

Macro Team

Copper Pitch





AGENDA

Elevator Pitch

The Copper Market

The Demand Revolution

The Supply Paradox

Geopolitical Context

Macro Context

Investment thesis

First Glance



First Glance

ISIN: US9117181043

CPER

Ticker

Commodity

Asset Class

NYSE

Stock Exchange

**Industrial
Metals**

Sector

35.56

Price

USD

Currency



Recommendation:

BUY

Elevator Pitch



Elevator Pitch

Why is Copper the right trade right now?

We are pitching the Copper since...



Structural Deficit

Demand projected to grow by ~50% by 2040, from 28 to 42 Mtpa. A 10 million metric ton annual shortfall is already the base case.



Supply cannot respond

The average copper mine takes 17 years from discovery to production. The resolution deposit (3x the global average grade), has been permitting for 28 years.



Macro Fully aligned

Weaker dollar and Global Manufacturing PMI on up-trend make a cyclical tailwind and a structural deficit arrive at the same time.



Five demand vectors

Evs, grid modernization, AI data centers, the developing world, and defense are all scaling simultaneously.

The Copper Market



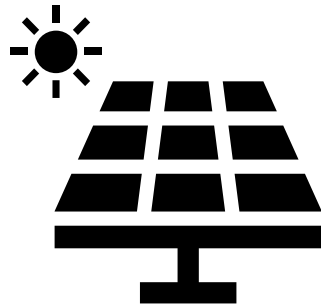
The role of copper in Modern Technology

Copper is the backbone of electrification, making it irreplaceable across power grids, renewable energy and EVs

