THE SILVERINSTITUTE

December 2014

Silver News

Silver Consumption Expected to Grow Supported by New Industrial Applications

"From watch batteries to massive solar energy systems, the special properties of silver are often indispensable in industrial applications, including silver coated bearings, catalysts, medical care and many products in our daily lives."

Silver consumption in industrial sectors is expected to rally from 2014 on the back of a continued recovery in the global economy. In addition, along with technology innovation, new applications of silver will continue to emerge, supported by lower silver prices, according to a report titled *Glistening Particles of Industrial Silver*, prepared for the Silver Institute by CRU Consulting.

Total silver industrial demand is forecast to grow 27 percent, adding an additional 142 million ounces of silver demand through 2018 compared with 2013 levels. Half of this growth will be accounted for by the electrical and electronics sector, but additional demand will be due to growth in other industrial applications, the report noted.

"From watch batteries to massive solar energy systems, the special properties of silver are often indispensable in industrial applications, including silver-coated bearings, catalysts, medical care and many products in our daily lives. Along with technological improvements, more and more applications of silver have been invented and, more importantly, commercialized, such as nanosilver, solar cells and printed inks," the report stated.

London-based CRU Consulting looked at silver demand in four sectors: batteries, ethylene oxide (EO), anti-bacterial uses and bearings.

In the battery sector, the report noted that silver-containing batteries are an established silver application but that new technologies for commercial, military and consumer sectors have expanded their use. CRU expects silver consumption in batteries to reach 36 million ounces in 2018, up 13 percent from 2013.

Silver catalysts help ethylene and oxygen combine to produce ethylene oxide, a widely-used chemical in textiles, anti-freeze and even cosmetics.
CRU expects global capacity to grow along with demand for EO. They forecast a market of 63 million ounces by 2018, a 21 percent rise from 2013 levels.

Although only small amounts of silver are used in antibacterial applications, the potential volume should not be underestimated, CRU analysts note. "The market has expanded from North America and Europe to many developing economies, such as China and other Asian Pacific countries, mainly driven by improving affluence and attention to health. This supports a bullish outlook for silver demand in this application in the long run, reaching 12 million ounces by the end of forecast period versus 9 million ounces in 2013," the report states.

continued on page 2

continued from page 1

Silver has been used in jet engine and heavy equipment bearings for a long time and these sectors are expected to grow. With rising automobile production and a resurgent construction industry, demand for silver coated bearings is expected to grow in parallel with these markets in the short to medium term. “CRU estimates this sector to consume between 2 and 3 million ounces by 2018,” the report notes.

The report also looked at additional sectors including photovoltaics (PV), automotive, brazing alloys/solder and silver inks.

The report is available at *Glistening Particles of Industrial Silver*.

Table E1: Silver consumption in other industrial sectors, 2013 and 2018F, Moz

	Consumption 2013	Consumption 2018F	CAGR 2013-2018	Thrifting risk	Technology reliance	Opportunity
Batteries	32	36	2.7%	M	H	M
EO	52	63	3.9%	M	M	H
PV	88	109	4.4%	H	H	H
Automotives	56	71	4.9%	L	M	H
Brazing & Alloys	70	88	4.7%	L	M	M
Bearings	2	3	8.4%	L	M	L
Printed silver inks	2	4	14.9%	L	M	L
Others (medical, water purification)	9	12	5.9%	L	L	L
Total	310	386	4.5%	_	_	_

Data: The Silver Institute, CRU Consulting
Notes: H-High, M-Moderate, L-Low
Notes: 2013 consumption data based on the Silver Institute data

New 3D Printing Products Target Jewelry Makers

3D Systems has expanded their suite of printing products to include an advanced material called FTX Silver Cast, a wax/resin combination developed especially for casting silver with 3D printers, according to company officials.

The new material comes in Cast, Gold, Silver, Gray and Clear, adding increased functionality to the company’s ProJet 1200 suite, and offering a wide range of intricate yet precise casting options to jewelry designers.

Officials of the Rock Hill, South Carolina, company say that jewelers can integrate FTX Cast, which casts much like traditional wax, into existing workflows with the added benefits of 3D printed parts, and can create samples and presentation models with FTX Silver and FTX Gold. “Now a jeweler, for instance, can design a ring, prototype it in FTX Gray [a high-contrast gray material perfect for accentuating fine features], print a customer sample ring in FTX Gold and FTX Silver, and create a final casting pattern in FTX Cast -- all from the same machine,” said Buddy Byrum, Vice President of Product and Channel Management, in a prepared statement.

