



## Electric Vehicles Give Dr. Copper a Facelift

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Demand drivers stemming from electric vehicles (EVs), as we previously explained, could impact the utilization of several metals and the emerging markets (EMs) from which they are sourced—and EV infrastructure is a secondary demand driver.

Regardless of the type of EV or its components, all EVs need charging stations, and the growth of EVs on the roads requires proportionate growth in charging stations worldwide.

The lack of charging stations is cited to be the first barrier for EV adoption in company fleets by members of EV100, an initiative that brings together companies committed to switching their fleets to EVs and installing charging infrastructure for employees and customers by 2030.

Unlike internal combustion vehicles that can only be fueled at gasoline stations, EV owners have several options for charging: at home, at work, or at public stations. Public charging stations are particularly important in the EV rollout as they provide autonomy and flexibility to EV drivers. In 2020, public charging stations grew 46% year-over-year to 1.3 million units, of which 30% were fast chargers.<sup>[1]</sup>

China is home to the largest network of charging stations worldwide. In 2020, about 800,000 out of the total 1.3 million public charging stations, or 62%, were in China.<sup>[2]</sup> And China has been building public charging stations at a very fast pace, with Chinese public charging stations growing 55% year-over-year in 2020.

We believe charging station investments are set to grow around the world. For example, the EU targets 1 million

charging stations by 2025 as part of its European Green Deal Investment Plan, a significant increase from the roughly 290,000 public charging stations in the EU currently (just 13% of which are fast charge). The target might sound optimistic, but industry experts, such as the European Automobile Manufacturers' Association (ACEA), are pushing for 1 million charging points by 2024 and 3 million by 2029.

The United Kingdom's Committee on Climate Change suggests 1,170 charge points will be required per 100 kilometers of road by 2030, but in 2019 there were just 570 charge points per 100 kilometers of road. The government's 10-year green plan includes an investment of £1.3 billion for charging stations to address this future need.

Meanwhile, the U.S. administration is planning to build 500,000 charging stations in the next few years. That's up significantly from the 100,000 public charging stations that existed in the United States in 2020, of which just 17% were fast charge.

### **Copper: Critical to EV Infrastructure**

Copper is sometimes viewed as being so critical to the world that it can be referred to as Doctor Copper because its ability to predict economic turning points suggests it has a Ph.D. in economics.

Copper is likely to benefit from EV infrastructure investments due to its heavy use in vehicles and charging stations. It has excellent electrical conductivity and is durable, allowing it to endure extreme temperatures. These properties make copper ideal for wiring and other electrical applications.

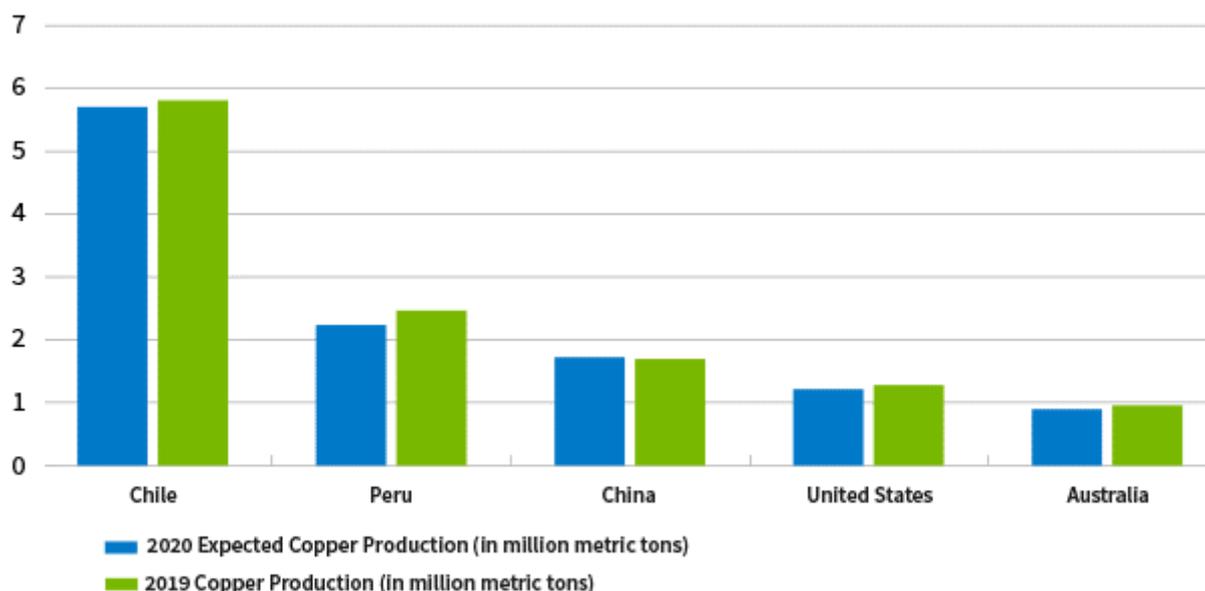
In addition, an EV contains three to five times more copper than a conventional vehicle. The International Copper Association (ICA) [3] predicts that more than 250,000 metric tons of copper per year will be consumed as a result of the higher stock of EVs in 2030, from about 80,000 metric tons currently.

The world's largest copper producing country is Chile, with about 29% of global copper mine supply. Peru and China are the second and third largest producers of mined copper, accounting for 11% and 9% of global supply, respectively. On the consumption side, China is also the largest consumer of copper, accounting for almost 60% of global demand as of March 2021.[4]

Although China is a diverse economy exporting a variety of goods, Peru and Chile's exports are more concentrated. Copper exports constituted 56% of the total value of Chilean exports[5] from January to May in 2021 and 32% of Peruvian exports[6] from January to April 2021, highlighting how important copper is to these countries.



## Chile and Peru Dominate Global Copper Mining



Source: USGS, as of 2021.

### Copper Mines: Mostly Located in EMs

As a top holder of the world's reserves, Chile is home to a number of copper producers as well as the world's largest mine, La Escondida, which alone accounts for about 5% of world production. The largest global producer is Corporacion Nacional del Cobre, Chile's national copper mining company, with 1.6 million metric tons in 2020, approximately 8% of global production. At a smaller scale, Antofagasta, which recently had its debut issuance in the EM corporate universe, is producing an equivalent of 4% of global supply.

Southern Copper Corporation is the world's fifth largest copper producer, with operations in Peru and Mexico. In 2020 the company produced about 1 million metric tons of copper, which is about 5% of global supply.

First Quantum Minerals (FQM), which is a copper miner operating primarily in Zambia and Panama, produced an equivalent of 4% of global supply last year. The company increased its copper output by 40% as the Cobre Panama mine has recently fully ramped up. Cobre Panama is one of the largest copper mines in the world, and FQM is one of the few companies in the industry to bring such large projects online recently.

### What About the Environment?

Of course, mining is perceived to have negative environmental consequences. However, there are ways to reduce the environmental impact of the extraction of minerals. We will explore that in our next post.

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[1] BloombergNEF.

[2] Global EV Outlook 2021, International Energy Agency (IEA).

[3] “EV motors boost copper demand”, International Copper Association, March 2020.

[4] Bloomberg data.

[5] Banco Central de Chile.

[6] Banco Central De Reserva Del Perú.

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