
S&P Global Energy

Copper Market Report

Copper (Cu)

October 2026

Preamble

This draft Copper Market Report aims to provide an independent assessment of the economic dynamics shaping the global copper value chain, helping public and private stakeholders better understand the economic dynamics in the market. The report examines the economics of copper processing, including the market forces influencing processing margins, profitability, and future capacity development.

S&P Global conducted a bottom-up, asset-level assessment of copper smelting and refining costs, revenues, and margins. The analysis incorporates treatment and refining charges (TC/RCs), operating costs, by-product credits, cathode premiums, and capital requirements to provide an independent view of processing economics across the global copper industry.

Building on the flagship Copper in the Age of AI report, which examined the broader market implications of copper demand growth and mined supply constraints, this study focuses on the economics of copper processing. The objective is to improve transparency into the economics of a segment of the value chain facing increasing pressure from competition for concentrate and tightening processing margins. The analysis reflects a multi-year effort combining bottom-up asset-level modelling, proprietary market intelligence, corporate disclosures, and extensive industry consultation.

This report is based on S&P Global's proprietary market and mineral intelligence¹, and our analysis of company disclosures and market information. We welcome input from market participants to support the ongoing refinement of future editions.

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1. Report leverages [Mine Economics](#) for mining cost curve, and [Copper Market Report](#) for the mining production outlook.



Key Takeaways

- Copper prices reached a record \$14,809/metric ton (t) in September 2026, while spot treatment and refining charges (TC/RCs) fell below minus \$200/t. Despite favorable market conditions for miners, smelters continue to face significant pressure on processing margins.
- Approximately 26.5 Mt of global smelting capacity is competing for roughly 18.7 Mt of concentrate production. The rapid expansion of Chinese smelting capacity, ~50% of the global total, has intensified competition for feedstock and driven TC/RCs to historic lows.
- Elevated sulfuric acid and precious metal prices, which are typically copper concentrate by-products, are partially offsetting the impact of historically weak TC/RCs. The profitability of many smelters remains highly sensitive to by-product prices, highlighting the risk of margin compression if market conditions normalize.
- Copper demand is expected to increase by ~5.3 Mt through 2030, while announced smelting projects add ~1.8 Mt of capacity¹. The need for additional mining feedstock, and the consequent pressure on smelting economics, could force closures, curtailments, increase market consolidation, and disincentivize future capacity expansion.

Introduction

Copper demand is expected to grow significantly over the coming decades, supported by electrification, grid expansion, digital infrastructure, and energy transition. However, current market conditions across the copper value chain remain mixed, with concentrate shortages supporting upstream producers while creating increasing challenges for downstream smelters.

Record copper prices have been driven by a combination of structural supply constraints and near-term market disruptions, with the LME cash price reaching \$14,809/t in September 2026. While these price levels support strong economics across much of the mining sector, they have not translated into stronger returns across the broader value chain.

In contrast to mining, the processing segment, smelting and refining, is facing growing economic pressure. While long-term copper demand is expected to generate a substantial supply gap², recent smelting capacity expansions have outpaced growth in mine supply, intensifying competition for concentrate. The excess smelting capacity has challenged the economics of processing.

Smelters have partially offset current pressures through by-product credits, mainly sulfuric acid and gold, supported by recent high prices. However, deteriorating treatment and refining charges (TC/RCs) are still forcing some operators to reduce utilization, suspend operations, or close altogether, as illustrated by Mitsubishi Materials' planned suspension at Onahama by 2027. While existing contracts provide some near-term protection, prolonged weakness could force further closures among custom smelters, pressure integrated operations, and increase market concentration, potentially limiting future capacity expansion.

Copper's Properties



Heat and electric conductivity

401 W/(m*k) (heat);
100% in IACS³

Conductivity second to silver, and ~1.6x higher than aluminum



Malleable and ductile

Tensile test at 40-50% elongation at break

Ductility just below silver, and ~2-3x higher than aluminum



Corrosion resistance

1-5 atmospheric corrosion rate (µm/year)

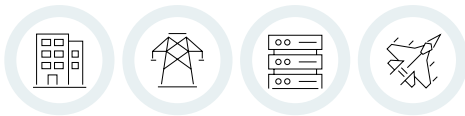
Just below stainless steel, similar to nickel

1. Solvent extraction-electrowinning (SX-EW) capacity expected to increase by ~0.2 Mt; 2. [Copper in the Age of AI: Challenges of Electrification](#) | S&P Global; 3.

International Annealed Copper Standard, ~58 MS/m for Cu.

Sources: S&P Global Analysis, Copper Price from LSEG.

