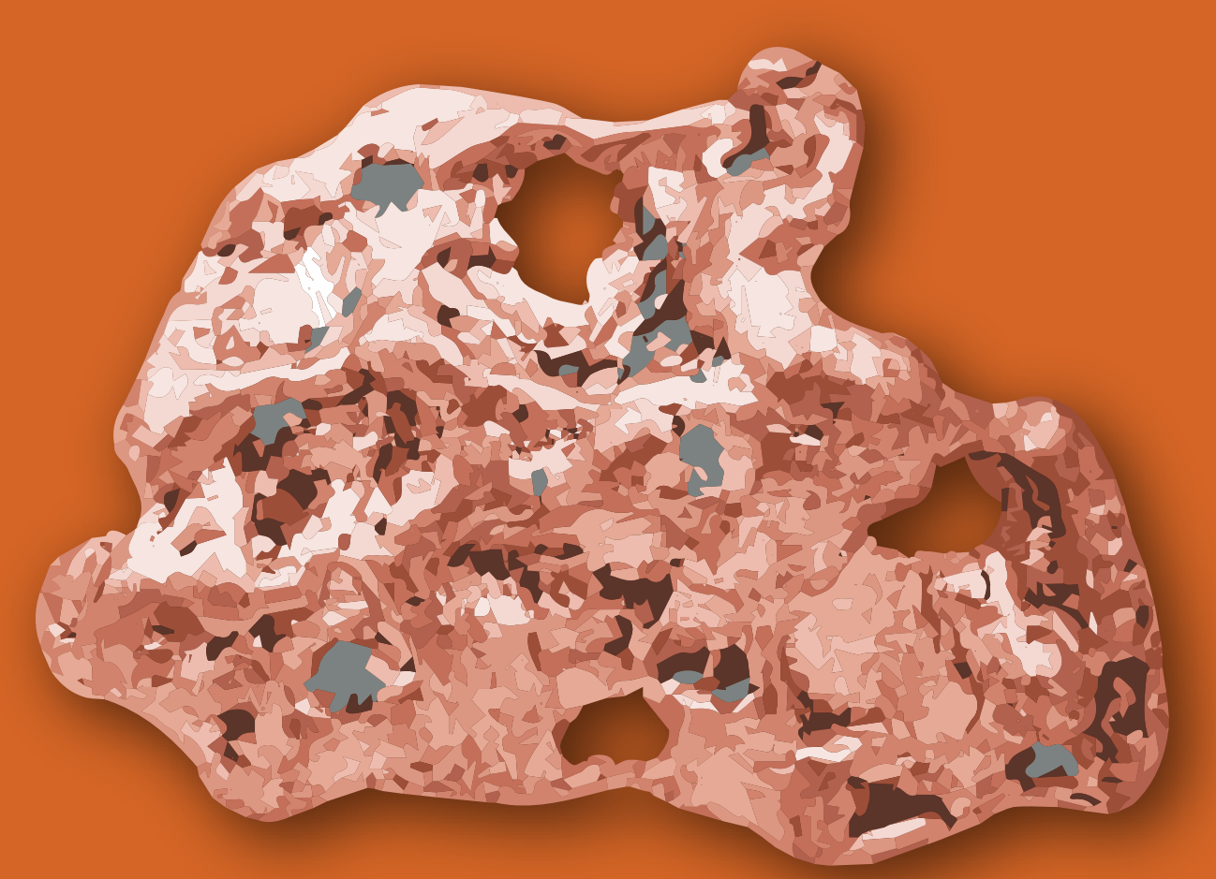
MINERALS ARE CRITICAL TO A RENEWABLE FUTURE

# COPPER



*Nothing works without it*

COPPER
**Cu**
29
63.546

## Scientific Properties

- Very Malleable
- Very Ductile
- Durable
- Conducts heat
- Conducts electricity
- Non-corrosive
- Non-magnetic
- Antimicrobial

## Uses for Copper in the U.S.

### ELECTRICAL

Copper is an excellent conductor of electricity and is used in wire form extensively in lighting and electronic components. It is used in microchips, electric motors, and large-scale electrical transmission lines. In renewable energy systems, it is used to generate power from solar, wind, tidal, hydro, biomass, and geothermal sources and transports that power for storage and use.

