

THE SILVER SERIES

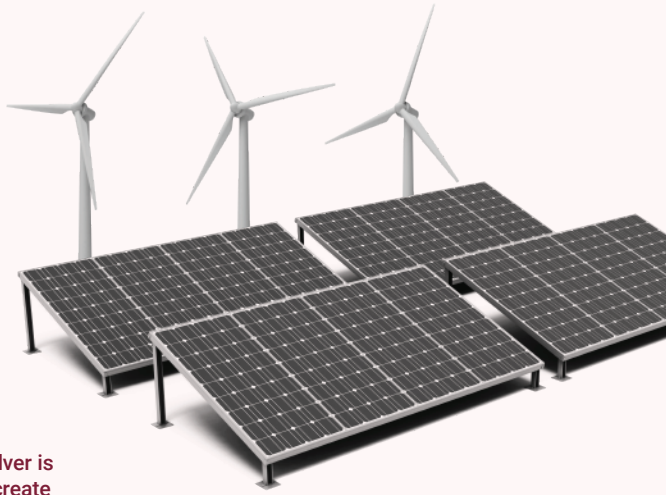
PART 1 2 3

MORE THAN PRECIOUS

# SILVER'S ROLE IN THE NEW ENERGY ERA



# A SILVER INTENSIVE FUTURE



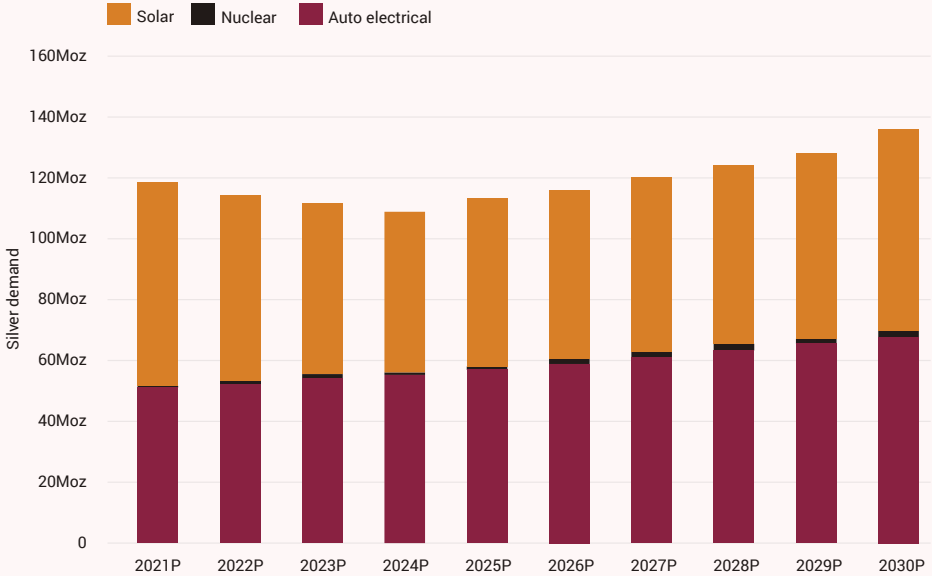
A green future will be mineral intensive, and metals will find new uses in green technologies. Silver is no exception.

Long known as a precious metal, silver is also an industrial metal needed to create an eco-friendly future.

## FORECAST DEMAND FOR SILVER IN GREEN TECHNOLOGIES

As the adoption of green technologies like solar power and electric vehicles increases, so will the demand for silver.

A green future depends on silver.



Source: *The Role of Silver in the Green Revolution*, Silver Institute and CRU, 2018

However, silver's importance in technologies was established long before the era of renewables...

# SILVER

## A CRITICAL METAL FOR TECH

As an antibacterial metal with the highest thermal and electrical conductivity, silver has found uses in various technologies over time.



### THE MIDDLE AGES

Silver containers were used to store wine, water, and food to prevent spoilage.

Families used silverware and silver utensils to protect themselves from the bubonic plague.



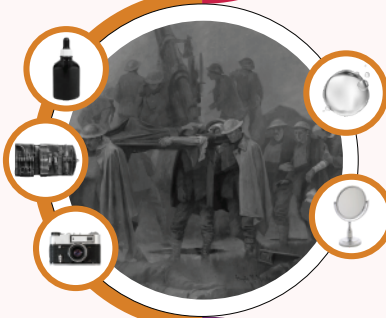
Silver nitrate was used to treat ulcers and burns.

### THE 1900'S

Eye drops containing silver were administered to newborns in the U.S.

During World War I, silver sutures and foils were used to close and cover deep wounds.

Until the 1970's, silver was used in photography for its light sensitivity.



NASA chose silver as a viable option for water purification in space.