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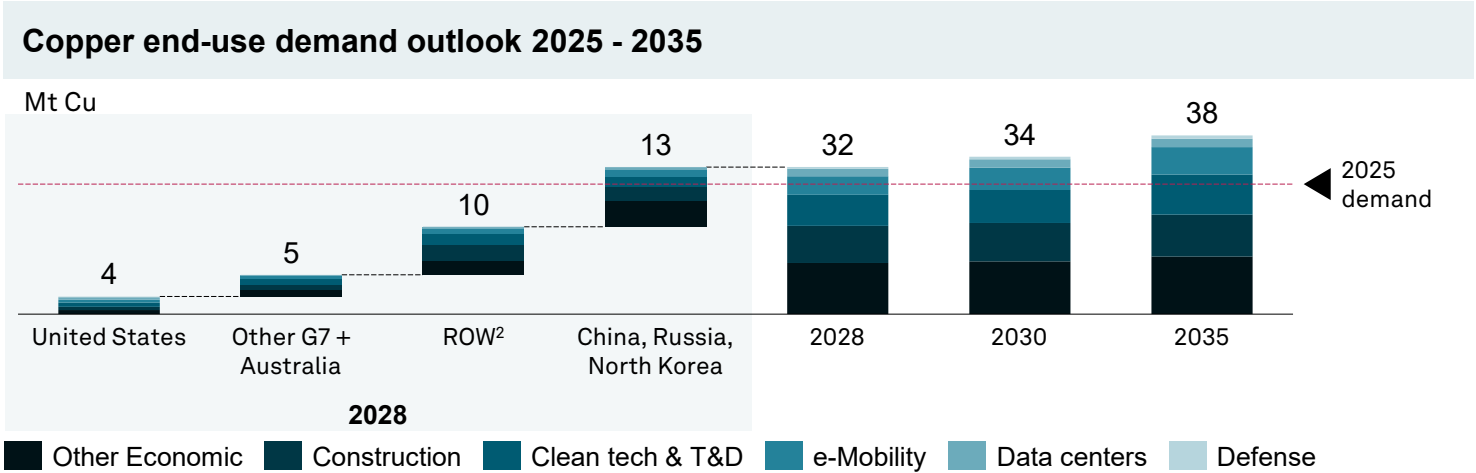
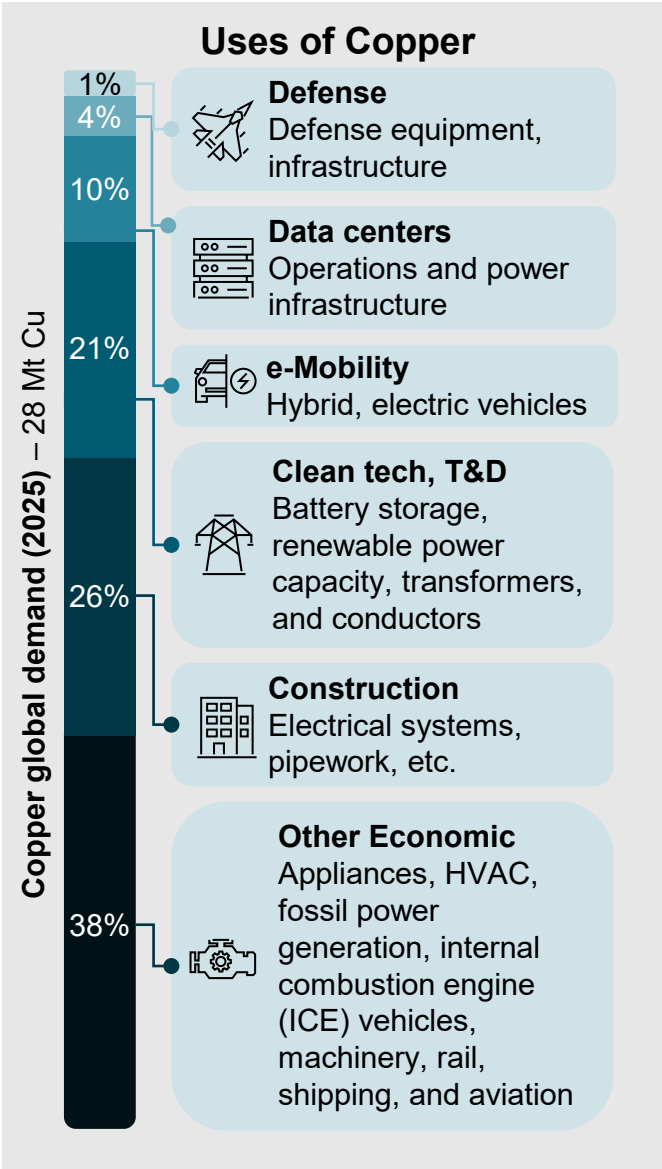


Copper demand

Copper demand is primarily driven by traditional sectors such as construction and power infrastructure, with emerging structural trends supporting future growth. These include the electrification of transport, renewable energy generation and transmission, AI-related infrastructure, and rising living standards in emerging economies¹.

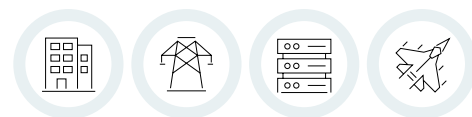
Global copper demand is expected to grow from 28 Mt in 2025 to 34 Mt by 2030 and 38 Mt by 2035. Electrification-related applications are projected to account for approximately 60% of incremental demand growth over this period, with electric vehicles and transmission and distribution infrastructure emerging as the largest contributors.

Continued urbanization and industrialization across emerging economies will remain an important source of copper demand growth. China and the broader Rest of World (excluding G7 + Australia) are expected to account for most of the incremental consumption through 2035, supported by investment in housing, infrastructure, and manufacturing. AI-driven data center expansion is emerging as a new source of consumption, while rising defense spending and military modernization may provide additional support to long-term demand. Every major growth trend, from urbanization to artificial intelligence, depends on moving and managing electricity efficiently. While copper remains the preferred conductor, higher prices can improve the economics of alternative materials in sectors such as building construction, air conditioning equipment, transformers, and selected vehicle components.



1. Additional details on demand: [Copper in the Age of AI: Challenges of Electrification](#) | S&P Global. Demand updated to reflect 2026 outlook; 2. Rest of World

Source: S&P Global Analysis



Copper supply

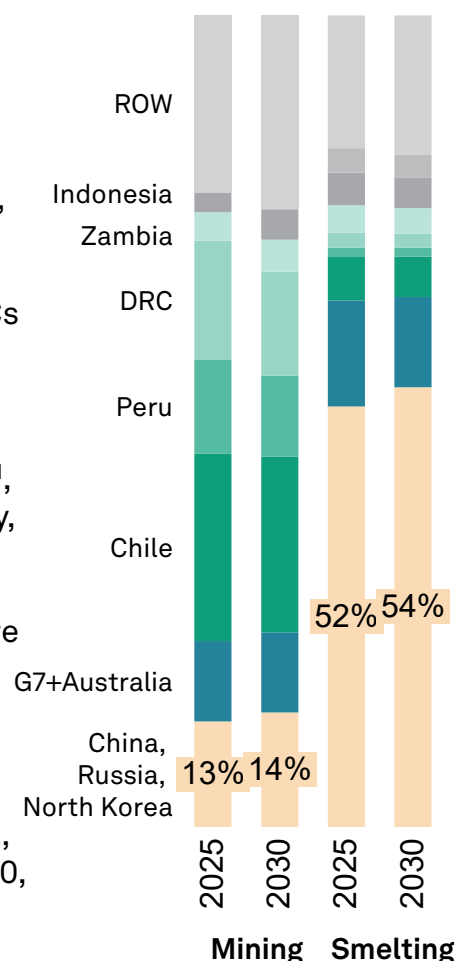
Copper smelting economics are increasingly shaped by concentrate availability, which remains concentrated among major producing regions including Chile, Peru, and the DRC. While future mine supply growth is expected from a combination of brownfield and greenfield developments, this section focuses on the downstream implications for copper processing. Additional analysis of copper mine supply is available in the [Copper in the Age of AI report](#).

