



SEPTEMBER 2023

Achieving net zero

And the critical role of copper

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The scramble for minerals

The 2020 Paris Climate Accord agreement is a legally binding treaty on climate change that was adopted by 196 parties at the UN Climate Change Conference (COP 31) and calls for emissions to be reduced by a staggering 45% by 2030. Reduce, reuse and recycle has become the order of the day so as to decouple the world's growth from fossil fuel consumption. To this end, the pivotal role that copper will play cannot be overstated.

Unless there are substantial advancements in carbon capture and storage technology in the near future, the entire path to achieving net zero emissions will depend on abatement strategies such as electrification and the utilizations of renewable sources. Given its status as the most cost-effective conductive material, copper occupies a central position in the capture, storage and transportation of these emerging energy resources.

In short, the pursuit of a global economy with net-zero emissions continues to be a primary catalyst for the structural bull market in commodities demand, with green metals, particularly copper, assuming a critical role.



A shift from hydrocarbons to sustainability



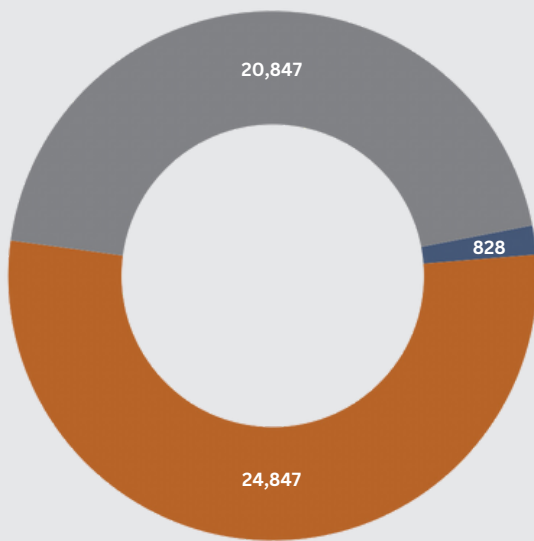
At the heart of copper's role in this "carbonomics" transformation, lies the imperative to shift from a production system primarily reliant on the chemical energy of hydrocarbons (such as oil and gas) to one that draws from a variety of sustainable sources like electromagnetic (solar), kinetic (wind), and geothermal energy. Copper possesses the essential physical properties needed to convert and transmit these energy sources into their final, practical forms, whether it's propelling a vehicle or heating a home.

Copper demand stemming from this energy transition will therefore increase from current levels. Remarkably, industry analysts¹ anticipate that by the middle of the decade, the growth in demand for copper driven by the green sector alone will not only match, but swiftly surpass, the incremental demand generated by China during the 2000s. These ripple effects into non-green sectors imply that the 2020s are poised to witness the most robust phase of volume growth in global copper demand in history.