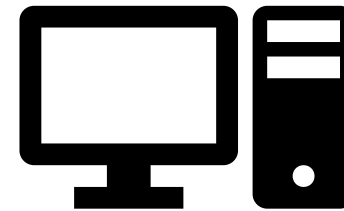
Highly used in modern technologies



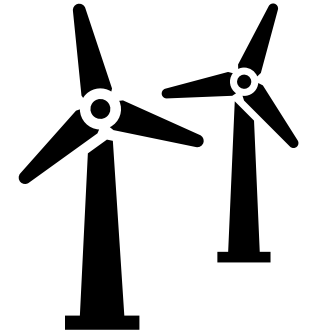
Electric vehicles



Renewable energy



Data Centers



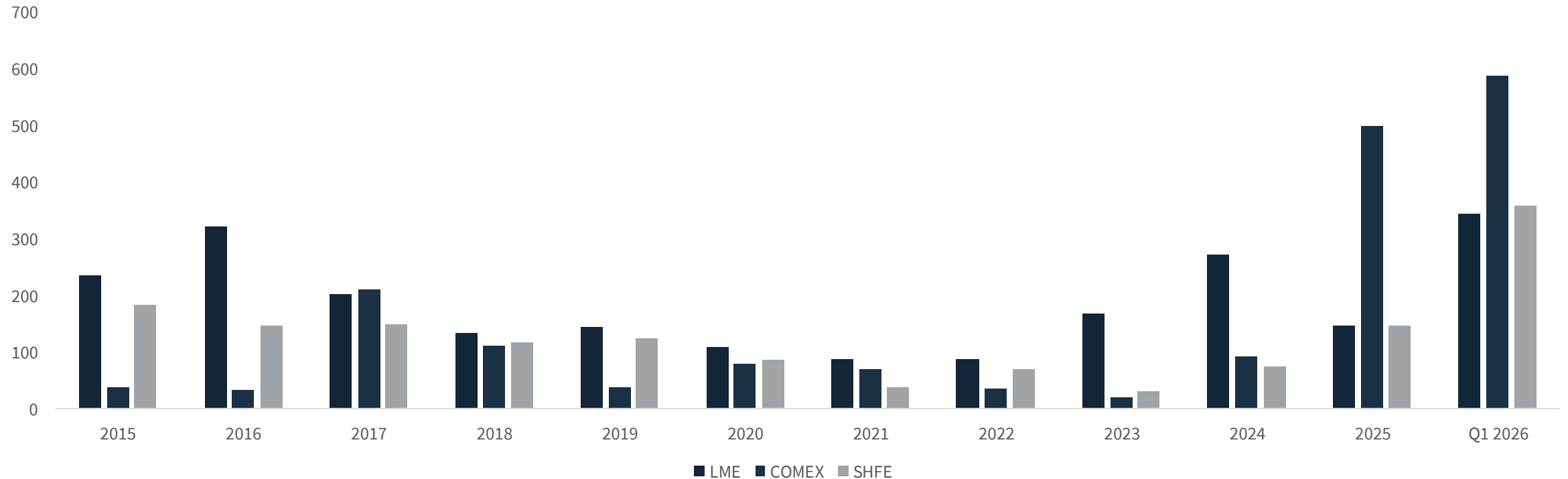
Wind turbines

- **Electric vehicles** require **25kg of copper**, and the battery around 60-100kg.
- **Solar Panels** require **2-5 tonnes** MW.
- **Data centers** require about **20-40 tonnes** of copper
- **Wind turbines** require **8-15 tonnes** per MW.

International Copper trade

Copper is traded in LME, COMEX and SHFE

Inventories of each market: LME, COMEX and SHFE

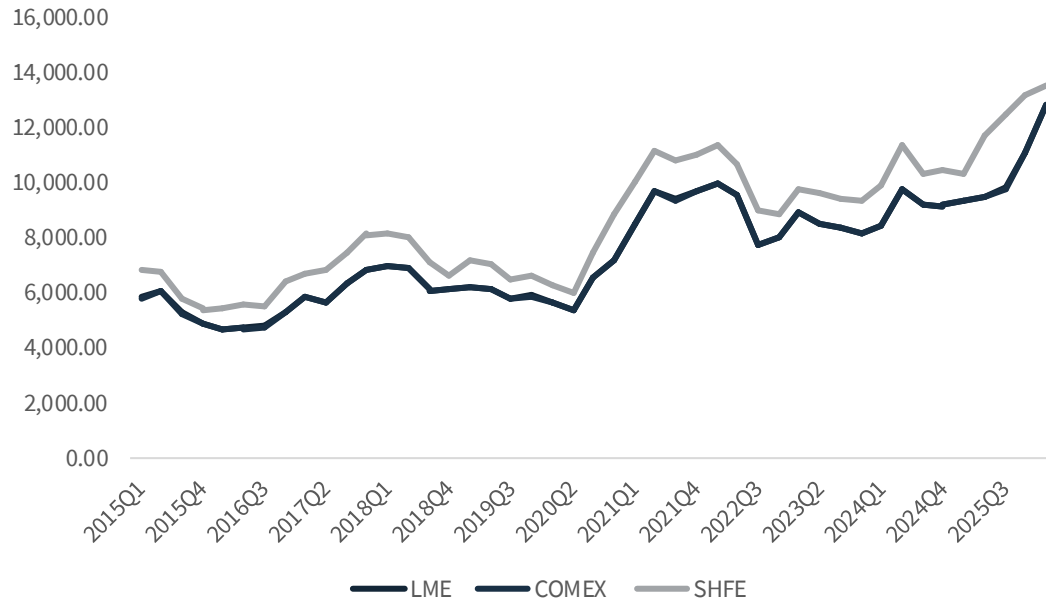


- Currently, COMEX has the **biggest inventories** among the three of them
- From 2023 to 2025, **COMEX stock rose by 309%**, due to **higher premiums** on this market in 2024 and tariffs in 2025. Which made **LME stocks drop by nearly 50%**.

LME, COMEX and SHFE

Differences in prices and premiums between the three markets

Price evolution



- LME and COMEX copper prices stay closely aligned
- The SHFE market has historically had higher prices than LME and COMEX

Premiums SHFE vs LME



- In Q1 2026, the premium between LME and SHFE registered lower values, meaning LME prices increased more than SHFE.
- LME vs SHFE premium has historically been positive