The rapid expansion of global smelting capacity, particularly in China, has outpaced concentrate supply growth, reshaping copper processing economics. China now accounts for over 50% of global smelting capacity and more than 70% of concentrate imports. TC/RCs are typically the main source of smelter revenue. However, as competition for concentrate has intensified, TC/RCs have fallen to historically low levels.

Weak TC/RCs have placed the greatest pressure on custom smelters¹, which rely on third-party concentrate rather than captive mine supply, increasing their exposure to tightening concentrate markets relative integrated producers. In contrast, integrated producers are better positioned to absorb lower processing margins through their exposure to mine production.

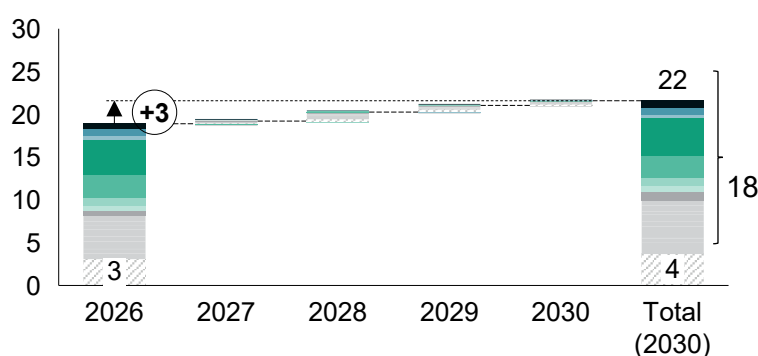
In today's market conditions, many smelters remain operating to capture by-product value such as sulfuric acid and precious metals, despite weaker concentrate terms. However, current economics are not supporting significant new processing investment. Outside China, only around 600 kt of new smelting capacity is expected through 2030, compared with roughly 3 Mt of additional mined production. As a result, future capacity growth may struggle to keep pace with long-term demand requirements.

Market Structure

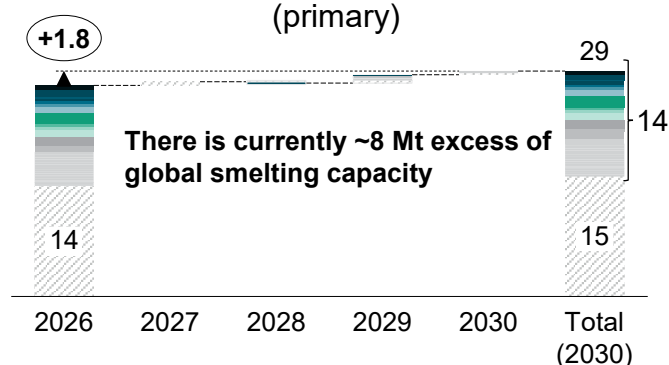


Copper supply potential

Mining production²



Smelting capacity (primary)

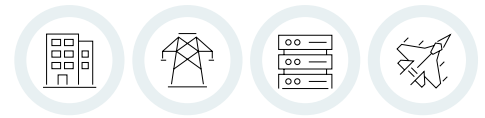


The supply chart represents potential risk supply pipeline based on company announcements

1. Roughly 60% of capacity; 2. Excluding SX-EW production, which is ~4.9Mt Cu

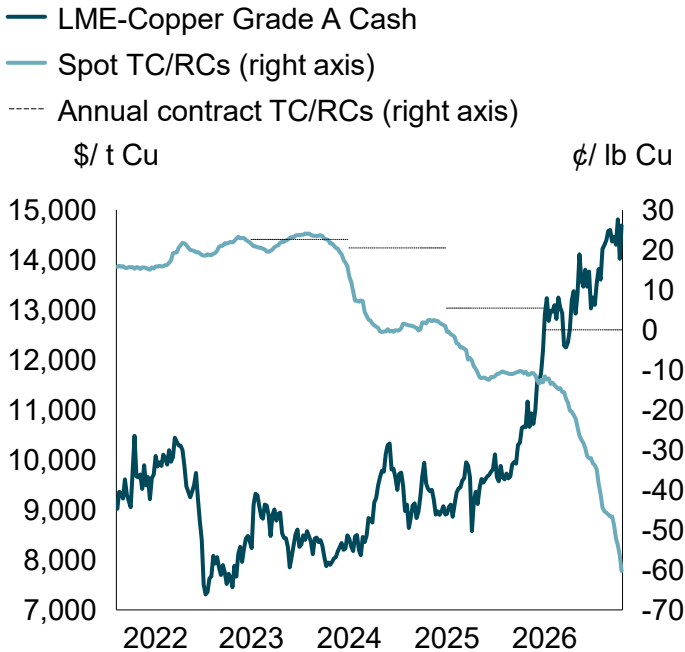
Sources: S&P Global, ICSG, S&P Market Intelligence

