THE SILVERINSTITUTE

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Silver News

Silver Industrial Demand Projected to Reach a New High in 2021

Physical Silver Investment Forecast to Jump by 32% in 2021 for a 6-Year High

Silver Supply and Demand

Million ounces	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021E	Year on Year 2020	Year on Year 2021E
Supply													
Mine Production	763	796	845	882	897	900	864	850	836	780	829	-7%	6%
Recycling	232	216	193	175	167	164	168	168	171	182	192	7%	5%
Net Hedging Supply	5	4	2	1	1	1	1	1	1	1	1	18%	-17%
Net Official Sector Sales	12	-	-	11	2	-	-	-	15	8	-	na	na
Total Supply	**1,012**	**1,015**	**1,040**	**1,069**	**1,067**	**1,065**	**1,033**	**1,019**	**1,023**	**972**	**1,022**	**-5%**	**5%**
Demand													
Industrial	508	451	461	450	457	491	519	513	515	487	524	-5%	8%
Photography	62	53	46	44	41	38	35	34	33	28	29	-15%	4%
Jewelry	162	159	187	193	202	188	195	202	200	146	173	-27%	18%
Silverware	42	41	47	54	58	54	60	68	62	32	40	-48%	25%
Net Physical Investment	273	241	301	283	310	211	154	163	183	199	263	9%	32%
Net Hedging Demand	-	40	29	-	-	12	2	8	-	-	-	na	na
Total Demand	**1,046**	**984**	**1,070**	**1,023**	**1,068**	**995**	**965**	**987**	**993**	**892**	**1,029**	**-10%**	**15%**
Market Balance	**-34**	**31**	**-30**	**46**	**-2**	**71**	**68**	**32**	**30**	**80**	**-7**	**165%**	**na**
Net Investment in ETPs	-18	53	5	-0.3	-17	54	7	-21	83	331	150	298%	-55%
Market Balance less ETPs	**-15**	**-22**	**-35**	**111**	**81**	**85**	**129**	**53**	**-53**	**-251**	**-157**	**373%**	**-38%**
Silver Price (US$/oz, London price)	35.12	31.15	23.79	19.08	15.68	17.14	17.05	15.71	16.21	20.55	25.40	27%	24%

Source: Metals Focus

Every key area of silver demand is forecast to rise in 2021, including a record total for overall demand -- 1.029 billion ounces -- the first time it has exceeded 1 billion ounces since 2015.

In addition, physical silver investment is forecast to jump by 32% in 2021 for a 6-year high, according to Philip Newman, Managing Director and Adam Webb, Director of Mine Supply, at Metals Focus, during the Silver Institute's Interim Silver Market Review webcast on November 17.

Other highlights included:

- Industrial demand will achieve a new high of 524 million ounces (Moz). This includes a 13% rise to over 110 million ounces in photovoltaic demand, a new high showing silver's key role in the green economy, underpinning much of the forecast 10% gain in silver's use in the electrical/electronic sector. In addition, brazing alloy & solder demand is set to expand by 10% in 2021, helped by a recovery in housing and construction.
- Physical investment in 2021 is forecast to increase by 32%, or 64 Moz, year-on-year to a six-year high of 263 Moz. The strength will be driven by the United States and India. Additionally, on top of solid gains last year, U.S. coin and bar demand is expected to surpass 100 Moz for the first time since 2015.
- Exchange-traded products are forecast to see total holdings rise by 150 Moz in 2021. Consequently, combined holdings will have risen by a dramatic 564 Moz over the past three years. During 2021 and through to November 10, holdings rose by 83 Moz, taking the global total to 1.15 billion ounces, close to its record high of 1.21 billion ounces which occurred on February 2.