Click on the image to see the 3D printers in action.

‘Nanojewelry’ Relies on Special Color Properties of Silver Nanoparticles

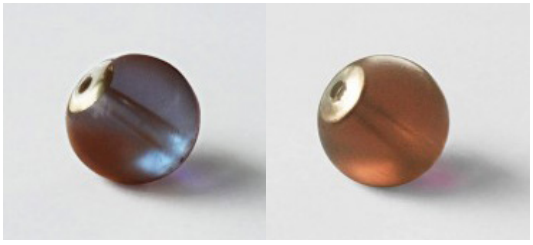
An object gets its color according to the hues of the spectrum it absorbs. A banana absorbs yellow. Even if the banana is split or broken apart, the same colors are absorbed and the yellow color stays the name.

Not so for silver nanoparticles. If a silver nanoparticle is broken apart, we experience a new and random color.

According to Sofie Boons and Jodie Melbourne, researchers at Imperial College London, the optical appearance of the created pieces is determined by the properties of the nanoparticles contained inside, including their quantity, shape, substance, size and degree of dispersion.

The researchers have spent over a year developing resins that contain nanogold and nanosilver particles and have experimented with different quantities and sizes of these particles. Their work has resulted in a range of differently-colored beads with unique optical properties. For example, when light shines through a bead it will have one color but its shadow will have another color. The color will change based on the bead’s surroundings and the angles of light that hit the beads.

Because each bead is different, the team has developed a hallmark that is stamped on a piece of metal contained in each bead. The marking notes the size, shape and quantity of the particles inside. Every bead also comes with its own certificate detailing the material and certifying its authenticity.



SOFIE BOONS

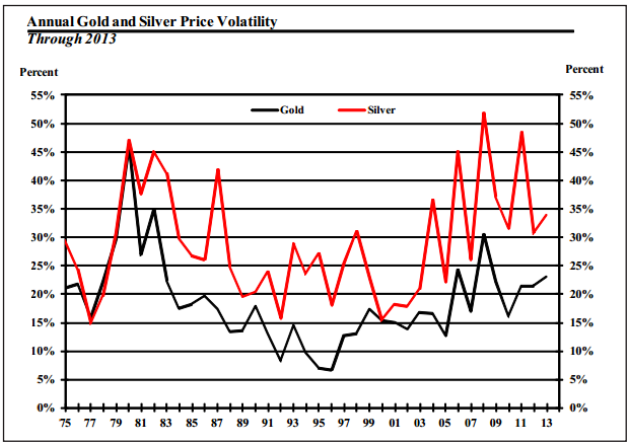
Colors in these beads were produced by the breaking up of silver and gold nanoparticles. The colors are unique to these particular beads.

Total Silver Investment Increase By One Billion Ounces Possible Over the Next Decade

Investors are likely to increase their net silver purchases in the years ahead, mainly due to the global economy, capital preservation and silver's application as a leading industrial metal, according to a report released by the Silver Institute on October 22. The report, *Silver Investment Demand*, suggests that investors may accumulate as much as one billion additional ounces of silver in various investment instruments over the next decade. This is in addition to more than 860 million ounces of silver purchased as an investment since 2006.

Other highlights of the report:

- Investment demand remains the single most important driver of prices in the silver market;
- The silver market is the second largest of the precious metals markets, behind only gold in terms of the value of metal flowing through the market on an annual basis;
- The dollar value of the silver market, which includes trading volumes on major futures and options exchanges and clearing volumes of the London over-the-counter market, combined with newly refined silver supply, was US$5.1 billion in 2013;
- At the end of 2013, at least 2.3 billion ounces of silver were held in bars and coins around the world;
- With silver producer mining costs declining, there are strong reasons to expect mining company equities to rise in the near term. In the long term, investors are likely to benefit from buying silver mining equities; and
- The silver market, when compared to the gold market, is a much more volatile market and investors are able to receive a much bigger response in the price of silver than that of gold.



SILVER INVESTMENT DEMAND]

Because the silver market is much smaller and less liquid than that of gold, silver prices are likely to rise and fall more in percentage terms than are gold prices. This means that, in the dollar terms, investors are able to receive a much bigger response in the prices of silver than those of gold for their invested capital.

The report was produced by the CPM Group, a New York-based metals consultancy. It looked at the components making up silver investment demand, including bullion & coins, futures and options, exchange traded products and silver mining equities. It also examined other important areas of the investment complex and contains an outlook for silver investment demand.

Click for a free copy of the Silver Investment Demand Report.

