



Copper Recycling

1. THE IMPORTANCE OF RECYCLING

During the past decade, strong growth in emerging economies, coupled with an increased use of copper for innovative technologies, has led to significantly higher copper demand. The recovery and recycling of copper helps to satisfy this demand and to build a sustainable future.

2. COPPER IS 100% RECYCLABLE

Copper is one of the few materials that can be recycled repeatedly without any loss of performance. There is also no difference in the quality of recycled copper (secondary production) and mined copper (primary production).

3. RECYCLING SAVES CO₂ AND ENERGY

Recycling copper is a highly eco-efficient way of reintroducing a valuable material back into the economy. The recycling of copper requires up to 85% less energy than primary production. Around the world, this saves 40 million tonnes of CO₂ annually and the equivalent of 100 million MWh of electricity.

4. COPPER IN USE

It is estimated that since 1900 two-thirds of the 550 million tonnes of copper produced are still in productive use (Glöser, 2013). Approximately 70% is used for electrical applications and 30% for nonelectrical applications.

This enormous stock of copper, contained in its diverse range of end uses, and equivalent to around 20 to 25 years of mine production, is often referred to as society's "urban mine."

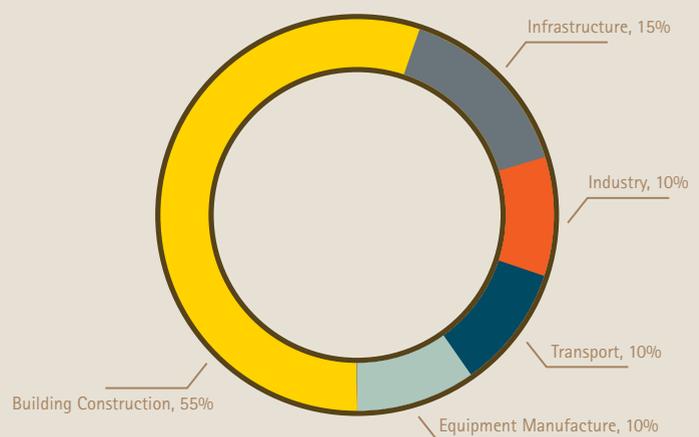


FIGURE 1: Copper in use (Glöser, 2013)

5. COPPER, THE RECYCLING CHAMPION

Currently, a total of around 9 million tonnes of copper per year come from the recycling of "old" scrap (copper contained in end-of-life products) and "new" scrap (generated during production and downstream manufacturing processes). The figure below shows how recycling is a core part of the overall copper value chain.