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- This year, the silver price has built on its 2020 gains and has continued to strengthen. Through to November 10 prices have risen by 28% year-on-year. This follows a 27% rise for the annual average price in 2020. The upside reflects healthy investor inflows into silver, on the back of supportive macroeconomic conditions, notably the persistence of exceptionally low interest rates, concerns about uncontrolled fiscal expansion and, most recently, growing concerns about rising inflationary pressures. Metals Focus expects the silver price to rise by 24% year-on-year to US$25.40. This would achieve the highest annual average since 2012's US$31.15.
- In 2021, mined silver production is expected to rise by 6% year-on-year to 829 Moz. This recovery is largely the result of most mines being able to operate at full production rates throughout the year, following enforced stoppages in 2020 due to the pandemic.

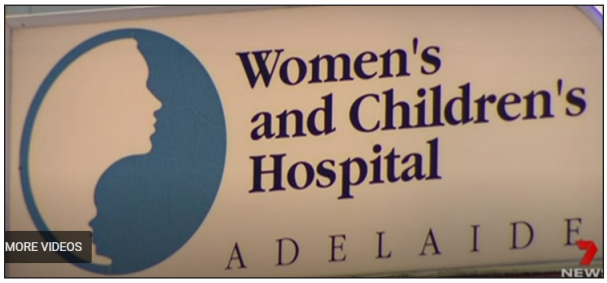
Read more details here on the Silver Institute website and click here to watch the full webcast.

Australian Scientists Develop an On-Demand Silver Delivery System for Burn Dressings

The use of silver-laced dressings for wounds has been shown to be effective at not only reducing infection but accelerating healing. And, because it is accepted practice among the best healthcare providers to deliver medicine only when necessary, according to the American Medical Association, a research team at the University of South Australia's Future Industries Institute, has developed a hydrogel-coated dressing, aimed at children, that only releases silver nanoparticles when an infection is present. The treatment relies on a delivery system that senses a change in acidity and temperature, which are signs of infection, and releases silver to the wound site.

Lead researcher Dr. Zlatko Kopecki said in a prepared statement: "Wound infection and sepsis are daily problems for children with burn injuries. Silver-based wound care products can inhibit the growth of bacteria, but they can also cause toxicity when they deliver too much silver to wounds. Our treatment is unique in that it capitalizes on the anti-bacterial properties of silver, but avoids over-exposure by only activating when infection is present."

In Australia, approximately 50,000 burn-related hospital admissions are recorded per year, with young children particularly at risk, University officials noted. Scald burns (65 percent) or flame burns (20 percent) are the most common burn-related injuries for children aged four years and under.



Click photo to watch video.

Silverlon Wound Contact Dressing Receives US Government Fast-Track Approval for Use in Radiation Burns;

Product in Strategic National Stockpile for Emergency Use

Argentum Medical's Silverlon Wound Contact dressing has received U.S. Food and Drug Administration approval for its Breakthrough Device Program, an initiative for devices and device-led combination products (a mix of drugs, devices, and/or biological products) that helps speed development, assessment, and review of drugs and devices while preserving standards for premarket approval.

The silver-based dressing contains 50 to 100 times more metallic silver ions than other silver-impregnated dressings, company officials say, and is approved for an application up to seven days for patients who have suffered skin injury due to radiation treatment.

"This important FDA Breakthrough Designation has been 20 years in the making and is the ultimate validation for Silverlon," said Raul Brizuela, president and CEO of Argentum Medical, in a prepared statement. "Receiving this designation will expedite our efforts to bring Silverlon to patients with radiation dermatitis and cutaneous radiation injury."

Argentum Medical had received a US$10.1 million grant for Silverlon's development from the Biomedical Advanced Research and Development Authority (BARDA), part of the United States Department of Health and Human Services, for advanced development of radiation exposure wound technology. Silverlon, based in Geneva, Illinois, has, since 2016, been part of the Strategic National Stockpile, which makes medical and other life-saving supplies immediately available during emergencies.

Brizuela says that Silverlon technology is more effective than its competitors because of its ability to stretch and adhere across a body area, resulting in more exposure to and longer duration on a wound. Rather than relying on wound dressings that need to be changed every few hours, Silverlon can be used for much longer stretches of time, reducing the need for rapid resupply, he noted.

