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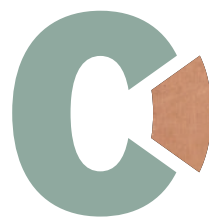


International Copper Association

Copper Alliance

COPPER— THE PATHWAY TO NET ZERO

Regional Focus: Latin America

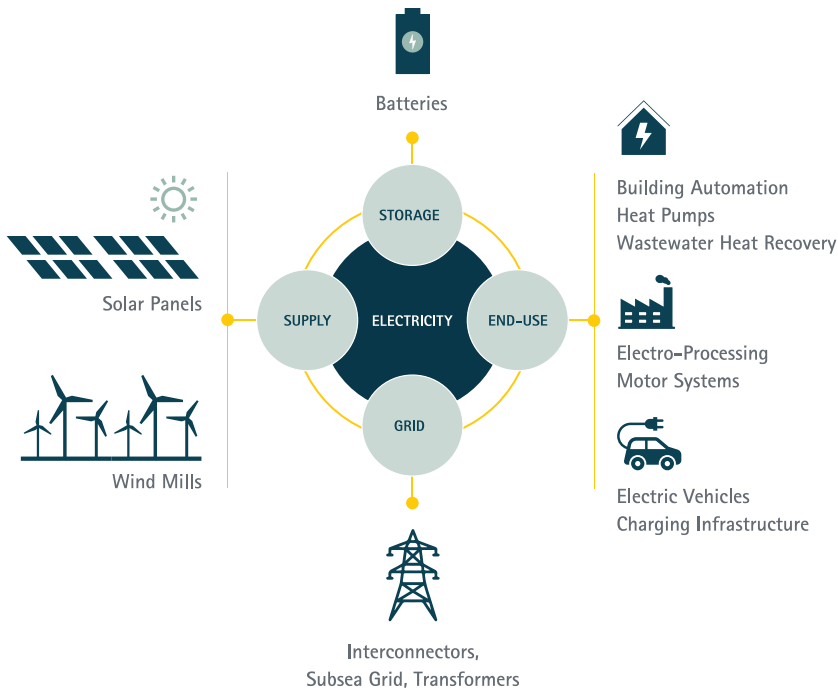


Power
of Zero

Policymaker Summary
April 2023

Copper is essential for the clean energy transition

Thanks to its superior electrical conductivity, copper is used in a vast array of decarbonizing technologies. When taken together, these technologies have the potential to account for the abatement of approximately two thirds of global greenhouse gas (GHG) emissions by 2050.



As a result of the energy transition, population growth and economic development, the annual global refined copper demand is expected to double by 2050 compared to 2020.

Copper is a highly recyclable material. 19 percent of copper demand in Latin America can be fulfilled through the recycling of copper scrap from end-of-life products (Fraunhofer Copper stocks and flows, 2018)¹. Another 22 percent of copper demand can be fulfilled through the recycling of fabrication scrap.

Figure 1 – Copper In The Energy Transition

Copper production in Latin America

The copper industry in Latin America includes copper mines, smelters, refiners, recycling facilities and fabricators of semi-finished products from copper and copper alloys, such as tubes, wire rods and bars.

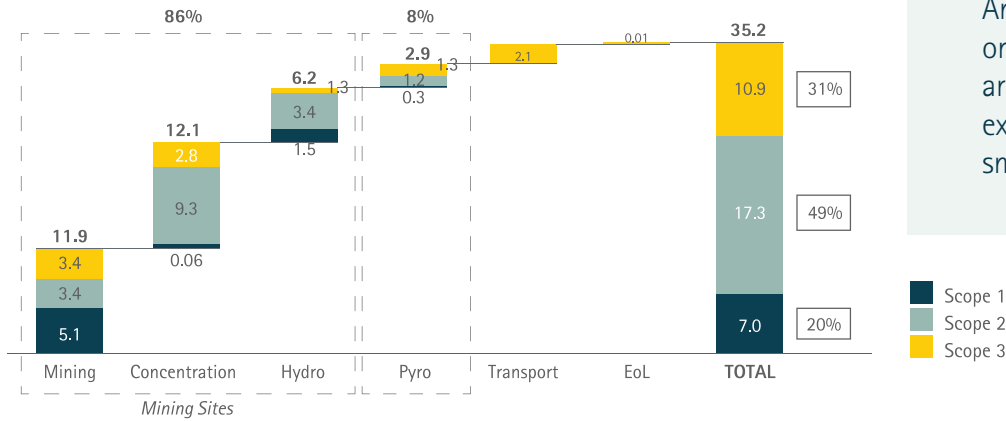
Copper is an important contributor to the Latin American economy and copper producers (mining, smelting, refining and recycling) employ approximately 260 000 people in this region. Many more individuals are employed indirectly.