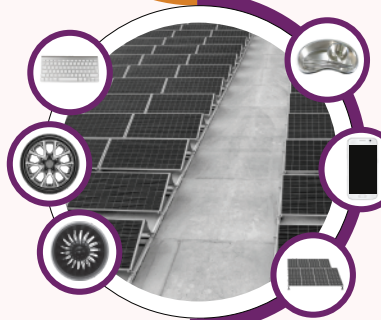
Silver has been used in mirrors and building windows for its reflectivity.

### THE 2000'S

Silver nanoparticles are used in clothing, keyboards, and biomedical devices.

Silver alloys are used for brazing and soldering in appliances, automobiles, and aircraft.

Silver bearings are used in aircraft engines.



Silver acts as a biocide on hospital door handles, surgical tools, linens, and furniture.

Silver is found in almost all electronics—from buttons and switches in houses to circuit boards in phones and computers.

Green technologies like solar power, electric vehicles, and nuclear power rely on silver.

So how does silver fit into a future of green technologies?

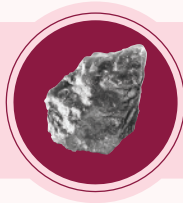
# SILVER IN SOLAR ENERGY

Among all metals, silver has the highest electrical conductivity—making it an excellent choice for solar power generation.



A typical solar panel can contain as much as 20 grams of silver.

Source: ScienceDaily



As global solar capacity grows, so will the demand for silver.

## INSIDE A PHOTOVOLTAIC (PV) CELL

PV cells are small in size, and their silver content is even smaller.

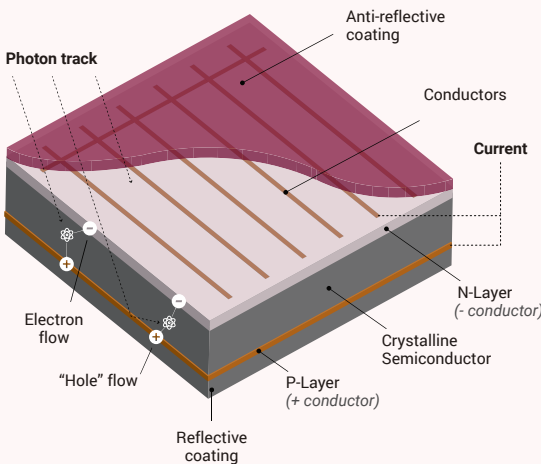
### So where is silver found inside a PV cell?

When light strikes a PV cell, the conductors absorb the energy, and electrons are set free.

The flow of electrons generates electricity, and this is where silver plays a crucial role.

**Silver pastes** are used to create conductive layers within the cell, on the top and the bottom of the silicon semiconductor.

As the best conductor of electricity, silver carries and stores electricity efficiently, maximizing the energy output of the solar cell.

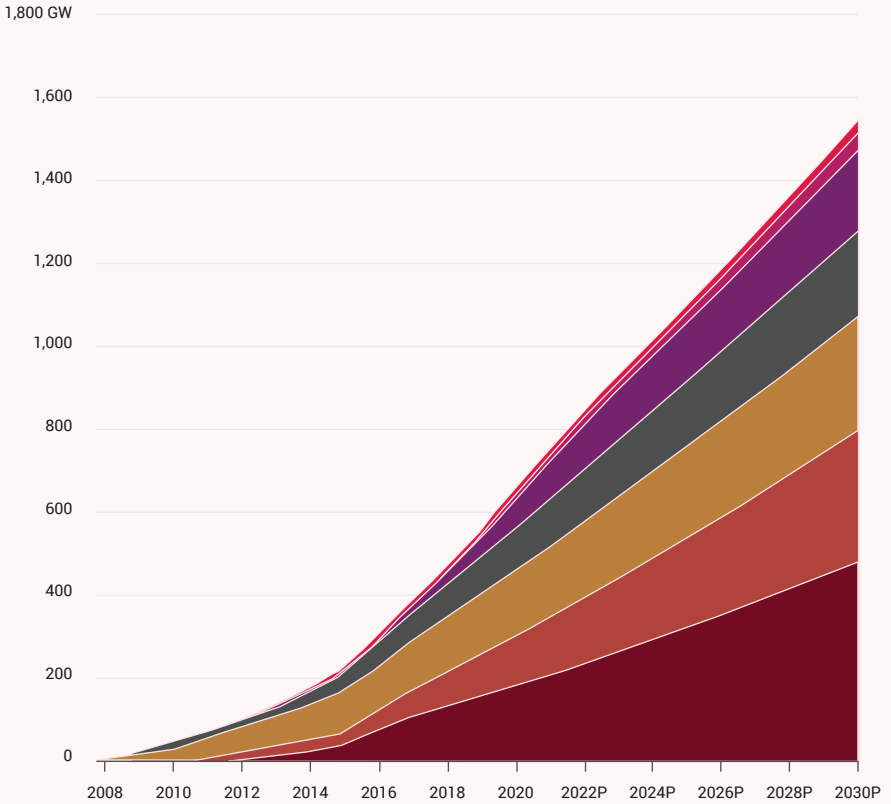


Source: Silver Institute



## HISTORICAL AND FORECASTED SOLAR CAPACITY BY REGION, 2006-2030

■ China 
 ■ North America 
 ■ Europe 
 ■ Asia (Developed) 
 ■ India 
 ■ Southeast Asia 
 ■ Other