Silver Helps Fix Shortcomings of Lithium Batteries

Lithium batteries hold great promise for powering electric cars, but these all-solid-state batteries (ASSBs) have a big problem. After many charges, they tend to short circuit internally, which destroys the battery.

'Lithium growth,' as engineers call it, occurs when metallic lithium particles grow into imperceptibly small voids in the areas between the lithium and the solid-state electrolytes inside the battery. This growth occurs during charging cycles, and the result is that the battery changes in volume, leading to stress cracking. Once a crack happens, lithium filaments grow into the crack and cause the battery to short circuit. The battery's performance not only suffers, but its lifespan is also shortened.

Several fixes have been suggested or tried, such as filling these empty spaces to prevent lithium intrusion, but none have been totally successful. One approach which holds promise is to introduce a silver-lithium layer at the battery's anode. The silver-lithium foil suppresses the growth of lithium filaments, also called dendrites, and forms a stable interface with the solid electrolytes.

Writing in the journal *Advanced Science*, the research team from the Next Generation Battery Research Center, Korea Electrotechnology Research Institute in Gyeongsangnam-do, Republic of Korea stated: "Capacity retention was improved by 94.3% over 140 battery cycles. Additionally, even under harsh conditions, stable cycling was achieved, circumventing the short-circuit issue in cells that use metallic lithium."

They concluded: "This work delivers an invaluable lesson that, based on an easy and highly productive process, introduction of a functional layer that can be formed [during manufacture] offers a dendrite-free and stable interface and without further processes can be a viable option for realizing the practical application of ASSBs."

Negro Leagues Baseball Commemorative Silver Dollar Available in 2022

The United States Mint in 2022 will release the Negro Leagues Baseball Silver Dollar as part of the Negro Leagues Baseball Commemorative Coin Program. The .999 silver, one-dollar coin depicts a pitcher in mid-throw on the obverse, or heads. The reverse, or tails, shows a batter at home plate ready to hit the ball.

The Negro National League was formed in 1920 to address the problem of African-American players being banned from the major leagues. The league operated until 1960 and provided opportunities for more than 2,600 African American and Hispanic baseball players to showcase their baseball abilities.

The Negro Leagues introduced innovations such as shin guards and the batting helmet. In 1930, they pioneered 'Night Baseball,' and in 1927, the Negro Leagues introduced professional baseball to Japan. Jackie Robinson, a player for the Negro Leagues' Kansas City Monarchs, broke Major League Baseball's color barrier on April 15, 1947, when he joined the Brooklyn Dodgers. The Leagues also produced other Major League Baseball stars, including Leroy 'Satchel' Paige, Larry Doby, Willie Mays, Henry Aaron, Ernie Banks, and Roy Campanella.

The silver coin's mintage is 400,000, and coin prices include a surcharge of US$10. The law authorizing the coin requires the Mint to pay the surcharges to the Negro Leagues Baseball Museum for educational and outreach programs and exhibits.

Other coins in the series are a US$5 gold coin and a half-dollar clad coin.

US MINT

A Way to Make Silver Nanowires Cheaper, Faster and in Large Batches Developed in India

Silver nanowires are finding increasing use in consumer electronics, medical apparatuses, environmental devices and more, so making them quickly, at lower cost and higher quality has become a dream of many engineers.

Indian developers at the CSIR-National Chemical Laboratory, Pune, have taken a step forward towards that goal.

They say that their low-cost, large scale manufacturing process can produce 500 grams a day of silver nanowires for about US$20 per gram compared to US$250 to US$400 per gram depending upon the market price of silver, according to research leader Amol A. Kulkarni.