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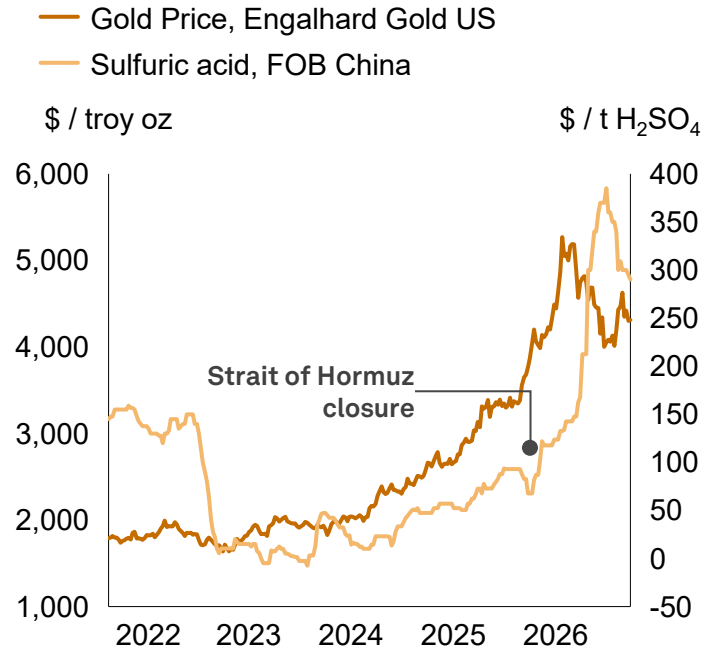


Market developments

Copper LME price and TC/RCs



Key by-product prices

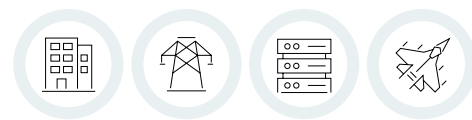


Recent market events

1. LME copper cash price hit a record \$14,809/mt on Sept. 9, driven by US Section 232 tariff speculation. Traders front-loaded imports into US ports, tightening global supplies [Platts, 2026].
2. Sulfur prices reached record highs in July 2026, with FOB prices exceeding \$1,000/t and CFR prices approaching \$1,200-1,300/t. The rally was driven by Hormuz-related supply disruptions, strong demand, and export restrictions in key producing countries such as Russia, Turkey, and China [Platts, 2026]. Elevated prices in Africa are turning into cost risk for miners, with heap leach and solvent extraction-electrowinning (SX-EW) operations most exposed to the current squeeze [Platts, 2026].
3. 2025-2026 disruptions of mine supply: Grasberg's mudslide in 2025, with repairs not expected until end 2027 [Platts, 2026]. Severe late July 2026 winter storm in Chile disrupted key copper-producing regions, with Lundin's Caserones and Candelaria mines suspending operations [Platts, 2026].
4. 2026 annual benchmark TC/RC was set at \$0/mt and 0 cents/lb, agreed between Antofagasta and a leading Chinese smelters. In July 2026, both parties agreed fallback pricing for midyear copper deals, the first time such a mechanism has been adopted [Platts, 2026].
5. Japan's Mitsubishi Materials will suspend copper concentrate smelting at its Onahama facility by end-March 2027, citing "significant deterioration" in TC/RCs and intensified competition from Chinese, Indian, Indonesian, and DRC smelters [Platts, 2026]. Mitsubishi Materials, JX Advanced, to integrate copper operations into new joint venture [Platts, 2026].
6. In mid-2025, Glencore's Mt. Isa copper smelter in Australia declared operations no longer viable, citing challenging market conditions. In October 2025, the company secured a support package of A\$600 million from the government to keep asset operational until end of 2028 [Platts, 2026].

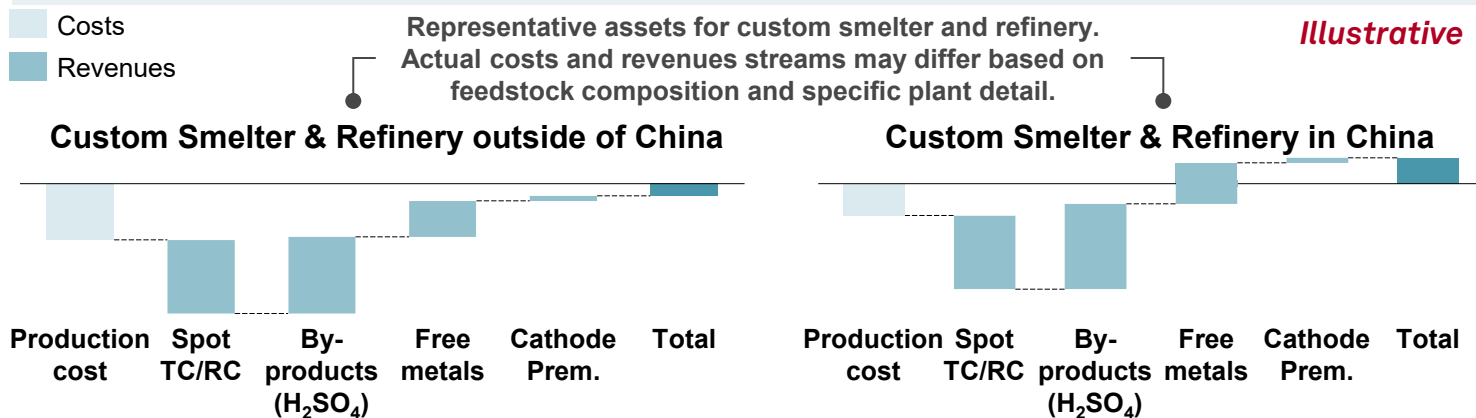
Note: Data compiled as of Sept 28, 2026.

Sources: S&P Global. TC/RC spot, and sulfuric acid prices from S&P Global Platts, Copper prices from LSEG.



