

Silver News

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Global Silver Demand Edged Higher in 2019, Investment Demand Up 12%

Silver Mine Supply Fell for Fourth Consecutive Year: Highlights from *World Silver Survey 2020*

“Global silver investment jumped 12 percent to 186.1 million ounces, making it the largest annual growth since 2015.”
– *World Silver Survey 2020*

Global silver demand pushed higher in 2019, with a 12 percent increase in investment demand as retail and institutional investors focused their attention on the long-term investment appeal of the metal.

Highlights include:

Total global silver demand in 2019 grew by 0.4 percent despite an ongoing global trade war affecting many industries. Silver industrial demand was resilient, slipping by 0.1 percent last year, with several key segments of silver industrial fabrication expanding, primarily silver's use in photovoltaics, which grew by 7 percent to its second highest annual level.

For the fourth consecutive year, silver mine supply declined 1 percent in 2019, according to the *World Silver Survey 2020*, produced for the Silver Institute by [Metals Focus](#), a London-based independent precious metals consultancy.

Investment and Price

Global silver investment jumped 12 percent to 186.1 million ounces, making it the largest annual growth since 2015. Notable gains in Europe (+25 percent), the US (+9 percent) and India (+5 percent) led to the increase. Institutional investment fared even better than retail demand. Last year, exchange-traded product (ETP) holdings stood at 728.9 million ounces at year-end, up by 13%, achieving the largest annual rise since 2010.

Demand

Global silver demand edged higher in 2019 to 991.8 million ounces, up 0.4 percent, as higher net-physical investment was offset by lower jewelry and silverware demand. Industrial fabrication was nearly unchanged from 2018 at 510.9 Moz. Photovoltaic demand registered a 7 percent increase in offtake, rising to its second highest annual level, while silver's use in brazing alloys rose 1 percent.

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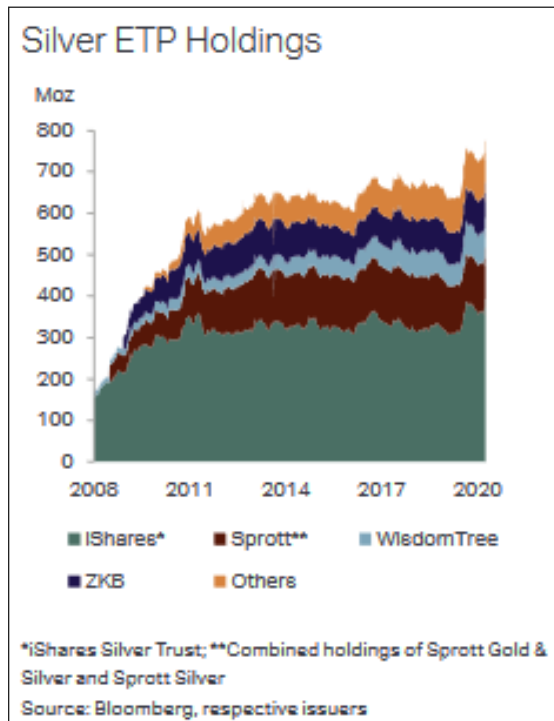
Jewelry posted a 1 percent decrease to 201.3 million ounces, primarily due to soft demand in India and China. In contrast, Thailand achieved a 13 percent increase last year and growth was also registered in Indonesia, Japan and Italy.

Supply

Global mine production fell for the fourth consecutive year in 2019 by 1.3 percent to 836.5 million ounces. This was a result of declining grades at several large primary silver mines and disruption-related losses at some major silver producers. Primary silver production declined by 3.8 percent in 2019 to 240 Moz.

The Silver Institute released *World Silver Survey 2020* on April 22. This publication, marking the 30th edition of the Survey, can be downloaded from the [Silver Institute's website](#).

An archive of the broadcast can be accessed by visiting the broadcast platform, [World Silver Survey 2020 Presentation](#), which will remain available for one year.



Combined silver Exchange Traded Products (ETP) holdings stood at 728.9 million ounces at the end 2019, up by 13% from the previous year, the largest annual increase since 2010.

Silver to Help Rapid Detection of COVID-19

By Trevor Keel, PhD., Technical Director to The Silver Institute

Relatively little is currently understood about the COVID-19 virus, but access to rapid and accurate diagnosis tools to support quarantine and treatment is critical to prevent the pandemic from spreading further and lasting longer.