1. Goldman Sachs, 13 April 2021: *Copper is the New Oil*

Copper is central to the development of the circular economy

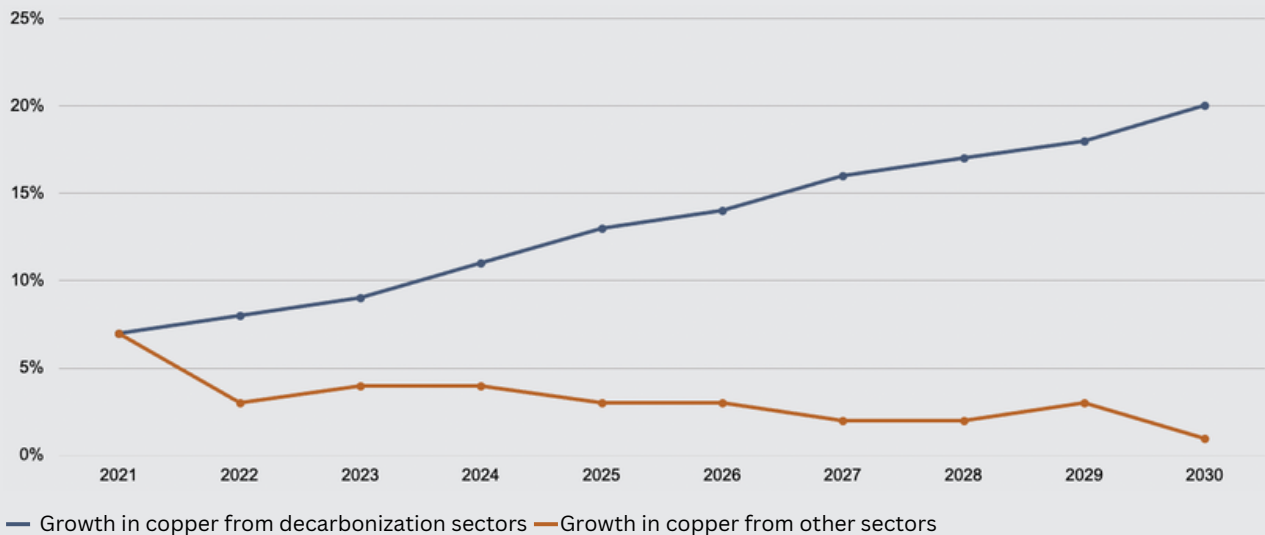
2023 Consumption of Copper by End Use



While Copper is an extremely versatile commodity, used in infrastructure, consumer goods and water pipes, it is decarbonization that is set to drive over 70% of copper consumption growth over the coming decade.

■ Decarbonization sectors ■ Non decarbonization sectors ■ Other

Copper Consumption Growth

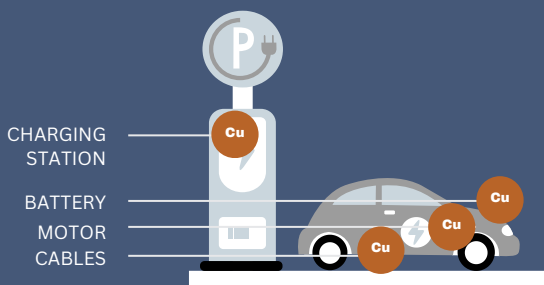
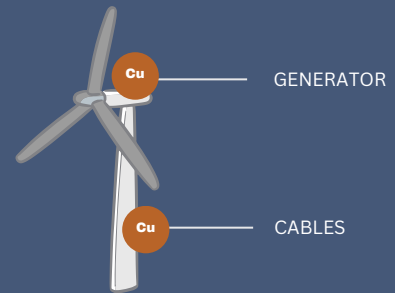


— Growth in copper from decarbonization sectors — Growth in copper from other sectors

Copper will power the next generation of CleanTech

WIND TURBINES

Copper demand from wind energy will account for 20% of green demand, with copper intensity expected to grow as offshore projects that require twice as much copper, become more prevalent.

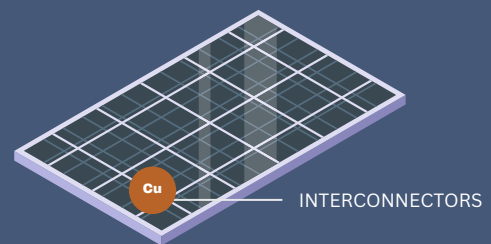


ELECTRIC VEHICLES

Electric vehicles have more than 5 times the copper of ICE vehicles and by the end of decade they will account for around 40% of the green copper demand.

SOLAR PANELS

Copper is key for efficiency and performance of PV (photovoltaic) panels, and thanks to their fast declining cost and deployment, they will be the second driver of green demand after EVs.



ENERGY STORAGE

In EVs, copper is mostly used for batteries, and in the future, the development of grid energy storage systems will represent a key upside for green copper demand.

Source: World Bank, ICA, Copper Alliance, Goldman Sachs Global Investment Research

The switch to clean energy will increase copper use



COPPER IN SOLAR TECHNOLOGY

There are approximately **4.56t per megawatts (MW)** of copper in solar power systems. Commonly used in:

- **Interconnectors:** Connects solar cells and forms the solar panel.
- **Wiring:** Conducts electricity.
- **Inverters:** Inverts the DC current into AC current.

Total demand in 2030: **1.6mn mt** and **3.3mn mt** in the hyper adoption case.

