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### Consumer Trends Bode Well for Silver

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In this report, we look at silver's recent price move and revisit the long-term consumer-driven trends that affect silver. Fundamental shifts in technology and consumer preferences are supportive for several verticals of silver usage. First, we discuss silver's recent rise.

### Silver Has Been on the Move

Since we last wrote about silver on April 16, Silver Outlook is Bullish, the price of silver has risen steadily. Silver's price per ounce climbed from \$15.68 on April 16 to \$17.52 as of this writing (June 17), gaining ~12%. Although silver's year to date return is still underwater at -2.21% (as of 6/16), it's moving closer to positive territory for 2020. Silver ETF holdings continued to set records and now stand at 750 million ounces, up 90 million since we wrote in April, and have a total market cap of ~\$13.5 billion.

We continue to confirm our investment thesis: *Although the silver market is small in size, it has the potential to move higher quickly, when conditions are supportive, and to outperform more traditional asset classes.* Figure 1 shows the current dislocation between gold and silver prices, which has created an opportunity gap for investment.

**Figure 1. Silver vs. Gold Prices: Opportunity Gap** (2006-June 2020)



Source: Bloomberg. Data as of 6/17/2020. The gold spot price is measured by GOLDS Comdty Index; SILV Comdty Index measures the silver spot price. You cannot invest directly in an index. Past performance is no guarantee of future results.

## Silver Consumer-Demand Trends

Currently, demand for silver is enjoying a boost because of investment interest, as global economic uncertainty stokes demand for the value storage of precious metals. However, industrial use is the backbone of silver's demand and technological advancements are providing strong growth in silver consumption.

We see four very positive silver demand trends originating in consumer preferences:

1. How we get household energy
2. What we drive
3. How we communicate and consume data
4. How we stay healthy in a post-COVID-19 world

The three primary technology shifts supporting the first three trends — solar energy technology, electric vehicle technology and 5G — are all rooted in silver-using electronics. These three trends are no longer in the unstable early days of development and have reached a cost-effective and economically reliable status, which helps to increase demand for silver. Silver, long a popular input for medical uses, could also play a small but significant role in how we cope with the impacts of COVID-19.

### Trend #1. How We Get Household Energy

Solar energy has established a significant stronghold in the mainstream at this point. The costs of solar power have settled into a more competitive equilibrium and we expect that installations of solar sources will remain robust in the near term thanks to a combination of higher energy demand from consumers, a preference for renewables and better pricing.

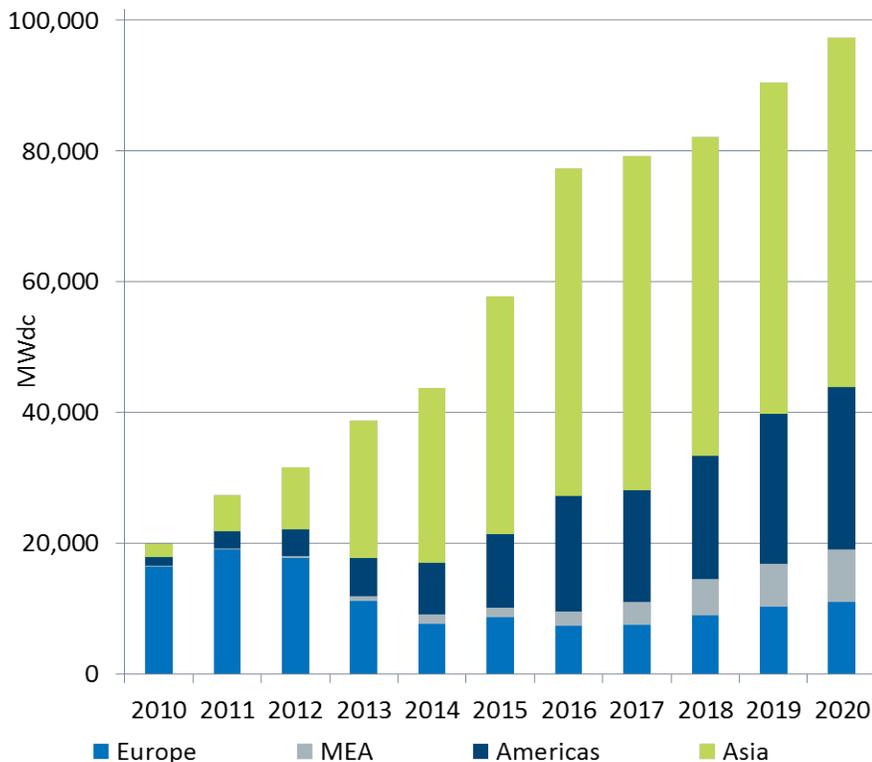
Photovoltaic ("PV") cells, the technology at the heart of solar energy collection, continue to be a growing category for industrial silver use. While industrial silver use was flat in total between 2018 and 2019, PV usage was up 7%.<sup>1</sup> China has been a key user of silver in the production of solar panel components. In 2019, as trade war pressures dampened industrial activity around the world, China's silver industrial demand for non-PV uses was down — but PV usage was up.<sup>2</sup>

Solar panel demand from emerging markets buyers is a major reason for China's sturdy PV numbers. Within China, panel installations were actually down in 2019, as centralized subsidies for solar installation declined (a trend expected to continue). However, falling prices in silver modules helped stoke panel demand overseas. According to the World Silver Survey 2020 report by the Silver Institute, two-thirds of Chinese panel production in 2019 went to emerging markets buyers.