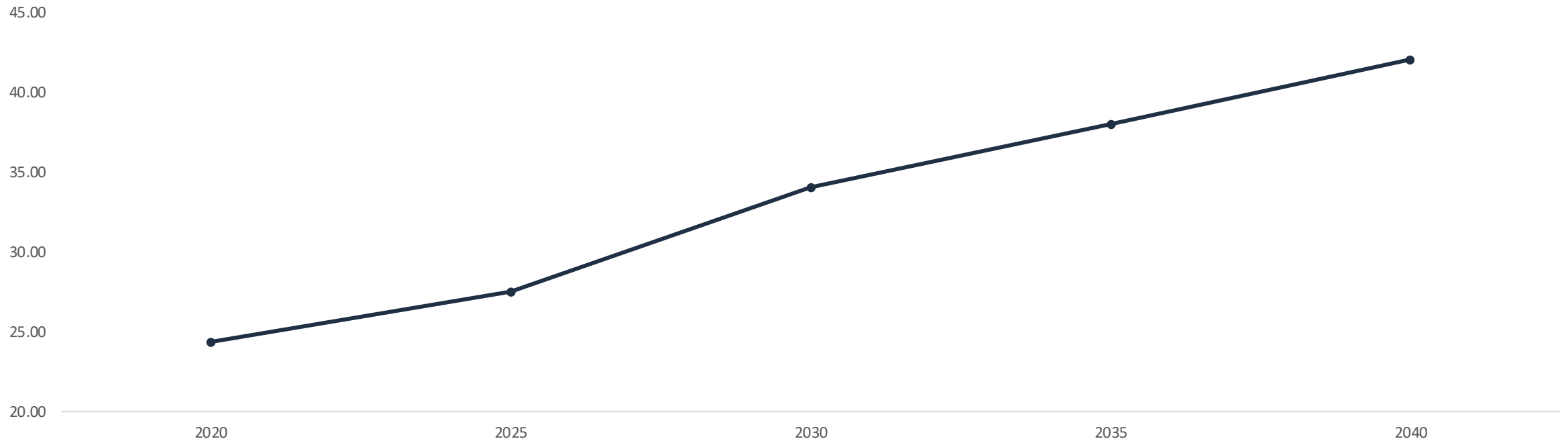
The Demand Revolution



Global Copper Demand

Global Copper Demand set to grow 50% by 2040

Copper Demand

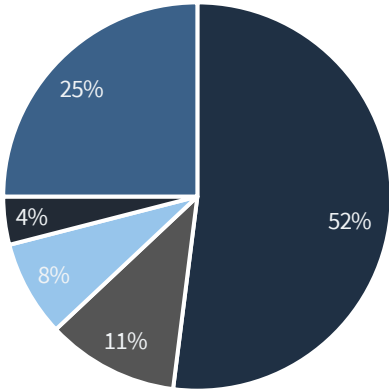


- Total demand is projected to jump from 28 Mtpa in 2025 to 42 Mtpa by 2040, representing a **massive volume growth of 50%**;
- Aggregated demand is the result of multiple, independent trends **scaling simultaneously**, ensuring a **steady growth** trajectory regardless of individual market cycles.

Asia-Pacific Dominance

Asia, specifically China, will continue to be the major demand driver

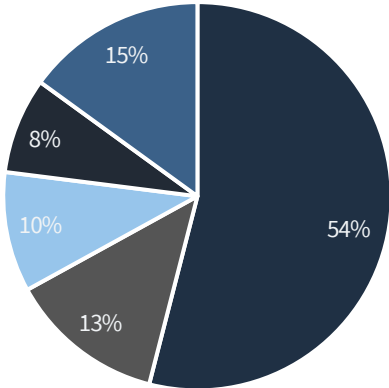
Regional Breakdown 2024



■ China ■ Europe ■ North America ■ India ■ Rest of the World

- China accounts for approximately **50%** of global copper demand nowadays;
- Chinese buyers are actively **"buying the dip"** to replenish inventories after sustained high prices.

Regional Forecasted Breakdown 2035



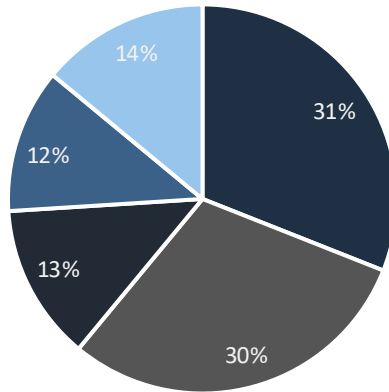
■ China ■ Europe ■ North America ■ India ■ Rest of the World

- India's **total copper demand share** doubles to 8% as it urbanizes and expands its power grid;
- Growth shifts from Chinese construction toward localized **AI and EV supply chains** in the US , Europe, and SE Asia.