### CONSTRUCTION

Because copper is malleable, ductile, durable, and corrosion resistant, it's used extensively in water and natural gas pipes. It's also used in heat exchangers for radiators, air coolers, oil coolers, heat sinks, calorifiers, heat pumps, and coils in air-conditioning and refrigeration units. With clever design, copper can make heat exchangers ecofriendly and economical for natural refrigerants.

### TRANSPORTATION

Copper is an essential component in the wiring, motors, connectors, radiators, brakes, and bearings used in vehicles large and small. This includes e-bikes, motorcycles, cars, buses, electrified railways, subways, airplanes, and rockets. It's also used in space exploration, from the shuttles to the space stations, and lunar rovers and their delivery systems.

### HEALTH

While too much is toxic, copper is an essential nutrient. It's in all body tissues, helps make red blood cells, maintains nerve cells, and bolsters immunity. It also helps form collagen and absorb iron, and produces energy. We consume it by eating shellfish, whole grains, some greens, black pepper, nuts, and organ meats. Copper's antimicrobial properties help fight against germs and disease.

### COINS

Traditionally, copper has been one of the few metals used to make coins, along with silver and gold. In fact, all coins minted in the U.S. since 1964 are made of copper alloys with no silver content, except for certain commemorative coins.

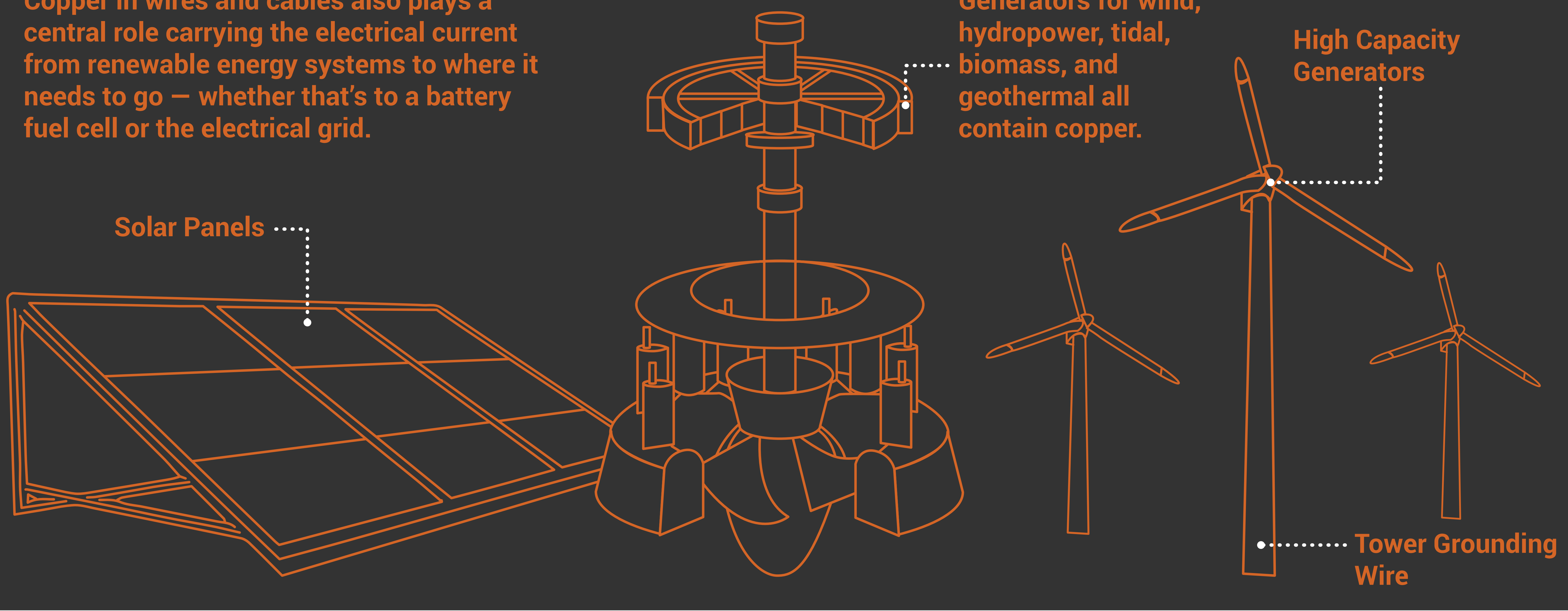
### INSTRUMENTS

Brass (copper-zinc alloy) is more malleable and has better acoustic properties than pure copper or zinc; consequently, it is used in a variety of musical instruments, including trumpets, trombones, bells, and cymbals.