UK-based company [AgPlus Diagnostics](#) is working on commercialization of a new point of care (PoC) diagnostics platform that relies on a simple chemical reaction driven by silver nanoparticles to measure and quantify the presence of targeted molecules.

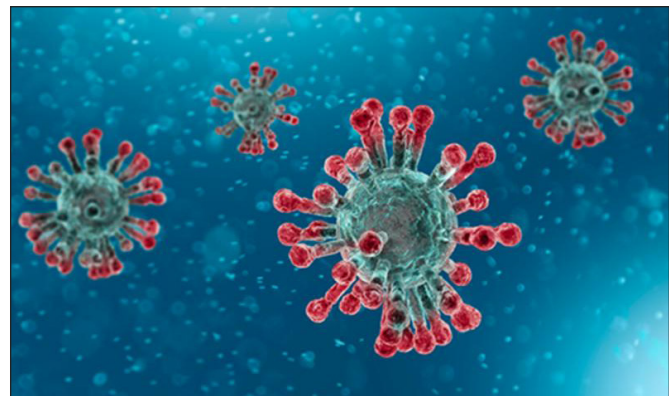
The team at AgPlus was able to modify one of their slower, straightforward, lab-based testing systems to screen for antibodies, antigens and proteins more rapidly.

The company's CEO Fiona Marshall said: "We are in the process of developing various formats of the test to support a range of testing. First, we are working on an assay to detect COVID-19 antigen directly and second, a serological assay that will detect anti-COVID-19 antibodies for IgM (Immunoglobulin M is the first antibody the body makes when it fights a new infection) and IgG (Immunoglobulin G is the most common antibody; it takes longer to form after an infection than IgM)." The assays are intended to be utilized for fingerstick testing. An alternative route would be by nasal swab and testing would be done on both samples, she said. The assay will be fully quantitative as well as giving a yes/no answer to infection so it can be also used to monitor as an infection decreases. This will allow for detection of initial infection of the virus, potentially pre-symptoms, then the ongoing monitoring of disease progress after treatment. She added: "The assay could also potentially be utilized to support drug development. The main application will be to screen those with symptoms to rule in or rule out COVID-19 infection."

Access to accurate and rapid antigen and antibody tests is critical in the fight against COVID-19, so the opportunity to be able to run both tests on one simple platform would be hugely advantageous, Marshall said.

The original testing platform was built on technology that was developed at the [National Physical Laboratory in the UK](#).

"The main application will be to screen those with symptoms to rule in or rule out COVID-19 infection." – AgPlus CEO Fiona Marshall



AGPLUS DIAGNOSTICS

Rapid testing of the COVID-19 virus is vital for stemming the pandemic.

Silver to Play Critical Role in 5G Technologies

The next generation of mobile communications technology known as 5G – already rolling out in some countries – is massively increasing download speeds, reducing time lags, and driving progress in many sectors including the ‘Internet of Things,’ which connects household and commercial products, like cars, appliances and medical devices to the internet.

The electrical components that make 5G possible rely on silver, according to a Market Trend Report, entitled *Silver’s Role in a Future 5G Connected World*, authored by the research firm Precious Metals Commodity Management and published by The Silver Institute.

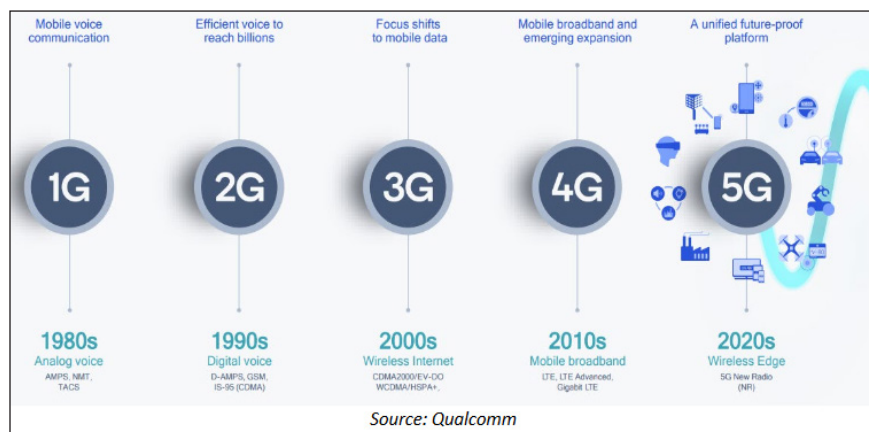
Currently, 5G deployment is still in its early stages, and related silver demand currently constitutes approximately 7.5 million ounces. With the growth of 5G in the coming years, silver’s role in the technology’s electronic applications is forecast to rise to approximately 16 million ounces by 2025 and as much as 23 million ounces by 2030, a 206 percent increase over today, the report noted.