Europe also has a bright outlook for solar demand, thanks to ambitious targets for renewables. Demand for solar installations in the U.S. continues apace, arising from both consumers installing panels on homes and from utilities providers.

A newer technology, Concentrated Solar Power ("CSP") tower systems, could be another driver of demand in the PV sector. CSP systems harness sunlight by using mirrors to reflect and direct it to a receiver at the top of a tower, where the energy is used to create steam which powers an electric generator. Though CSP installations thus far are minimal, the costs are competitive and the design can be deployed in existing thermal power plants, including coal, natural gas and geothermal facilities.

**Figure 2. Global PV Installations by Major Region (2010-2020)**



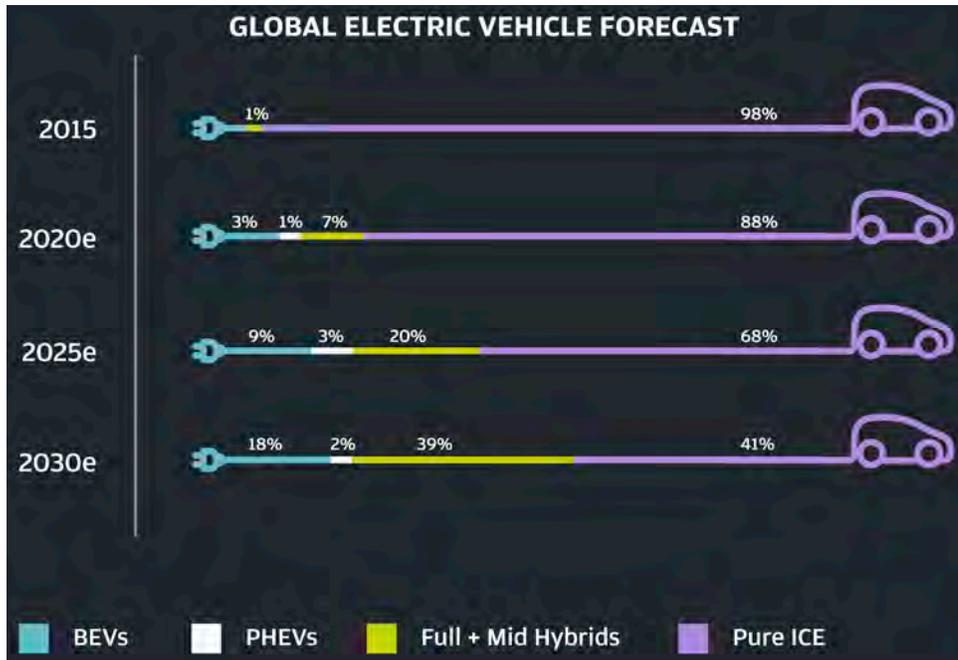
Source: IHS Markit.

## Trend #2. What We Drive

Consumers are also on the bandwagon for battery-electric vehicles (“BEV”). Not only do BEVs offer substantial reductions in emissions, but sticker prices have fallen considerably as battery-making costs decline (on the order of 15-20% per year according to J.P. Morgan). While BEVs made up only 1% of global auto sales in 2015, J.P. Morgan estimates they will represent 18% of sales by 2030.

Silver has a critical role in battery production. But it’s not just the batteries. Sensors, for instance, are also a vital part of BEV technology, as they continuously monitor battery function; BEV technology also relies on expanded use of semiconductors and a span of electrical components. Silver factors into all of these applications, as well as in the charging stations which are becoming increasingly popular for residential use and expanded infrastructure.

Figure 3. Electric Vehicles Continue to Grow in Popularity



Source: J.P. Morgan, Driving into 2025: The Future of Electric Vehicles.

### Trend #3. How We Communicate and Consume Data

With communication at the center of daily life for consumers, the outlook is also favorable for the continued rollout of 5G, the next wave of wireless technology. Like residential energy and electric vehicle developments, the 5G evolution is fundamentally electronics-focused — a great omen for continued silver demand.