**More than 30% of copper used worldwide is recycled. Recovered scrap copper made up about 38% of the U.S. supply in 2020.**

## Copper used in Renewable Energy

Copper in wires and cables also plays a central role carrying the electrical current from renewable energy systems to where it needs to go — whether that's to a battery fuel cell or the electrical grid.

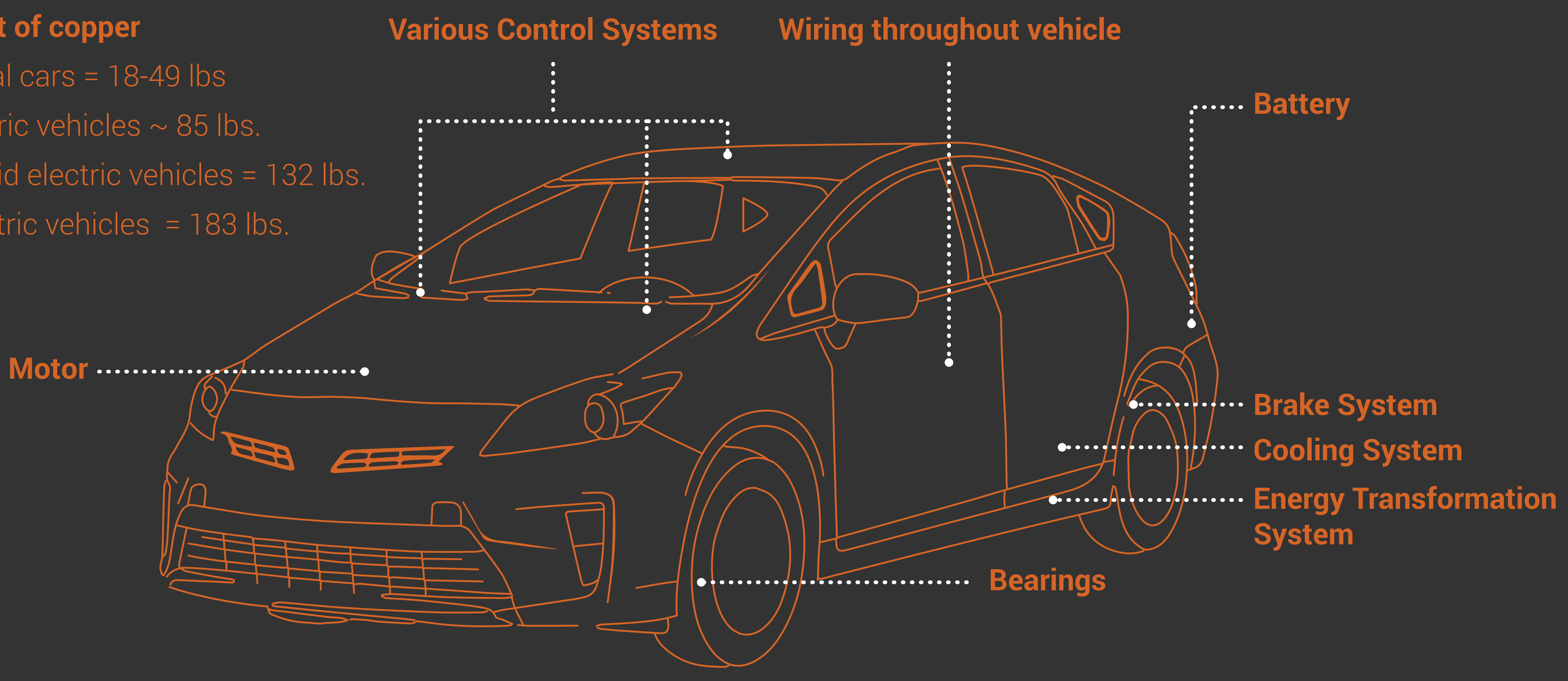


Generators for wind, hydropower, tidal, biomass, and geothermal all contain copper.

## Copper used in Electric Vehicles

**Cars use a lot of copper**

Conventional cars = 18-49 lbs
Hybrid electric vehicles ~ 85 lbs.
Plug-in hybrid electric vehicles = 132 lbs.
Battery electric vehicles = 183 lbs.



www.blm.gov/alaska/minerals

**References:**
https://www.usgs.gov
https://copperalliance.org
https://copperalliance.eu
https://www.copper.org
https://www.rsc.org
https://fwee.org
https://www.medicalnewstoday.com
https://geology.com