,380	2,770	149,000	94,000
Switzerland	96	77	42	40	1,250	314	1,610	946	50,500	962,000
Taiwan	232	93	209,000	264,000	66	13	3,320	1,740	--	--
Thailand	3,520	1,860	3,380	3,470	606	27	2,440	1,390	--	--
United Arab Emirates	715	322	--	--	--	--	2,020	1,060	2,380	58,400
United Kingdom	17,300	15,800	95,900	50,600	372	55	3,560	2,910	140,000	141,000
Venezuela	--	--	--	--	331	63	206	103	--	--
Other	1,910	1,200	942	1,940	440	106	7,720	4,390	116	709
Total	193,000	169,000	1,080,000	1,120,000	54,400	7,130	1,080,000	807,000	4,450,000	3,440,000

-- 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.

Source: U.S. Census Bureau.

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)	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousands)	Silver content (kilograms)	Value (thousands)
2010	3,230	\$1,750	316	\$77	4,630,000	\$2,890,000	738,000	\$708,000	5,370,000	\$3,600,000
2011:										
Argentina	--	--	--	--	--	--	81,700	137,000	81,700	137,000
Belgium	--	--	--	--	83,700	89,700	864	190	84,600	89,800
Bolivia	--	--	--	--	--	--	99,700	113,000	99,700	113,000
Canada	84,200	31,900	--	--	1,260,000	1,320,000	515	532	1,340,000	1,350,000
Chile	--	--	--	--	97,100	105,000	19,800	30,900	117,000	136,000
China	--	--	--	--	5,150	5,390	--	--	5,150	5,390
Colombia	--	--	--	--	1,050	1,090	10,400	12,100	11,400	13,200
Costa Rica	--	--	--	--	--	--	2,550	722	2,550	722
Dominican Republic	--	--	--	--	--	--	584	585	697	705
Germany	--	--	--	--	113	120	18	17	267,000	283,000
Guatemala	--	--	--	--	--	--	87,100	95,500	87,100	95,500
Hong Kong	--	--	--	--	39,300	42,400	--	--	39,300	42,400
India	--	--	--	--	74	71	945	536	1,020	607
Italy	--	--	--	--	121,000	141,000	2,220	1,460	123,000	142,000
Japan	--	--	--	--	29,000	31,200	--	--	29,000	31,200
Kazakhstan	--	--	--	--	60,100	76,600	--	--	60,100	76,600
Korea, Republic of	--	--	--	--	207,000	196,000	--	--	207,000	196,000
Malaysia	--	--	114	27	--	--	--	--	114	27
Mexico	--	--	--	--	2,100,000	2,370,000	661,000	1,020,000	2,760,000	3,390,000
Morocco	--	--	--	--	27,200	30,300	--	--	27,200	30,300
Panama	--	--	--	--	1,030	1,100	767	891	1,800	1,990
Peru	--	--	--	--	29,600	34,800	79,000	98,000	109,000	133,000
Poland	--	--	--	--	780,000	783,000	--	--	780,000	783,000
Russia	--	--	--	--	119,000	114,000	--	--	119,000	114,000
Saudi Arabia	--	--	--	--	3,220	3,030	--	--	3,220	3,030
Switzerland	--	--	--	--	258	260	22,000	26,800	22,300	27,000
Taiwan	--	--	--	--	3,620	3,890	--	--	3,620	3,890
United Kingdom	--	--	--	--	20,500	20,800	31	37	20,500	20,900
Other	--	--	--	--	226	273	800	654	1,030	927
Total	84,200	31,900	114	27	5,250,000	5,660,000	1,070,000	1,530,000	6,410,000	7,220,000

-- Zero.

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

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)
2010	316,000	\$142,000	788,000	\$170,000	1,430	\$390	638,000	\$354,000	6,510,000 ³	\$436,000 ³
2011:										
Argentina	--	--	--	--	--	--	2,510	2,480	1	43
Australia	3	3	211	13	--	--	983	1,150	68,200	25,400
Brazil	--	--	--	--	--	--	--	--	782,000	3,800
Canada	173,000	59,800	46,400	2,890	--	--	447,000	504,000	2,640,000	183,000
China	12	2	71,000	4,760	--	--	--	--	847,000	8,980
Colombia	--	--	--	--	--	--	7,580	8,530	107,000	1,640
Costa Rica	161	153	25	4	--	--	13	15	146,000	5,530
Czech Republic	52	56	--	--	--	--	--	--	2,080	142
Dominican Republic	3,010	2,620	1,130	289	--	--	32	31	44,500	17,900
France	5	6	33,500	2,430	--	--	--	--	348	1,860
Germany	180	99	13,000	12,900	432	65	169	238	780,000	138,000
Honduras	65	76	22	20	--	--	134	157	19,500	5,580
India	2	2	218	252	--	--	103	124	2,780	917
Italy	106	163	5,010	6,610	--	--	256	251	79,300	14,600
Jamaica	108	36	--	--	--	--	59	56	1,150	7,540
Japan	4	5	164,000	182,000	9	5	--	--	6	377
Kazakhstan	--	--	--	--	--	--	7,760	8,780	--	--
Korea, Republic of	--	--	285	234	--	--	--	--	410	417
Lebanon	--	--	--	--	--	--	25	34	2,690	54
Malaysia	--	--	2,100	169	--	--	--	--	681,000	6,360
Mexico	39,700	44,300	5,250	164	--	--	195,000	235,000	1,210,000	28,400
Netherlands	298	298	171	16	80	20	4	7	7,670	197
Panama	270	287	--	--	--	--	113	183	2,080	759
Peru	--	--	--	--	8	5	2,610	2,750	3,320	23
Singapore	--	--	--	--	--	--	--	--	109,000	17,400
South Africa	--	--	2	10	--	--	--	--	39,100	1,390
Taiwan	--	--	133	26	--	--	21	2	153,000	6,230
Turkey	27	32	--	--	--	--	8	9	82,600	945
United Arab Emirates	--	--	--	--	--	--	2,720	2,840	(³)	5
United Kingdom	--	--	1,880	462	1,340	632	20,500	27,800	658,000	18,700
Venezuela	--	--	--	--	--	--	--	--	7,560	88
Other	39	45	(³)	10	--	--	1,430	1,510	353,000	22,500
Total	217,000	108,000	344,000	214,000	1,870	727	690,000	796,000	8,820,000	519,000