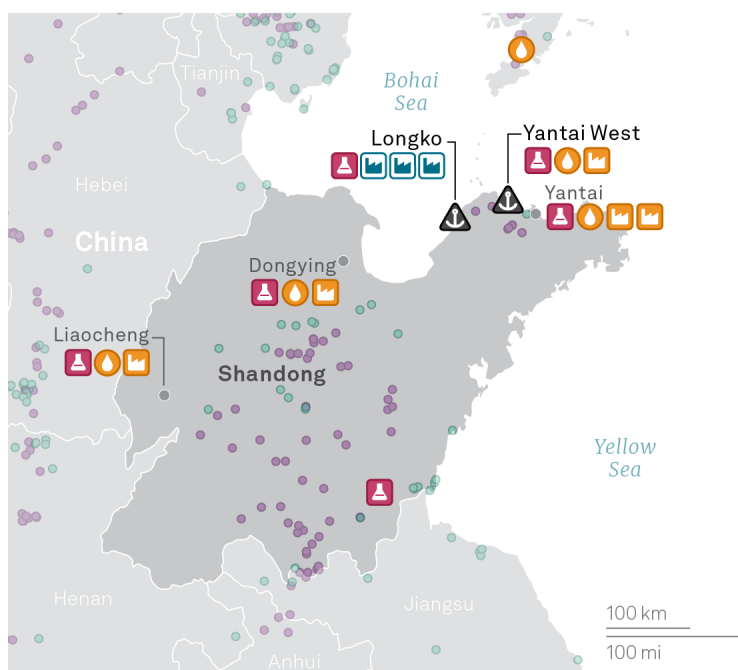
Processing challenges for custom smelters

Copper economics¹ for a smelter and refinery



China's Shandong industrial province

- Port
- Copper industry**
 - Copper smelter
 - Copper refinery
 - Sulfuric acid plant
- Precious metals
 - Refinery
- Construction materials
 - Cement
 - Iron and steel



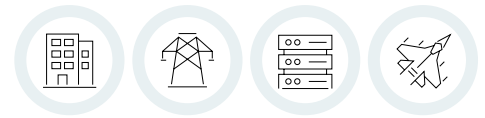
Source: S&P Global Energy

The Shandong province illustrates the benefits of industrial clustering, with smelters located near ports, on-site acid plants, precious metals refiners, cement producers and manufacturers, reducing logistics costs and maximizing by-product value recovery.

- Despite facing similar market conditions, Chinese custom smelters have remained more resilient than custom smelters in ROW.
- Custom smelters are more exposed to concentrate market tightness and negative TC/RCS. However, leading facilities, particularly in China, benefit from modern technologies, advanced blending strategies, and strong by-product recovery capabilities. China's smelter fleet is relatively young, averaging ~14 years compared with ~50 years in the rest of the world.
- Many Chinese smelters operate within integrated industrial ecosystems that combine logistics, downstream processing, precious metals refining, and local by-product consumers, further supporting lower costs and higher recoveries.
- Integrated producers can better withstand weak TC/RCS through their exposure to captive production, as they are part of the same flowsheet. However, current conditions discourage additional utilization through third party concentrate, and any new capacity decision must be economically competitive as a standalone unit.

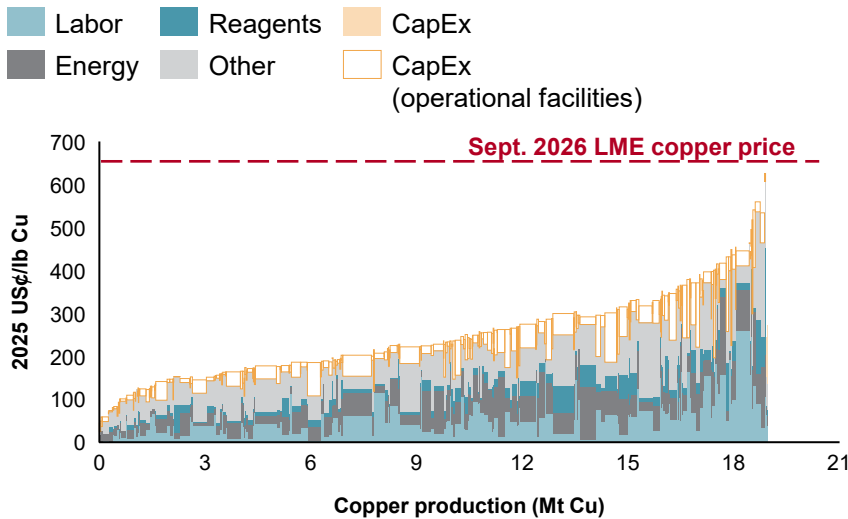
1. Costs include power, labor, sustaining CapEx/maintenance, reagents. Assuming concentrate for custom smelters is procured at spot market. By-product and metal prices based on July 2026 outlook for 2026. Free metals include copper, gold and silver; credits can be higher for smelters recovering other valuable metals and by-products. Assuming relatively clean concentrate without any impurities.

Sources: S&P Global. Spot TC/RCS, Cathode premium, gold and silver prices from S&P Global Platts. LSEG for copper price.

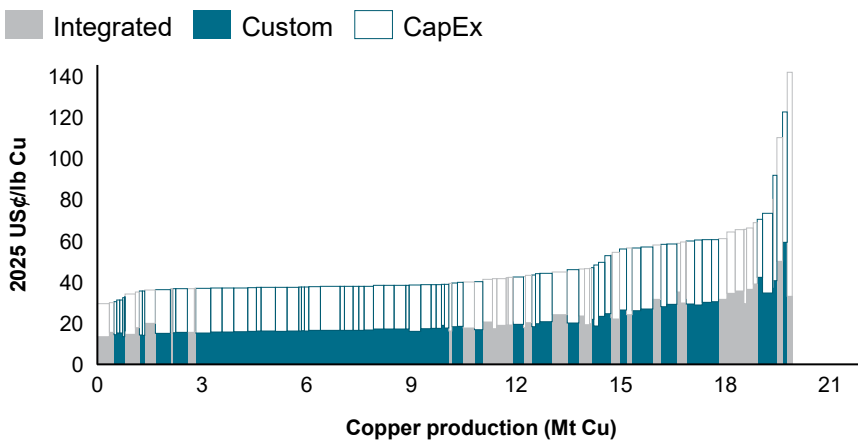


Production cost curve

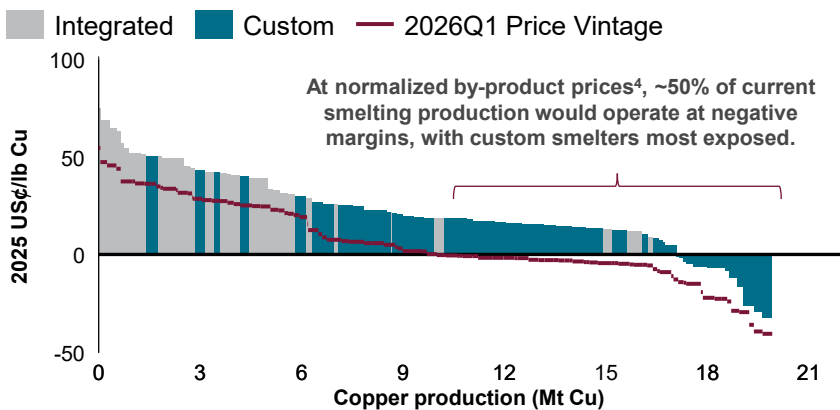
Mining production cost curve – Copper 2026¹