1. Fraunhofer Copper stocks and flows, 2018, see <https://copperalliance.org/policy-focus/society-economy/circular-economy/stocks-flows/>

GHG Emissions from Latin American copper production today

Scope 1, 2 and 3 CO₂e emissions of Latin American copper production in 2018 (Mt)



The high share of mining sites in the generation of GHG emissions is explained by the fact that Latin America is the main source for copper ores worldwide. Most of these ores are concentrated on site after extraction and then exported to smelters and refiners across the globe.

Figure 2 – Scope 1, Scope 2 and Scope 3 CO₂e Emissions of Latin American Copper Production in 2018 (Source: Quantis, ICA Analysis)

86 percent of CO₂e emissions were generated by mining sites, 8 percent by the smelting and refining stages of production (pyrometallurgy) and the remaining 6 percent occurred in upstream and downstream transport and in the end-of-life treatment of sold products.

Copper–The Pathway to Net Zero

The International Copper Association (ICA) and its members have performed an in-depth, robust analysis, based on a comprehensive set of data, facts and sound hypotheses, to determine how fast GHG emissions of copper production can be abated with market-ready and developing technologies, at what cost and under what conditions. In this section, we outline the main findings of this analysis.

Four key levers to reduce Scope 1 & 2 emissions



DECARBONIZED ELECTRICITY

Examples

Decarbonized electricity supply or on-site generation



ALTERNATIVE FUELS

Hydrotreated vegetable oil
e-fuels
Hydrogen



EQUIPMENT ELECTRIFICATION

Battery-driven haulage trucks
Electric drills
In-pit crushing and conveying



EFFICIENCY GAINS

Higher efficiency grinding media for mills
Higher efficiency in smelting, leaching, ...

These technologies should allow a substantial reduction of Scope 1 and 2 emissions from copper production in Latin America, as shown in the picture below:

Mio t CO₂e

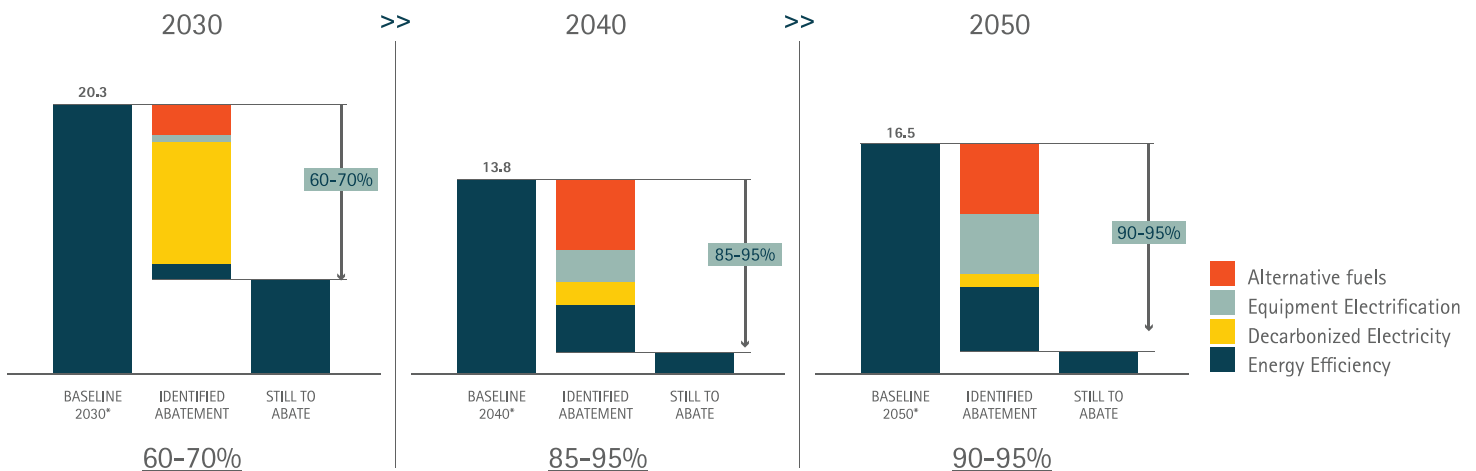


Figure 3 – Potential for Scope 1 and 2 Emissions Abatement (Source: MineLens asset decarbonisation tool; Team Analysis)

Reducing Scope 3 emissions

Addressing the reduction of Scope 3 emissions is more challenging, as the interdependence between actors in the value chain requires a partnership approach to maximize potential abatements, which are not under the sole control of copper producers. The availability of up-to-date, quality data on emissions presents an additional challenge.