¹Revised. -- Zero.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Containing 99.5% or more by weight of silver.

⁴Less than ½ unit.

Source: U.S. Census Bureau.

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

(Metric tons)

Country	2007	2008	2009	2010	2011 ^c
Algeria	(3)	(3)	(3)	(3)	(3)
Argentina	256	356	533 ^r	723 ^r	700
Armenia	37	40	53	68	75
Australia	1,879	1,926	1,635	1,864	1,725 ⁴
Bolivia	525	1,114	1,326	1,259	1,214 ⁴
Brazil ⁵	36	36	35	37 ^r	37 ^{p,4}
Bulgaria ^c	55	55	55	55	55
Burma	(3)	--	(3)	--	--
Canada	860	728	631	596	572 ⁴
Chile	1,936 ^r	1,405	1,301	1,287 ^r	1,291 ⁴
China ^c	2,700	2,800	2,900	3,500	3,700
Colombia	10	9	11	15	24 ⁴
Congo (Kinshasa)	76	34	--	6 ^r	10 ⁴
Ecuador ^c	(3) ⁴	(3) ⁴	(3)	(3)	(3)
Ethiopia	1	3	1	2 ^c	2
Finland ^c	50	70 ⁴	70	70	70
France ^c	1	1	1	--	--
Ghana	3	3	4	4 ^c	4
Greece ^c	26 ⁴	28 ⁴	30	30	30
Guatemala	88	100	128	195 ^r	273 ⁴
Honduras	54	60	49	48 ^c	48
India	82	96	95	92	94 ⁴
Indonesia	269	226	359 ^r	272 ^r	275 ⁴
Iran ^c	20	15	15	15 ^r	15
Ireland ^c	4	4	4	4	4
Italy ^{c,6}	(3)	(3)	(3)	(3)	(3)
Japan	5	2	2	1	4 ⁴
Kazakhstan	723	646	618	551	645 ⁴
Korea, North ^c	20	20	20	20	20
Korea, Republic of	1	1	NA ^r	NA ^r	NA
Malaysia	(3)	(3)	(3)	(3)	(3) ⁴
Mexico	3,135	3,236	3,554	4,411	4,150 ⁴
Mongolia	20	20	20	29 ^r	30
Morocco ^c	195	190	195	195	190
Namibia ^c	30	30	30	30	30
New Zealand	11	18	14	16 ^r	16
Nicaragua	3	4	4	7 ^r	7
Oman	(3)	(3)	(3)	(3)	(3)
Papua New Guinea	49	48	55	50 ^c	50
Peru	3,494	3,686	3,854	3,640	3,414 ⁴
Philippines	28	14	34 ^r	41	42
Poland	1,199	1,161	1,207	1,181	1,167 ⁴
Portugal	24	29	22	24 ^r	24 ^{p,4}
Romania ^c	18	18	18	18	18
Russia	911	1,132	1,313	1,356 ^r	1,350
Saudi Arabia	9	8	9 ^r	8 ^r	8 ⁴
Serbia ^c	2 ^r	2 ^r	3 ^r	5 ^{r,4}	5
South Africa	70	75	78	79	84
Spain	3	3	4	4 ^c	4
Sudan	2	--	(3)	1	4
Sweden ^c	270 ⁴	265 ⁴	265	270	270
Tajikistan ^c	3	3	3	3	3
Tanzania	12	10	8	12 ^r	13
Turkey	198	294	352	350 ^c	350
United States	1,280	1,250	1,250	1,280	1,120 ⁴

See footnotes at end of table.

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

(Metric tons)

Country	2007	2008	2009	2010	2011 ^e
Uzbekistan	78	75	53	59	65
Zimbabwe ^e	(3) ^r	(3) ^r	(3) ^r	(3) ^r	(3)
Total	20,800	21,400	22,200 ^r	23,800 ^r	23,300

^eEstimated. ^pPreliminary. ^rRevised. NA Not available. -- 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, 2012.

³Less than ½ unit.

⁴Reported figure.

⁵Includes the following quantities, in kilograms, identified as secondary silver: 2007—32,000; 2008–09—32,500; 2010—32,500 (estimated); and 2011—32,500 (estimated).

⁶Includes production from imported ores.