Sectoral Shift to Electrification

Power & Grid becomes the dominant demand driver.

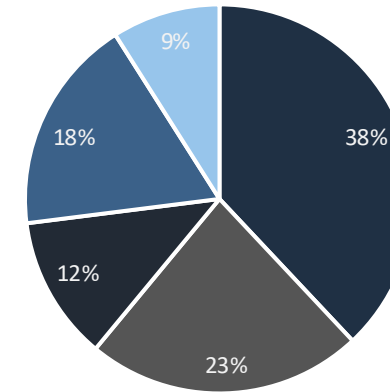
Sector Breakdown 2024



■ Power and Grid ■ Construction ■ Industry ■ Transport ■ Consumer products

- Construction and power sectors consume **61% of total output**, anchoring demand in physical urban expansion.
- The transport sector holds a **12% share**, reflecting a market still dominated by internal combustion engines before the projected EV acceleration.

Sector Forecasted Breakdown 2035



■ Power and Grid ■ Construction ■ Industry ■ Transport ■ Consumer products

- Power and Grid share jumps to **38%** to support a **\$7.5 trillion** modernization and AI data center buildout;
- Transport demand grows to **18% share** as EVs require **2.9x more copper** than traditional engines.

Demand is no longer cyclical

Copper demand is now driven by independent systems that do not switch off at the same time

Demand Engine	What drives it	Economic Nature
Core Economy	Construction and industry	Cyclical (GDP-linked)
Electrification	Grids, Evs and renewables	Policy - driven
Energy Access	Developing World	Structural Expansion
AI/data centers	Compute + power demand	Price inelastic
Defense	Geopolitics	Counter - cyclical

- **Multiple Drivers at once:**

- Prior cycles were dominated by a **single** engine;
- Current demand is driven by **five independent systems scaling simultaneously**: electrification, AI, defense, industrial base, and developing-world buildout.

- **Low Price Sensitivity:**

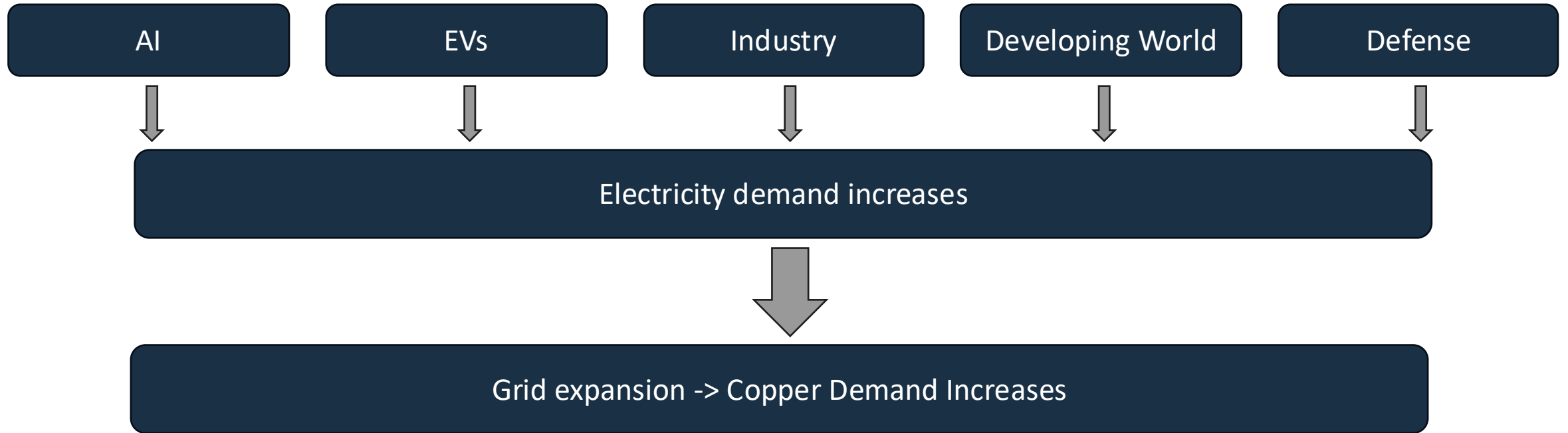
- Incremental demand is concentrated in sectors where copper is a **small share of total system cost** (e.g. data centers <0.5%);
- Substitution is limited and often **technically constrained**