Source: *The Role of Silver in the Green Revolution*, Silver Institute and CRU, 2018

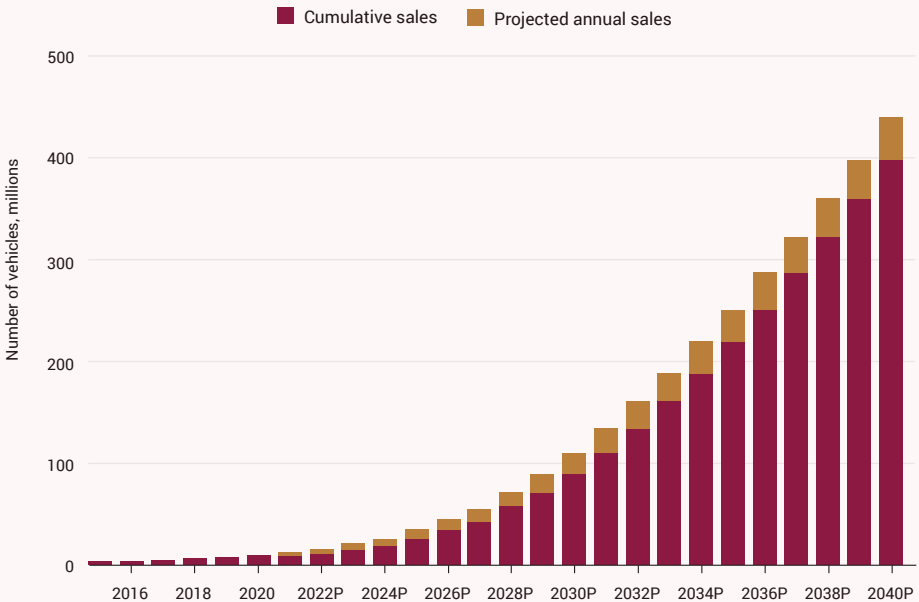
# SILVER IN ELECTRIC VEHICLES



Just like other electronic appliances, Electric Vehicles (EVs) make use of silver for its conductivity and corrosion resistance.

Virtually every electrical connection in a vehicle has silver, and over 55M oz of the white metal are used annually by motor vehicles.

## PROJECTED GLOBAL ELECTRIC VEHICLE SALES, 2015 TO 2040



Source: Bloomberg NEF, Marklines, 2016, GFMS, Refinitiv, Silver Institute -p61

## ELECTRICAL CONTACTS COATED WITH SILVER ARE USED FOR



Operating electric windows



Moving electrically powered seats



Silver-ceramic lines are used for defogging car windows during the winters



Automatic parking systems



Distance sensing systems



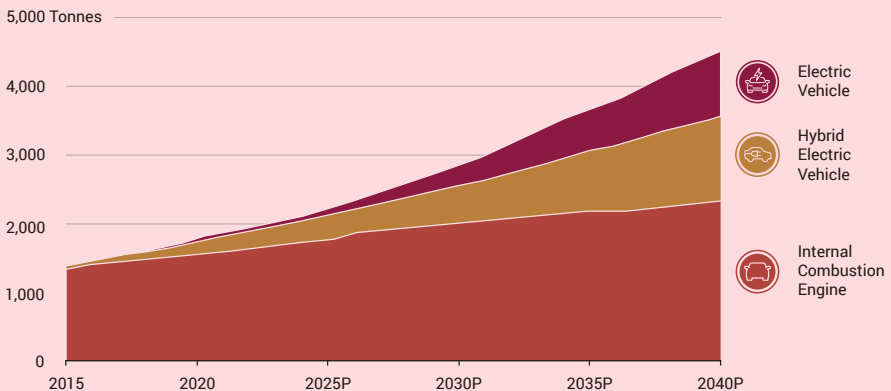
Starting the engine and sparkplugs



Source: Mining Global, Silver Institute

As more consumers go electric, EVs are expected to account for 49% of silver use in automobiles by 2040.

### PROJECTED SILVER USE IN THE AUTO SECTOR



Source: Alchemist Issue 90, LBMA, 2018



As the world moves towards a greener future, silver will play an increasingly important role

*Endeavour*  
SILVER 

TSE: EDR NYSE: EXK

Endeavour Silver finds, builds, and operates quality silver mines in a sustainable way to create real value for stakeholders.

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