

Long-term availability of copper guaranteed

Copper reserves and resources

The future availability of minerals is generally based on the concept of reserves and resources. Reserves are deposits that have been discovered, evaluated and deemed economically viable for extraction. Resources are much larger and include reserves, discovered deposits that are potentially viable and undiscovered deposits that are predicted based on preliminary geological investigations.¹

According to the United States Geological Survey (USGS), copper reserves currently amount to around 1,000 million tonnes (Mt). The identified and undiscovered copper resources are estimated at around 2,100 million tonnes and 3,500 million tonnes respectively. The latter do not take into account the huge quantities of copper that occur in deep-sea nodules and in land-based and submarine massive sulphides. Current and future exploration opportunities will lead to an increase in both reserves and known resources.

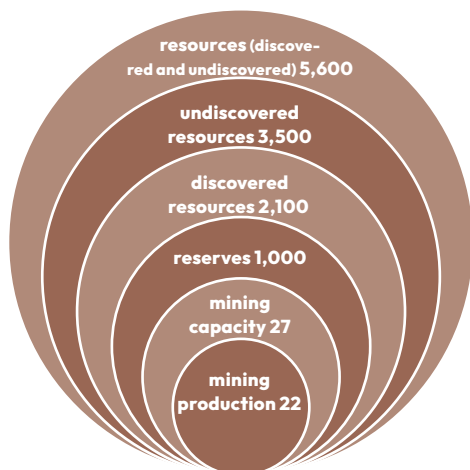


Fig. 1: Global copper reserves and resources in million tons (Figure not to scale)

Will we run out of copper?

According to data from the US Geological Survey², geological availability should also be guaranteed in the longer term due to the large reserves in South America (Chile, Peru) and other regions of the world (including Australia). Since 2000, 290 million tonnes of copper have been mi-

ned. During the same period, known reserves increased by 450 million tonnes. As a result, the reserves/production ratio has risen by 50% from 26 to 40 tonnes. According to USGS data, there have always been an average of about 40 years of copper reserves and over 200 years of copper resources remaining. These figures take into account time frames, technological advances and changing economic conditions in the mining industry.

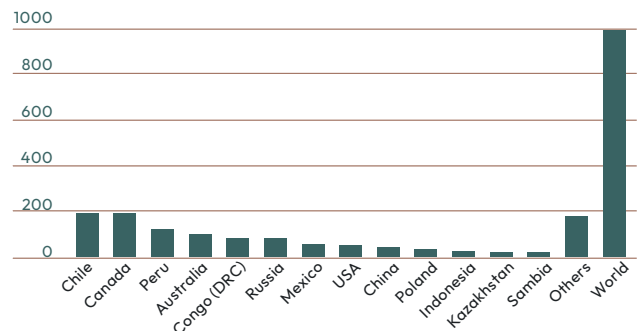


Fig. 2: Copper reserves in million tons (USGS, 2024)

Copper occurs naturally in the earth's crust at a concentration of around 28 ppm (parts per million)³. Therefore, the total amount of copper in deposits over 3.3 km, the probable future mining limit, is estimated at 300,000 million tonnes.⁴

Current and future exploration opportunities will further increase the number of reserves and known resources.

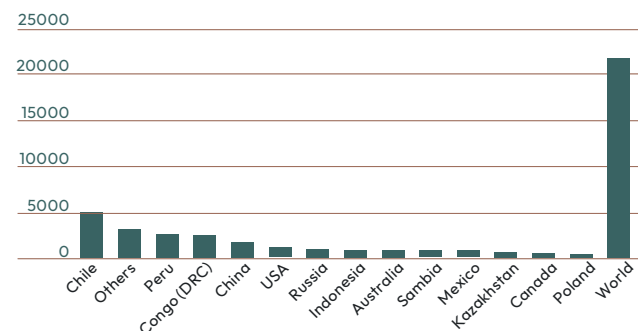


Fig. 3: Mine production in million tons (USGS, 2024)

There are several copper mine projects that are currently being examined or developed that will contribute to future

growth in supply. Global mine production currently stands at around 22 million tonnes of copper and mine capacity at 27 million tonnes.⁵

Geopolitical availability is assured

According to the DERA raw materials list⁶, copper ore has a rather low risk and copper refining a medium risk in terms of country concentration and weighted country risk. Nevertheless, according to the EU, copper is a potentially critical metal and is also listed as such in the EU's Critical Raw Materials Act (CRMA)⁷. The reason: copper is categorised as critical because it is considered a strategic raw material for the EU. Raw materials are strategic if they are of great importance for strategic technologies in the EU. Copper is difficult to replace due to its superior performance in electrical applications and it improves the secondary supply due to the very long life of copper in products.⁷



Image 1: Minas de Rio Tinto, Spain (shutterstock)

Recycling as a source of raw materials

The recycling of copper also plays an important role in the availability of the metal. The primary copper of today is the recycling material - or secondary copper - of tomorrow. Currently, around nine million tonnes of copper come from the recycling of „old“ scrap (copper in old products) and „new“ scrap (the scrap resulting from production and manufacturing processes) every year. This means that around 35% of the annual global copper input comes from recycled sources.⁸ The expansion of the circular economy is of great importance for the availability of copper in Europe and especially in Germany. This can be seen in the high level of the recycling indicators „Recycled Content“ of 40% and „End-of-Life Recycling Rate“ of 80% in 2022 in Germany.⁹ In contrast to other goods such as electricity or food, copper is not actually „consumed“. Copper is one of the few raw materials that can be recycled again and again without any loss of performance.

Conclusion:

Based on the latest findings on geological availability and the current geopolitical situation, and thanks to continued industrial innovation, there is ample reason to believe that copper will continue to make its vital and positive contribution to society and remain an important element of the global decarbonisation processes.



Image 2: copper scrap (pixabay)

Literature

- ¹ Studies, including documentation of the assessment methodology and descriptions of each area, are available on the USGS Mineral Resources Program website at <http://minerals.usgs.gov/global/>
- ² US Geological Survey (USGS Mineral Commodity Summaries 2024)
- ³ Rudnick, Roberta & Gao, Shan. (2013). Composition of the Continental Crust. Treatise on geochemistry. 4.10.1016/B978-0-08-095975-7.00301-6. <https://doi.org/10.1016/B978-0-08-095975-7.00301-6>
- ⁴ Kesler, S.E. and B. Wilkinson. Earth's copper resources estimated from tectonic diffusion of porphyry copper deposits. *Geology* 36(3):255-258(2008). <https://doi.org/10.1130/G24317A.1>
- ⁵ ICSG Directory of Copper Mines and Plants / World Copper Factbook (ICSG, 2023)
- ⁶ DERA-commodity list (2023)
- ⁷ EU Critical Raw Materials Act (CRMA), 2023
- ⁸ Copper Recycling. International Copper Association (sustainablecopper.org)
- ⁹ BGR/DERA, interview 2024

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