Smelting and refining primary² production cost curve, excluding by-products credits – Copper 2026



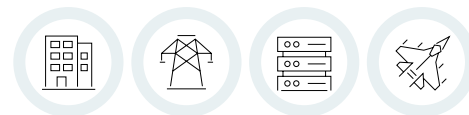
Margin estimate smelting and refining curve³ – Copper 2026



Findings

- S&P Global CERA estimates a cost range of between **¢340/lb** and **¢399/lb** for 80-90th percentile of Copper mining, excluding capital expenditures (CapEx). Differences are due to ore grade, production method, recovery rate, and location, with costs mostly driven by energy, and labor.
- Current LME copper prices remain above the cash costs of operating mining projects.
- For smelting and refining, a fraction of upstream costs, the cost range is estimated between **¢27/lb** and **¢32/lb** for 80-90th percentile, above the historical treatment charges since 2023. Cost range excludes CapEx as these mature assets are mostly fully depreciated and amortized. Differences driven mostly by location, as well as technology, concentrate grade, and recovery rates.
- Processing is CapEx intensive, with new-build investments of **¢125/lb** to **¢250/lb**, and reactivation investments of **~¢70/lb⁵**.
- Weak TC/RCs for custom smelters are being offset by elevated sulfuric acid and by-product prices.
- Integrated smelters benefit from captive concentrate supply and lower exposure to the spot market.
- Today, we estimate close to 15% of smelting production is operating at a loss or near loss. If by-product prices return to early 2026 levels, the number could increase to 50%, increasing the risk of closures.

1. Covering ~85% of 2026 global recovered Cu production; non-primary Cu mines costed based on co-product revenue shares; 2. Primary copper smelting utilization (concentrate capacity basis): ~83% in China, ~70% other Asia-Pacific, ~84% in Europe, ~66% in the Americas, and ~63% in Africa, excluding scrap production. Costs exclude feedstock costs, operating margin, and by-product credits. Refining charge is add-on cost for standalone smelters; 3. Margin calculated from cathode premium, sulfuric acid, free metal from copper, gold, and silver less operating costs; cathode premiums based on Platts' US and China assessments, and Aurubis at ~\$315/t; 4. Sulfuric acid ~\$189/t average; TC/RCs unchanged; 5. Retrofit projects can require greenfield-level CapEx.
Sources: S&P Global, S&P Global Market Intelligence Mine Economics



Methodological approach

Feedstock



Copper Concentrate: Integrated smelters use upstream concentrate specifications. Custom smelters assume 25% Cu, 1 g/t Au, and 60 g/t Ag concentrate grades. Sulfuric acid based on smelter's adjacent plant capacity or estimated at ~1 t sulfur per t concentrate processed.



Archetype Approach: Consumption and recovery rates are estimated using technology archetypes derived from feasibility studies, technical reports, and academic literature, covering Direct-to-Blister, Double Flash, Flash-Peirce-Smith, TSL-Peirce-Smith, TSL Smelting and Converting, Mitsubishi, Bottom-Blowing, Side-Blowing¹, and Teniente.



Smelting and Refining OpEx

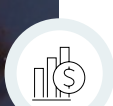
Labor: Labor costs are estimated by combining the number of full-time equivalent employees (FTEs), regional processing/refining wage rates, and a regional multiplier to account for additional mining and refining labor costs. FTE requirements are estimated using an S-curve relationship between plant capacity and workforce size, calibrated with available industry data.



Energy: Includes fuel, power, and utility costs estimated from asset archetypes and adjusted for country-specific energy prices. Power costs are based on archetype electricity consumption and local wholesale electricity prices plus transmission fees.



Reagents: Reagent costs are estimated using asset archetype reagent costs and adjusted for regional differences in reagent prices.



Smelting and Refining CapEx

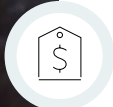
Capital expenditure: Includes levelized initial CapEx, allocated to each facility and recovered over a 20-year project life using a 7% discount rate to reflect the time value of money, as well as sustaining CapEx representing ongoing investments required to maintain operations and productive capacity, estimated as a percentage of initial CapEx.



Margin: Calculated as operating costs plus sustaining CapEx minus revenues from sulfuric acid sales, free metals from gold, silver, and copper, and cathode premium.



Metal and sulfuric acid prices: \$5.81/lb per Cu, \$4,485/oz of Au, and \$72/oz of Ag (S&P 2026 outlook); Sulfuric acid prices based on S&P's July 2026 outlook at country level or regional prices when possible (avg. of ~\$300/t)². Includes shipping freight for countries/regions that are net importers.

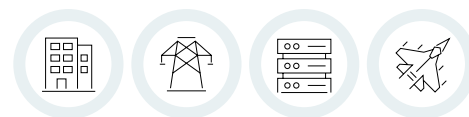


TC/RCs: For custom smelters, assumes spot prices of -\$108/DMT, and -¢17/lb; European smelters at ¢0/lb. Integrated smelters are assumed to be receiving the latest 2026 fixed annual benchmark of \$0/DMT.



Payability: Payability rates increase with metal content, ranging from 93.3-96.6% for copper, 90-98% for gold, and 90% for silver. No regional differences.