Based on a preliminary assessment, the following main levers were identified to abate Scope 3 emissions:

1. decarbonized electrification
2. near shoring
3. alternative production technologies or fuels
4. efficiency gains
5. increased circularity

Combining these levers may allow the Latin American copper producers to envision a reduction of Scope 3 emissions, together with their value chain partners, as shown in the picture below:

This preliminary assessment is based on a global analysis and hence constitutes a first approach, to be further refined by engaging with the value chain and working together on reducing Scope 3 emissions.

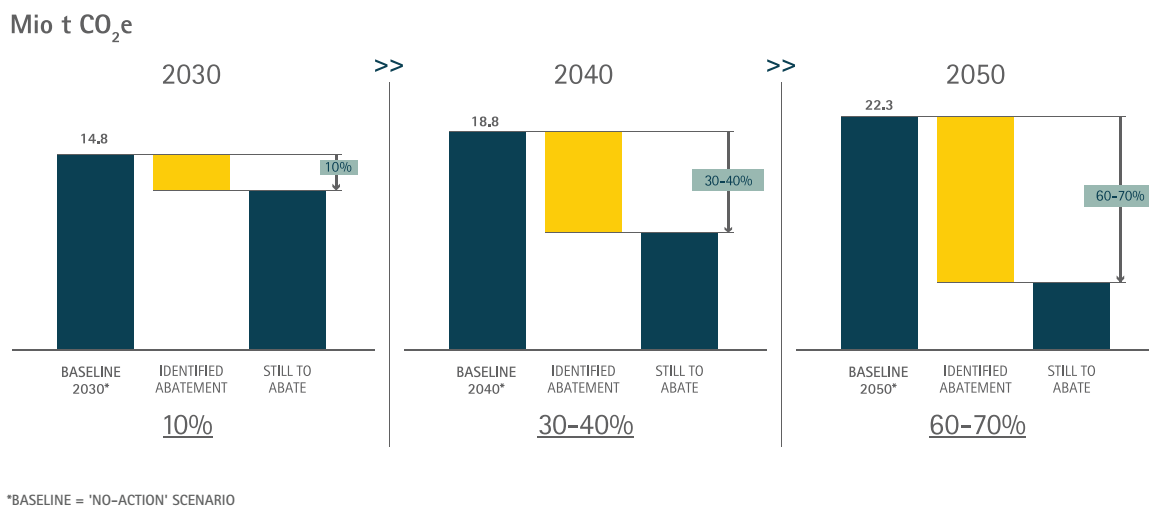


Figure 4 – Scope 3 Emissions Abatement Potential (Source: MineLens asset decarbonisation tool; Team Analysis)

Our commitment to decarbonize copper production

Based on the analysis, the members of the International Copper Association (ICA) in Latin America and globally commit to

- ▶ a goal of bringing Scope 1 and 2 greenhouse gas emissions to net zero by 2050;
- ▶ actively engaging with their value chain partners to bring Scope 3 emissions as close as possible to net zero by 2050.

This is a collective ambition. The intermediate trajectories of individual ICA members companies are likely to vary given differences in the scope of activities and operating conditions of companies. This ambition is based on current knowledge and, therefore, may evolve.

This target to decarbonize production hinges on a set of key enabling conditions explained below.

Enabling conditions for reaching the decarbonization goals of ICA Members in Latin America

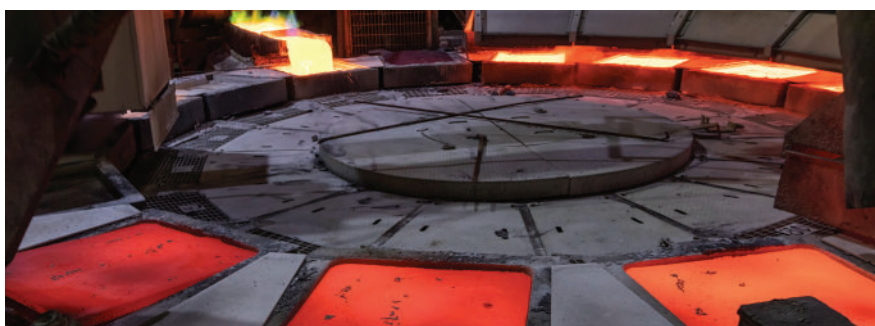
1. Access to a sufficient amount of decarbonized, competitively priced electricity

As copper is an electricity-intensive process, its production requires access to decarbonized electricity that is cost effective, available at scale and supplied through adequate infrastructure. This challenge will only increase into the future, as production volumes are growing and equipment electrification plays a role in decarbonizing copper mining and smelting operations. The speed at which electricity grids expand their capacity, develop their infrastructure and decarbonize their output is therefore critical for the reduction of copper GHG emissions and should be accelerated whenever possible.