One consumer area that will see a major benefit of 5G is increasing download speed of videos. For example, with 4G a two-hour movie takes six minutes to download. With 5G, the same video can be downloaded in less than 4 seconds.

In addition, the report details 7 electronic market areas in which silver will be in demand: “A range of silver products are used in different electronics market segments, including Semiconductors (integrated circuits & printed circuit boards), MEMS (micro electro-mechanical systems), Automotive Electronics, Consumer Electronics, Flexible Electronics, LED/OLED and Printed Electronics.”

The report concludes: “5G will be the glue in an ecosystem of improved connectivity between all sorts of devices, and as such, it is expected that connected devices, such as the IoT, will significantly increase over the next five years.”

[To download the report, click here.](#)



Silver will play a vital role in the 5G Revolution.

Scientists Delve Deeper into Silver’s Antibacterial Impact

Scientists know that silver ions can pierce the outer cell walls of microbes, destroying the structure and the germ itself. However, there still is more to learn about the actual mechanism if silver is to become the antibacterial of choice among physicians who are finding it more problematic to prescribe antibiotic drugs which are losing their efficacy through overuse.

Researchers in the US at the University of Arkansas are taking an untraditional approach to understand silver’s effect on germs. Instead of studying bioassays to examine the impact of silver on a microbe and compare it to an untreated sample, they are using microscopic imaging to watch and track a particular protein found in *E. coli* bacteria over time. They were surprised to learn that silver ions actually sped up the movement of the protein instead of slowing it down as they had hypothesized. “It is known that silver ions can suppress and kill bacteria. We thus expected that everything slowed down in the bacteria when treated with silver. But, surprisingly, we found that the dynamics of this protein became faster,” said Yong Wang, assistant professor of physics, in a prepared statement. He is the author of the study, which was published in the journal [Applied and Environmental Microbiology](#).

The researchers watched as silver ions caused paired strands of DNA in the bacteria to separate, and the binding between the protein and the DNA to weaken. “When the protein is bound to the DNA, it moves slowly together with the DNA, which is a huge molecule in the bacteria. In contrast, when treated with silver, the proteins fall off from the DNA, moving by themselves and thus faster,” Wang noted.

Wang has been studying effects of silver on bacteria for several years, and has come up with previous findings that are helping to understand silver’s role as a biocide (see [Silver Ions Aid in Watching How DNA Reacts to Chemicals](#); February 2019 *Silver News*).

“What we want to do eventually is to use the new knowledge generated from this project to make better antibiotics based on silver nanoparticles,” said Wang.

Samsung Announces New Silver-Powered Solid-State Battery

By Trevor Keel, PhD., Technical Director to The Silver Institute

Over 200 years ago, Alessandro Volta discovered that zinc and silver provided the most effective combination of metals to form a crude battery. Since then, scientists have driven hundreds of developments in the field, and silver has always been considered important because it offers high energy-density when coupled with other metals. Both the military and aerospace sectors utilize silver-zinc in a range of applications and undertook a considerable amount of research and development to further develop the technology. The US National Aeronautics and Space Administration (NASA) is becoming increasingly involved in the development of a rechargeable version of a silver-zinc battery. While NASA was ultimately not able to improve on the most commonly used rechargeable nickel-cadmium technology at the time, their R&D efforts led to high density silver-zinc cells, 1/3 of the size of anything else available. Today, these small powerful batteries are used in a range of high-end applications including hearing aids, which require reliable and safe power sources.

The latest chapter in silver's story in the battery sector comes from Samsung, which has recently announced improved Electric Vehicle (EV) batteries. Researchers from the [Samsung Advanced Institute of Technology \(SAIT\)](#) and the [Samsung R&D Institute Japan \(SRJ\)](#) have published their work on high-performance, long-lasting all-solid-state batteries in the journal [Nature Energy](#).