- **Not GDP dependent:**

- Large parts of demand persist even in slowdown environments.

Demand is structurally stronger

Copper demand is driven by five simultaneous, mutually reinforcing vectors that the supply side cannot currently meet



✓ Electrification Multiplier

Growing areas drive exponential increases in electricity demand.

✓ No Substitution

Aluminium can only replace copper in <2% of application.

✓ Simultaneous Scaling

Drivers of electrification are expanding simultaneously in multiple sectors at once.

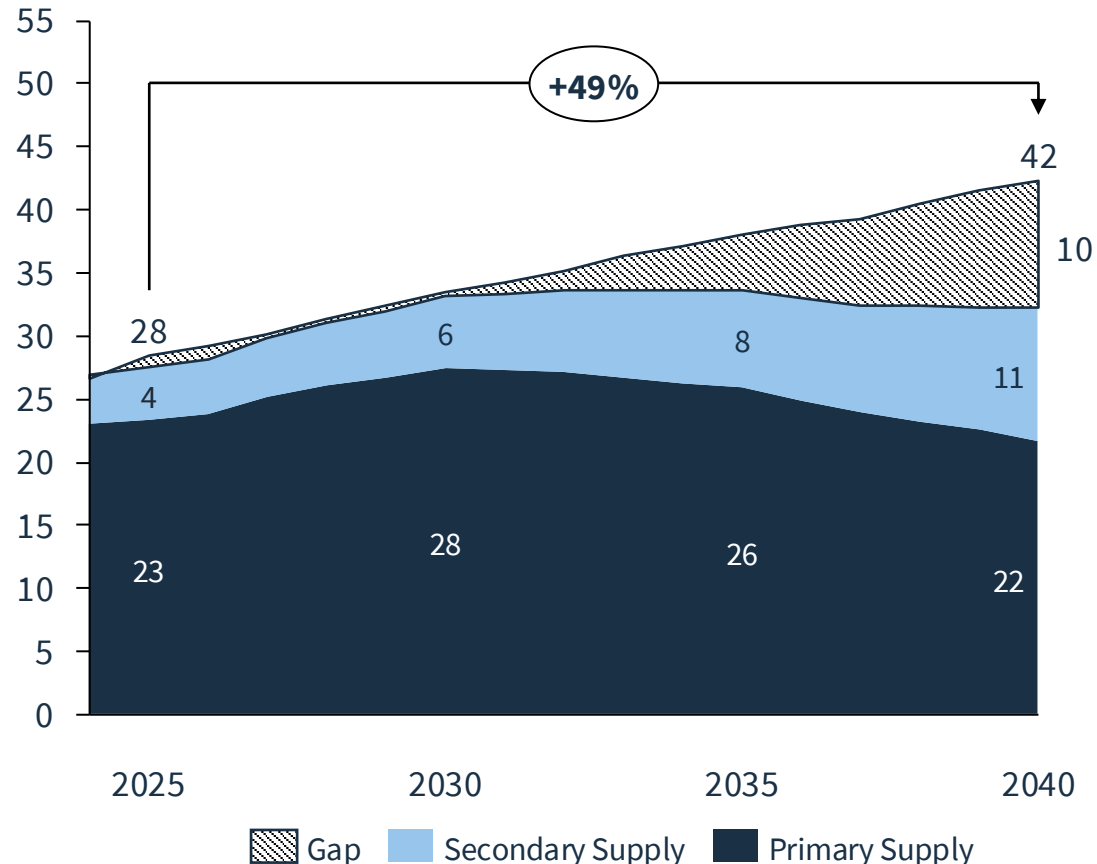
The Supply Paradox



The Scale of The Gap

Demand Growth is Outpacing Supply Capacity

Demand vs. Supply



Source: S&P Global

4 May 2026

Supply-Demand Outlook (2025-2040)