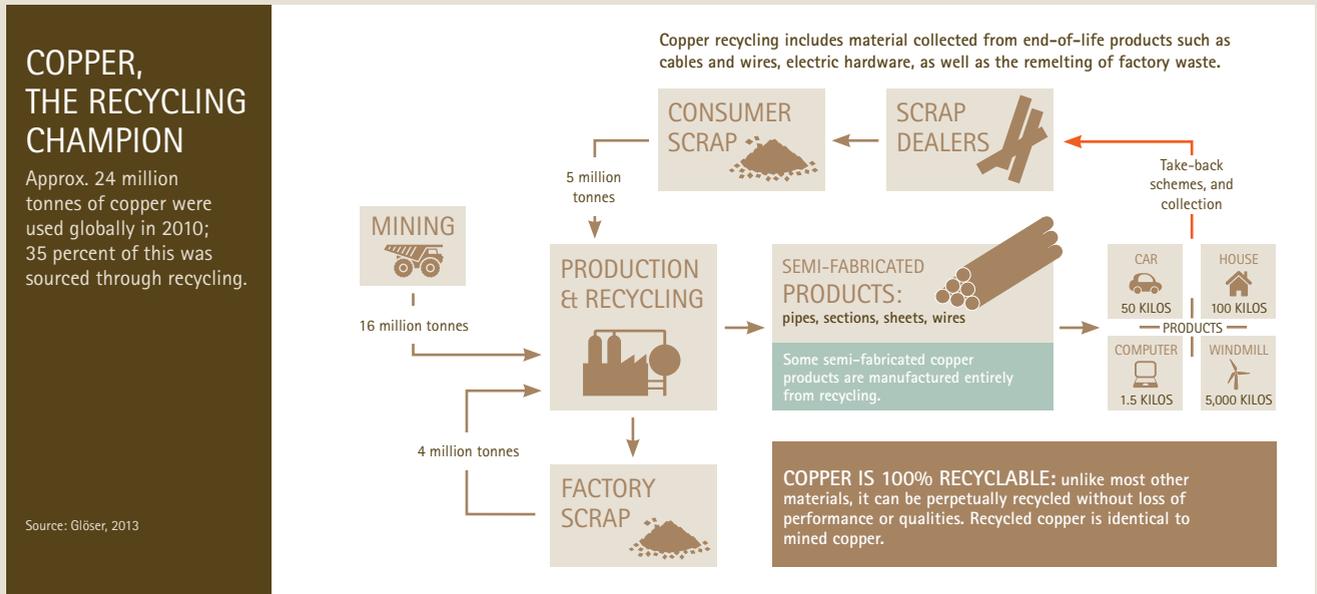


FIGURE 2: Simplified value chain for copper

While a few copper applications result in unrecoverable losses, such as dissipative losses due to abrasion (e.g. automotive brake pads) and copper chemicals used as animal food supplements and fungicides, most other applications are part of well-established recovery and take-back schemes.

6. HISTORICAL PERSPECTIVE

Two of the most relevant indicators of the recycling performance of copper are the Recycling Input Rate, which tracks the percentage of annual copper use sourced through recycling, and the End-of-Life Recycling Rate, which represents the amount actually recycled as a percentage of what is theoretically available in a given year. Both indicators have remained fairly stable since the 1950s, despite the steady increase in annual copper demand (from 2.5 million tonnes in 1950 to 19 million tonnes today) and the increasing complexity of the many end-use products containing copper, e.g., cell phones and laptops, which are more difficult to collect and reprocess.

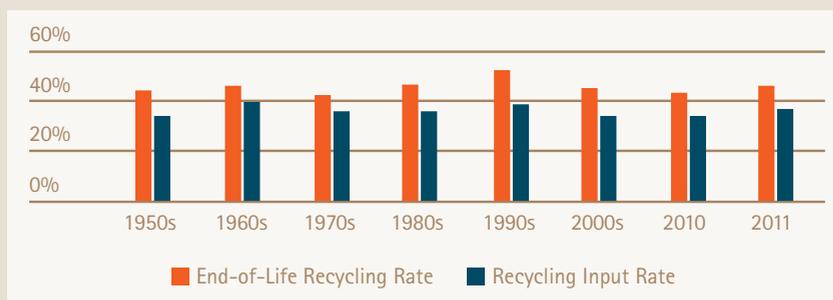


FIGURE 3: Copper recycling rates since 1950 (Glöser, 2013)

9. SUMMARY

Copper is one of the few materials that can be recycled repeatedly without any loss of performance. As well as helping to satisfy the annual demand for copper, recycling conserves valuable natural resources, saves energy and reduces CO₂ emissions.

The growing demand for copper will require a combination of raw materials coming from mines (primary copper), as well as from recycled materials (secondary copper). During the last decade about 35 percent of annual copper use came from recycled sources. Nevertheless, for recycling to be effective, innovation is also needed. Endeavors supporting recycling can be implemented in new product design to facilitate end of life recovery and the industrial recycling processes to increase overall yields. In addition, regulatory policies must continue to encourage recovery and recycling, both at the industry level and by the individual citizen.

10. DISCLAIMER

This document, developed to provide information on copper recycling, has been prepared from publically available information. Its purpose is to provide readers with information to make independent business decisions.

11. ANNEX: REFERENCES

Glöser, Simon; Soulier, Marcel; Tercero Espinoza, Luis A. (2013): A dynamic analysis of global copper flows. Global stocks, postconsumer material flows, recycling indicators & uncertainty evaluation. In Environ. Sci. Technol. (in press) DOI: 10.1021/es400069b. <http://pubs.acs.org/doi/abs/10.1021/es400069b>

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