In this work, the researchers have strived to overcome some of the most common drawbacks of lithium-ion batteries, namely a limited energy density, issues with safety (specifically thermal runaway, which can, in rare cases, cause them to catch fire) and the growth of dendrites – tiny, whisker-like growths – that deplete a battery's lifespan and safety profile. Samsung has proposed utilizing, for the first time, a silver-carbon composite layer as the anode. The team found that incorporating a silver-carbon layer into a prototype pouch-shaped cell enabled the battery to support a larger capacity, longer cycle life, and enhanced its overall safety. Just 5 micrometers thick, the ultrathin layer allowed the team to reduce anode thickness and increase energy density. It also enabled them to make their prototype approximately 50 percent smaller by volume than a conventional lithium-ion battery. The company hopes that further research will help drive the expansion of electric vehicles (EVs). The prototype cell that the team developed could enable an EV to travel up to 500 miles (800km) on a single charge and features a cycle life of over 1,000 charges.

Dongmin Im, Master at SAIT's Next Generation Battery Lab and the leader of the project stated, "The product of this study could be a seed technology for safer, high-performance batteries of the future. Going forward, we will continue to develop and refine all-solid-state battery materials and manufacturing technologies to help take EV battery innovation to the next level."



The Samsung team behind the latest battery research: (From left) Yuichi Aihara, Principal Engineer from SRJ, Yong-Gun Lee, Principal Researcher and Dongmin Im, Master from SAIT.

Beauty of Chemistry Photo Shows Silver Whiskers

As part of an on-line photography show titled *Chemistry in Pictures* in [Chemical & Engineering News](#), Drexel University Ph.D. student Pedro Amaral captured whiskers of silver growing on a copper coil submerged in a solution of silver nitrate. When silver ions from the solution touch the copper, the silver ions take an electron from the copper atoms – a reaction known as reduction – and create the silver metal seen on the surface of the coil. At the same time, the copper coil releases copper ions into the solution, creating copper nitrate, which gives the liquid the blue color that you see.



PEDRO AMARAL

A copper coil grows silver whiskers when submerged in silver nitrate.

Silver Ions Keep Face Masks Bacteria and Odor-Free

Although silver ions have not been shown to kill the Covid-19 virus, they are still being infused in face masks to keep them bacteria free and fresh smelling as silver kills many bacteria, including *E-coli*, which can be harmful to people.

One of the first, large-scale manufacturing of silver-ion masks in response to the coronavirus occurred in early February as the outbreak was hitting Hong Kong. Five textile manufacturers produced an initial batch of 3,000 handmade, reusable fabric masks to distribute among members of the city's vulnerable groups, according to [The South China Morning Post](#).

Liberal Party leader Felix Chung Kwok-pan, who also runs a family garment business, said the masks were effective in protecting the wearer against large droplets and airborne particles. and were antibacterial even after washing them up to 50 times. "We know the materials are not meant to block the virus," he said. "But our sector hopes to provide alternatives as fast as we can to relieve people's panic amid the government's fumbling response in mask supply."

Masks were in short supply in Hong Kong for more than a week, the newspaper reported, and some low-quality and overpriced products were appearing. To cope with the shortage, five textile manufacturers in Hong Kong partly suspended their original production to produce the reusable masks. Chung said that it could have taken three months to import mask-making machines, so it was more efficient to produce masks with traditional sewing machines used by factory workers.

The handmade washable, face masks were made of bioserica, a biodegradable fiber developed by the Hong Kong Polytechnic University, along with chitosan, a natural and non-toxic polymer, and silver ions.



Five Hong Kong textile makers banded together to produce face masks with silver ions to keep them bacteria and odor free.

SOUTH CHINA POST

Fish Scales and Silver Nanowires Make Light Emitting Wearable Material

In an ongoing quest to find electrical-conducting materials that are flexible enough to bend but not break – making them ideal for wearables – researchers at Nanjing Tech University in China are using silver and fish scales to produce biodegradable electronic displays.

The group created an extremely thin film from gelatin extracted from the fish scales. They then embedded silver nanowires within the film along with light-emitting materials including zinc sulfide and copper. When an electric current was placed on the scales, the combination lit up.

Unlike plastic, which is usually the medium for light emitting products, this fish scale device is biodegradable. The researchers found that it degraded in soil after 24 days compared to plastic which could take centuries. The device also has high transparency, low cost and can be recycled by dissolving it in warm water, according to the research team.

Wearables are a growing consumer and medical market segment ranging from body sensors that monitor health and fitness, trackers that locate the wearer, and textiles that can automatically warm a person during cold weather.

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