According to a statement from India's Ministry of Science and Technology: "The process is a simple, cost-effective, and scalable synthesis route when compared to existing batch manufacturing protocols that generate a large amount of nanoparticles in suspension, which is not easy to separate from nanowires. The developed process has been tested at CSIR-NCL's characterization facility and is in Stage 8 of the Technology Readiness Level [Level 8 is System Test, Launch & Operations and overlaps with Stage 9, the highest level] … The product manufactured consists of silver nanowires possessing excellent conductivity, which can be used in making conducting inks and coatings for display technologies and flexible electronics."

They added: "CSIR-NCL has licensed the process technology to Nanorbital Advanced Materials LLP (Ahmedabad, India) in November 2020 and has signed material transfer agreement, with three more industries in 2021. Kulkarni plans to further conduct testing of the developed nanomaterial in different display devices for transparent conducting applications as well as for printing of flexible electronics, including wearable electrodes."

A total of five national and international patents have also been filed for the process.

Sustainable Jewelry from E-Waste: One Entrepreneur's Story

About 11 years ago, Cape Town, South Africa jewelry maker Ashley Heather wanted to see if she could make a silver ring from silver halide taken from used photographic films and X-Rays. She was successful, but with the growth of digital photos that source went sour. Looking for a sustainable supply of used silver, she stumbled upon E-waste, mainly from discarded smartphones and computers and began to break it down into its component parts that could be used to make jewelry, namely silver and gold.

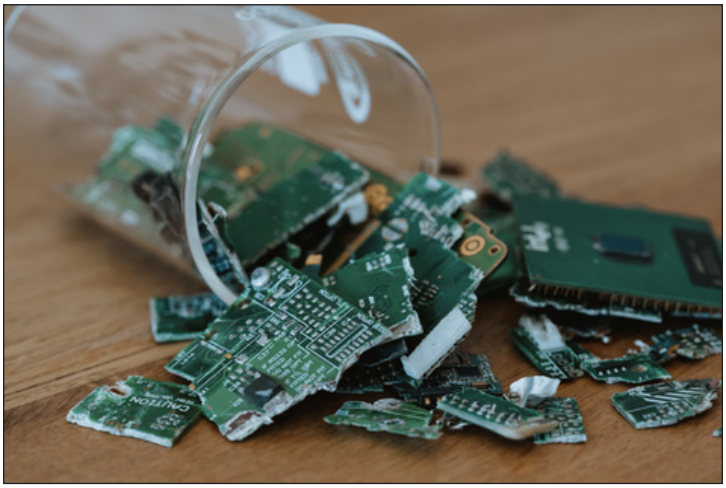
Again, she was successful. "When I fell in love with the craft of jewelry making, I knew I needed to find a way to combine this with my longstanding passion for sustainability," she told *Business Insider South Africa*. She added: "E-waste turns out to be a jeweler's dream, because it contains both gold and silver, and it's also the fastest growing municipal waste stream in the world."

Breaking down and separating the precious metals from E-waste is time consuming. The discarded electronic devices are first sent to a refinery where they are separated into recyclable and unrecyclable components. Then, they are crushed into small pieces and sent to a shredder before being put into a furnace or, for smaller batches, a crucible.

Next, the metals are dissolved in acid and then separated out through an electrolysis-type process. The metals are melted again and purified, assuring that only high-quality precious metals are extracted. "All the components from the plastics to the solid metal components, like the aluminum bits, are all sent their separate ways for recycling as well," Heather says.

How much silver can she retrieve from one smartphone, for example? Every device is different, she says, so it's difficult to estimate. One thing is certain: for every 1 million cell phones that are recycled, 772 pounds of silver, 75 pounds of gold, 35,274 pounds of copper and 33 pounds of palladium can be recovered, according to the US Environmental Protection Agency.

On her website, Heather notes: "Since those early days we have grown into a small team of passionate hands specializing in minimalist jewelry crafted in precious metals reclaimed from circuit boards by a small refinery right here in South Africa. We believe in slow fashion, in mindful consumption, in style that transcends trends. Our contemporary designs are pared down to their essential elements; simplicity and quality craftsmanship become as timeless as the materials themselves."



Click image to see how jewelry is made from E-waste

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