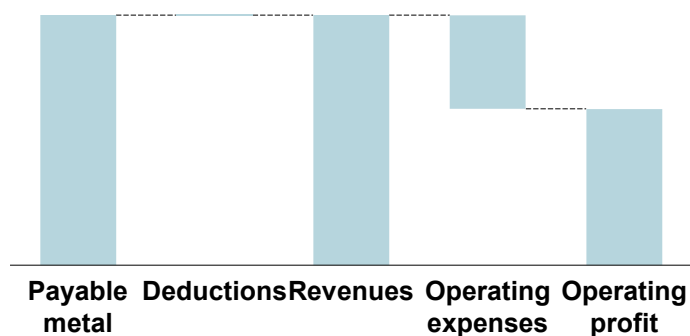
1. Smelting archetypes based on: Hannu Johto, Ali Bunjaku, Lauri Pesonen (2019) Detailed OpEx Comparison of Modern Copper Smelting Technologies Using HSC-SIM Modelling; DBF from Kamo Feasibility study, other academic papers to complete the process from concentrate to cathode production; 2. Regional/Country prices at approximately \$272/t in Japan, \$276/t in Europe, \$280/t in China, \$303/t in Africa, \$315/t on the US Gulf Coast, \$323/t in Southeast Asia, \$330/t in Brazil, and \$374/t in Chile



Appendix: Copper Income Model

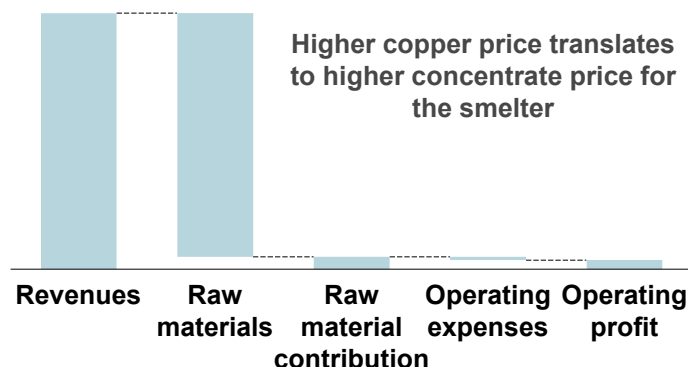
Illustrative

Mines income model



- **Payable metal:** Value of metal content in concentrate, includes copper, gold, and silver
- **Deductions:** TC/RCs, where integrated smelters assume operating costs minus gold, and silver deductions
- **Revenues:** Payable metal minus deductions
- **Operating expenses:** Mine related OpEx, includes energy, labor, reagents, and sustaining CapEx

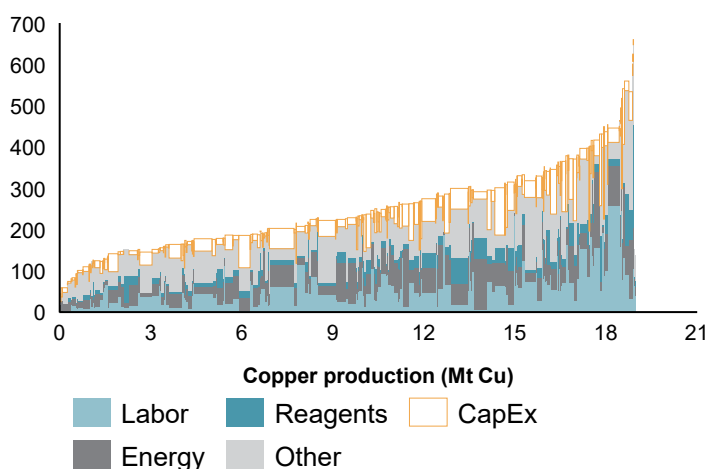
Smelter & refinery income model



- **Revenues:** Copper cathode, gold, silver, and sulfuric acid sales plus premiums
- **Raw materials:** Cost of concentrate, based on payable metal
- **Raw material contributions:** TC/RCs, premiums, free metals, and sulfuric acid
- **Operating expenses:** Includes energy, labor, reagents, others, and sustaining CapEx
- **Operating profit:** Revenue less raw material costs.

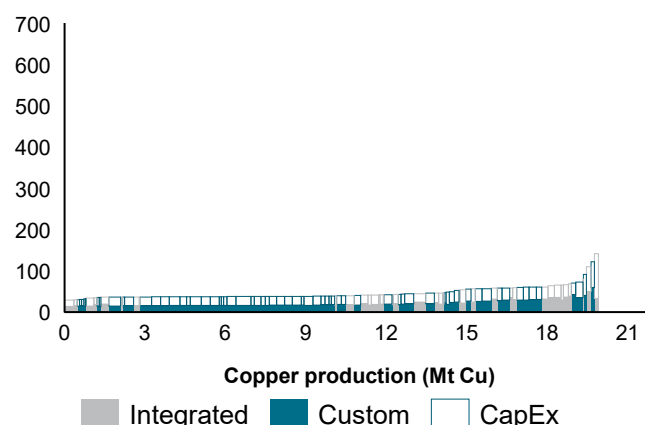
Mining cost curve

2025 US\$/lb Cu

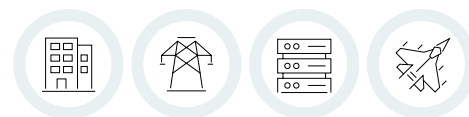


Smelter and refining cost curve

2025 US\$/lb Cu



The cost curves illustrate that most copper production costs are incurred at the mining stage, while smelting represents a relatively small component of total value chain costs. Despite its lower position on the cost curve, new smelting capacity requires significant upfront capital investment, typically exceeding \$1.5 billion for a greenfield facility.