Electrical Maker Switches to Antimicrobial Silver

Switches and wallplates from Leviton Manufacturing, Co. now offer silver treatment to protect against harmful bacteria.

The Melville, New York, maker of electrical equipment is responding to consumer interest in antibacterial surfaces for everyday fixtures such as light switches that eliminate germs that can be easily transferred to those who frequently touch them. This is especially true in hospitals, offices and healthcare facilities, as well as in public areas such as restrooms.

"Leviton's devices are intended to help keep frequently touched surfaces of switches, wallplates and other electrical wiring devices clean of bacteria and microbes," notes Michael Mattei, Vice President and General Manager of Leviton Commercial & Industrial. "As a result, we have developed a line of antimicrobial treated wiring devices that inhibit the growth of bacteria, mold, fungi and mildew, helping to keep switches and wallplates cleaner and safer from cross contamination."

Antimicrobial-treated devices from Leviton are made with materials that include a U.S. Environmental Protection Agency registered additive to protect the devices against the growth of harmful bacteria on their surfaces. Silver ions in the materials act as the antimicrobial agent by inhibiting cell division and preventing bacteria from reproducing. These materials have been tested to the internationally recognized JIS Z 2801:2000 industrial standard test protocol for measuring antimicrobial efficacy and have proven to show a consistent 99.9 percent microbial reduction rate against a broad range of bacteria including E-coli and MRSA, Mattei says.

The current offering of antimicrobial-treated devices includes a 20-ampere toggle switch available in single-pole and three-way functionalities and stainless steel wallplates available in single and double-gang configurations. The company plans to release Decora versions of the switch and wallplate in the coming months as well as additional color options of all antimicrobial-treated devices.

LEVITON

Antimicrobial treated wallplates from Leviton are protected with a polyurethane powder coating that is embedded with a silver ion additive. The powder coating resists fingerprints, scuffing and endures common cleaning agents.

Investors Hold Silver as Mine Production Hits Record High in 2014

Even with major equity indices in the United States near all-time highs, and expectations for higher interest rates during 2015, exchange traded fund (ETF) holdings of silver have remained remarkably robust, according to Andrew Leyland, Manager, Precious Metals Demand at Thomson Reuters. He presented his comments and report on provisional supply and demand forecasts for 2014 at the Annual Silver Industry Dinner in November in New York City, hosted by the Silver Institute.

ETF holdings stood at 650 million ounces by end-November, a year-to-date increase of 3.2 percent. This is in sharp comparison to gold ETF holdings, which have dropped 7.7 percent during the same period.

Other findings:

- Open interest in silver on the COMEX exchange has seen record levels, remaining a popular instrument for institutional investors.
- Demand for silver bars and coins has soared in recent weeks as bargain-hunting retail investors returned to the silver market after a disappointing first half of the year. In India, imports of silver are up by 14 percent year-on-year for the January to October period and set for an annual record.
- On the supply side, mine production is forecast to reach highs in the silver industry in 2014 as supply from Guatemala, Mexico, Chile and Peru increases. Primary supply is expected to increase by 3.5 percent in 2014 to 868 million ounces.
- Total physical demand for silver is forecast to be 6.7 percent lower in 2014 after a weak first half for many sectors. In Europe, a harmonization of sales tax rates in January saw silver become significantly more expensive for retail investors and led to lower sales until the recent price declines.

A free copy of the *2014 Interim Report* is available here.

Fernando Alanis, President and CEO of Peñoles and current President of the Silver Institute, speaking at the Silver Institute's Annual Industry Dinner on November 18, 2014.

Antibacterial Coating Debuts from Kansai

Kansai Paint Co., Ltd., Osaka, Japan, has introduced a new line of coatings that use silver to kill germs, according to company officials. The paints, marketed as *ActiveSilver Technology*, are for home and professional use and are especially suited to kitchens, bathrooms, children's rooms and hospitals. They use binder technology with silver ions suspended in the actual paint film to ensure quick acting, the company said.

"Kansai's legacy spans over 100 years of trust, quality and innovation," said Syed Ameer Hamza Hasan, CEO, Kansai Paint Middle East. The new antibacterial paint was introduced at the *Big 5 International Building & Construction* show in November in Dubai. "At Kansai Paint," Hasan added, "we invest heavily in R&D to develop products that are friendly to the environment with a strong focus on sustainable practices."

Larry Kahaner
Editor

www.silverinstitute.org
@SilverInstitute on Twitter

THE SILVERINSTITUTE
1400 Eye Street, NW, Suite 550
Washington, DC 20005
T 202.835 0185
F 202.835 0155