COPPER IN WIND FARMS

A **3 MW** wind turbine contains up to **4.7t** of copper. Commonly used in:

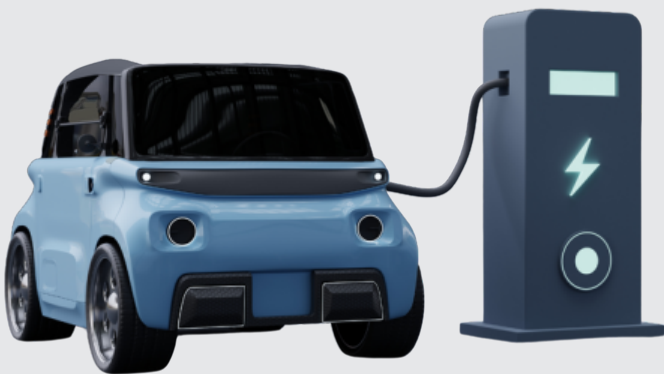
- **Cables:** Brings the current down to the base of the tower and to the power grid.
- **Generator:** Uses the kinetic energy of wind to generate electricity.
- **Transformers:** Used to step up voltage.

Total demand in 2030: **1.3mn mt** and **2.1mn mt** in the hyper adoption case.

Source: World Bank, ICA, Copper Alliance, Goldman Sachs Global Investment Research

Copper required for electric vehicles

Electric vehicles contain more copper than traditional ICE's. Of the three decarbonization drivers this coming decade, EV's will be the item most salient to households. Not only do EV's contain more copper than traditional vehicles, but copper is also needed in the charging stations.

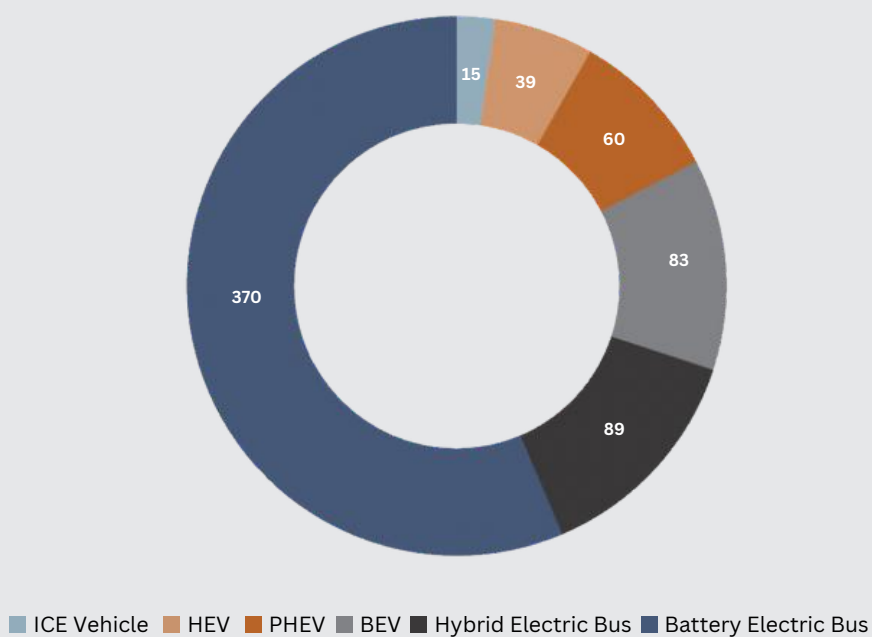


Level 1 and 2 AC charging ports contain between **1 and 7 kg** of copper and fast DC charger can contain up to **25kg**.

Electric vehicles rely heavily on copper for the motor cell that drives the engine.

Total demand in 2030: **2.6mn mt** and **3.2mn mt** in the hyper adoption case.

Copper Content by Type of Vehicle (Kgs)



No decarbonization without copper

The critical importance of securing sufficient raw materials in combating society's problems has never been more in focus. This importance extends to the greatest challenge of our time: Climate change.

Global consumption has reached unprecedented levels which has spurred a need for serious advancements in carbon capture and storage technology in the coming decade. Failure is not an option.

To this end, copper sits at the very heart of capturing, storing and transporting these new sources of energy. Without copper, the substitution of renewables in place of oil and carbon-based fuels will not occur.

In essence, while the green transition will support a surge in copper demand, the copper market as it stands is horribly under-prepared for the critical role it is set to play.

New supply at scale is key. Supply in Tier 1 jurisdictions is imperative.

Idaho Copper (OTC : COPR) meets both these requirements, namely, a large untapped copper deposit and in the heart of the US's mining region in Idaho.



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