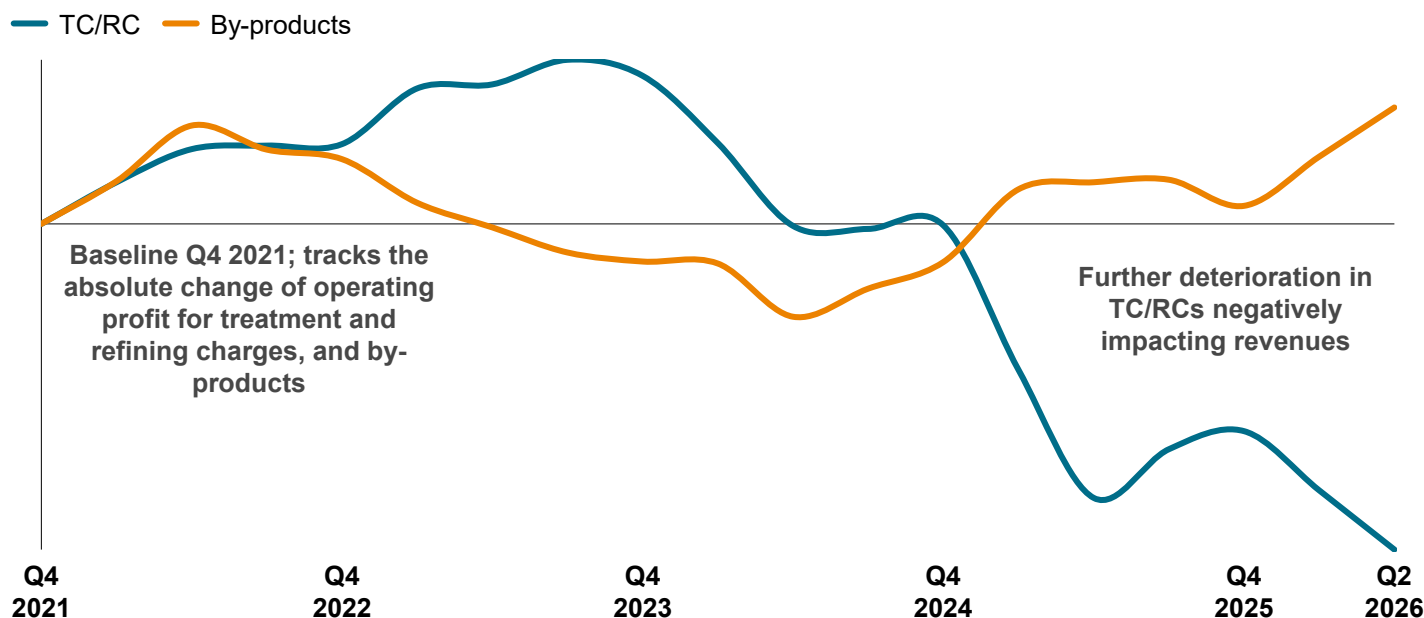


Appendix: Copper Income Model

Illustrative

Earnings change in smelting business unit from a public company

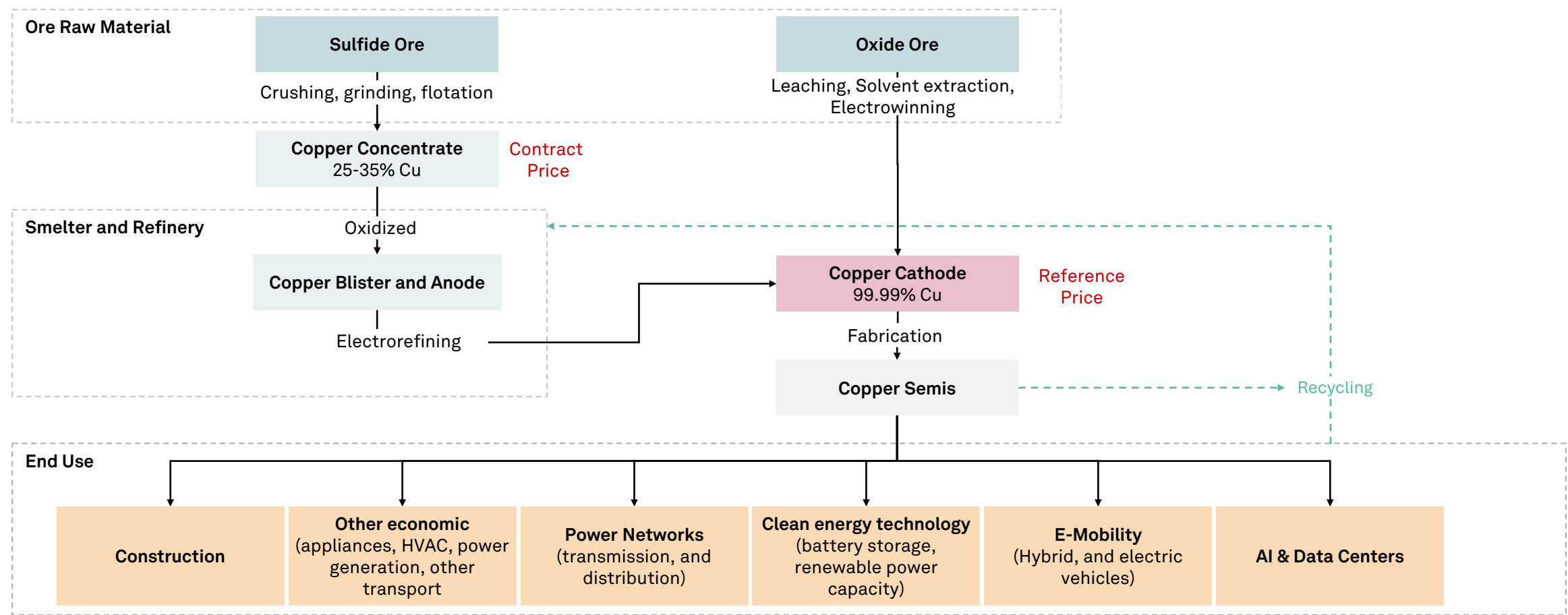
Absolute cumulative change, where Q4 2021 = 0



By-product credits can partially offset weaker smelting revenues, but they are not a complete substitute for healthy TC/RCs. As processing margins deteriorate, overall earnings come under increasing pressure. Sustained weakness in TC/RCs ultimately exerts a larger influence on profitability, underscoring the central role of concentrate market conditions in smelter economics.

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Cu value chain



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