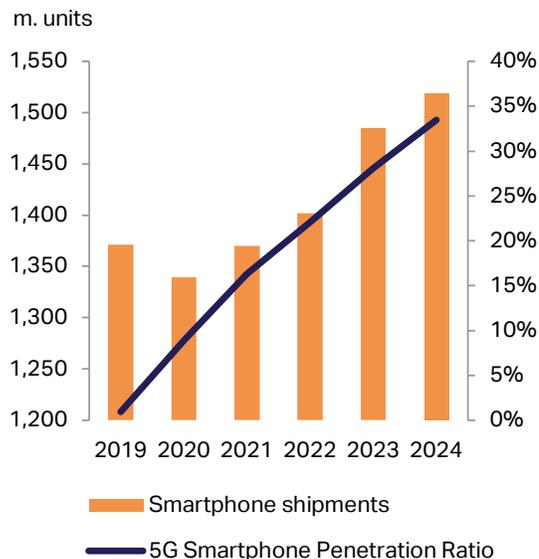
4G technology upgraded internet bandwidth by orders of magnitude, enabling all kinds of video and data-heavy communication and consumption among smartphone users who could previously only talk, text and otherwise use data within limits. 5G is set to unleash a similar expansion of bandwidth.

Expanded bandwidth opens up the landscape for the internet-of-things (“IoT”), supporting easy connectivity for household appliances and climate control functions and connectivity in our cars, for instance. It also means a whole generation of new 5G-compatible devices, which, like BEV, are only a small share of the market today but set to grow every year.

Also, like BEV, silver plays a role in the entire ecosystem of this trend. Silver is used in the semiconductors and electrical components that go into the towers, the devices and all the smaller pieces that make up the plumbing. While consumers will be core users of 5G, analysts also see the bandwidth upgrade opening the door to substantial innovation across the automotive, manufacturing and healthcare sectors.

**Figure 4. 5G Smartphone Sales Set to Grow**

## 5G Smartphone Ratio



Source: World Silver Survey 2020, pg. 49.

### Trend #4. How We Stay Healthy in a Post COVID-19 World

Back in 2017, we first explored silver demand and healthcare in our report, *Silver: An Essential Metal for the 21st Century*. Silver has been used in healthcare and medical applications not just in modern times, but dating back thousands of years, thanks to its inherent bacteria-killing powers.

Silver is an antimicrobial; the ions in silver absorb the oxygen around bacteria, essentially suffocating them. This property has made silver a popular input for medical uses, including coatings on surgical tools and hospital surfaces. Silver is used in thousands of medicinal and dentistry products, including ointments to protect wounds, especially burns, from infection. Silver is added to everyday products; for example, silver nanoparticles have been added to athletic socks since 2010 to kill the bacteria and fungus associated with smelly feet. This is an example of silver's increasing use in nanotechnology, a method of fighting and preventing diseases using atomic-scale tailoring of materials.

But the coronavirus is viral, so how does an antibacterial like silver help? In a mid-pandemic society, there are several important uses. First, a U.K.-based test developer is using the metal as an input in both infection and antibody tests to be used in a finger-prick format. As societies look for ways to resume activity safely, this type of rapid testing could prove instrumental.

Second, the use of silver-laced fabrics could become popular in face masks. Though silver masks don't offer additional protection against COVID-19 compared to non-silver masks, they can cut down on bacteria and odor, huge benefits for anyone who has to wear a mask for long periods.

# Silver Report

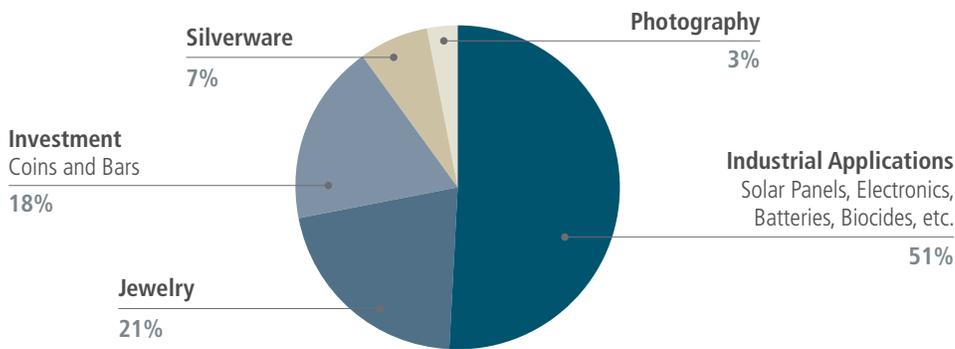
June 17, 2020

## Consumers Flock to Reliable, Cost-Effective Technologies

Consumers have a strong preference for green technologies and for using their wireless devices for communication, work and entertainment. Atop those broader demand trends, reliable and cost-effective technologies are changing consumer habits in household energy, what we drive and the devices we buy. All of these technologies come back to electrical components and battery technology—which rely upon silver. Amid the COVID-19 environment, silver could factor into consumer healthcare products as well.

While these forces are not the key drivers of industrial silver use today, these categories are expected to grow considerably. As we track global industrial demand for silver, these consumer-based drivers will be increasingly important.

**Figure 5. Industrial Uses Dominate Silver Demands**



Source: GFMS Refinitiv, Metals Focus, Silver Institute, UBS.

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<sup>1</sup> Source: World Silver Survey 2020.

<sup>2</sup> Ibid.

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