2. A stable and fit-for-purpose regulatory framework that incentivizes investments

The copper sector requires a regulatory framework that facilitates and sustains decarbonization while ensuring the industry can invest to meet the growing demand for copper.

- a. A faster permitting process for new mining assets and expansions is critical to enable the copper industry to meet growing demand. A sound balance must be reached between consultation of local communities and implementation constraints of industrial projects, to avoid long delays -often triggered by complex regulatory or legal procedures- in developing additional copper production capacities.
- b. Installation of on-site electricity generation capacities should be facilitated and accelerated, as it is a key emission abatement lever.
- c. Transparent carbon pricing should become common practice, to encourage investment that supports decarbonization and to create a global level-playing field when externalities like climate mitigation are integrated into product costing.
- d. A stable regulatory environment that ensures long-term mining licenses with fair and predictable royalty schemes is necessary, given the substantial upcoming capital expenditures by copper producers for process decarbonization and for capacity expansions.
- e. Regulations should incentivize the shift to fossil-free land and sea transport.
- f. Coherence should be ensured across regulations, standards and policies applicable to the copper sector, with the aim to foster the implementation of decarbonization technologies. This should include the facilitation of testing such technologies before their full-scale application.



3. Availability of decarbonization technologies from manufacturers at sufficient scale

Although most of the decarbonization technologies like battery-electric trucks, on-site storage systems for fossil-free energy or solar farms already exist, these technologies must be available at scale and at affordable prices from their manufacturers in due time. Here again, the increase of copper production compounds the importance of this availability: for example, copper producers will need twice the amount of mining trucks by 2050 compared to today, and all these trucks will need to be zero-emission by then. Collaborative R&D projects, also through public-private partnerships, should facilitate this availability of decarbonization technologies and their adaptation to the specificities of the copper industry, by enabling their faster testing, validation and integration into the production processes.

4. Access to financing

Flexible investment funds should be available to copper producers in Latin America. Between 2020 and 2050, the copper industry will need to invest around \$175 billion to meet increasing demand and an additional \$ 42 billion -at least- to reach decarbonization targets, an average of \$7+ billion per year. Given the critical contribution of copper to the energy transition and the ambitious plans of ICA members to decarbonize production, copper producers should be granted access to investment funds integrating environmental, social and governance (ESG) criteria to support innovative research and development and these substantial capital expenditures.

5. Increased end-of-life collection rates of copper-containing products to allow increased recycling

Refined copper production from secondary sources does not require the mining and concentration of copper ore, processes that account for about 60 percent of the total GHG emissions of refined copper production. Also, production from high grade scrap—rather than copper ore—reduces 70 to 85 percent of the emissions from smelting and refining. This ratio is lower (10 to 50 percent) when low grade scrap is used.

Consequently, increasing the input rate of recycled scrap in the production process lowers its carbon emission intensity while meeting the growing demand for copper. To achieve this, product designs that facilitate recycling and incentives for end-of-life collection are needed, together with improved separation techniques for the treatment of multi-metal scrap streams.

Here again, it is important to stress that recycled copper alone will not meet growing demand – more mining is and will be required to enable the decarbonization of many sectors of the economy.

6. Access to skilled workforce

Copper production sites need highly skilled staff. Addressing the decarbonization challenge requires skills, such as data mining, carbon footprint measurement and monitoring, energy storage, electrification infrastructure, that are new to the sector. Training and education programs can build the capacity of staff. Copper producers will need to hire new employees with new skill sets, and support from local educational institutions will be indispensable.



The Way Forward

ICA members commit to:

- **Measuring progress** through a robust, aligned methodology for calculating the carbon footprint of copper production and a regular, transparent monitoring mechanism (to be established by end of 2024).
- **Advancing decarbonization in a responsible way**, supporting and enhancing communities and the environment around copper assets in Latin America, for example through commitment to The Copper Mark®.
- **Updating *Copper—The Pathway to Net Zero and the Regional Focus: Latin America*** at least every 5 years, or more frequently if needed, to track and analyse relevant changes across the global industry.
- **Engaging in partnerships to address the challenge of decarbonization.** We invite policymakers, academic institutions and civil society organizations to pursue innovative partnerships to reduce GHG emissions: broad and deep pilot projects to test decarbonization technologies, focus on mutual benefits for copper producers and their suppliers to reduce the emissions of goods and services purchased,...

ICA members in Latin America look forward to actively engaging with suppliers, customers, communities and policymakers to ensure the contribution of copper and the copper industry to achieving the objectives of the Paris Agreement, in a responsible and sustainable way.



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