- Global **copper demand** is projected to rise from **~28 Mtpa** to **~42 Mtpa** by 2040
- **Primary mined supply** is expected to peak at **~28 Mtpa** around 2030 before declining to **~22 Mtpa** as existing mines deplete
- The result is a persistent annual **deficit of ~10 Mtpa**, equivalent to nearly **10x** the output of the world's largest copper mine
- Closing the gap requires **~880 Ktpa** of new capacity commissioned every year, roughly **double** historical rates
- **52%** of this capacity must come from **greenfield projects**

Price Won't Fix It

The Signal Has Been Sent. Supply Cannot Respond

LME Copper Prices (\$/t)



Sources: S&P Global, Investing

4 May 2026

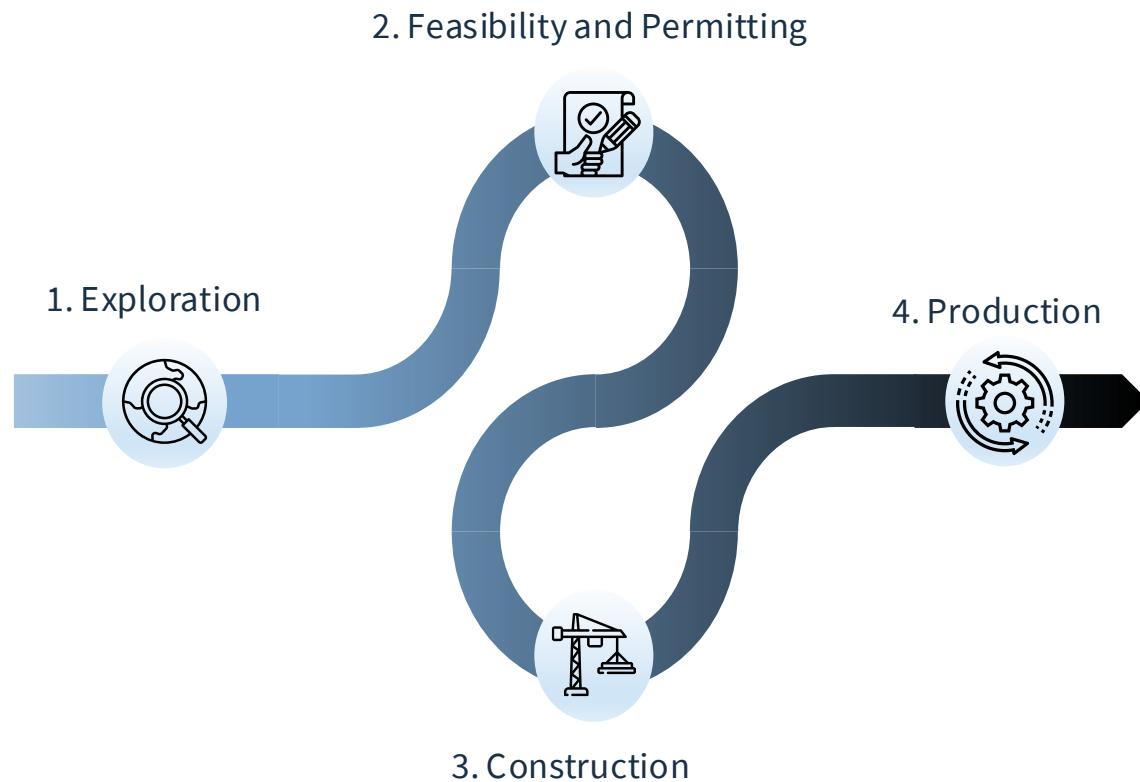
Why Investment Isn't Following The Price

- Copper is currently trading at ~**\$13.000/t**, well above the **\$11.500/t** threshold needed to incentivize new mine development
- Yet exploration budget stand at **\$3.3bn** in 2025, less than half the **\$6.6bn** peak of 2012, and significant new discoveries have collapsed by 2/3 over the past decade
- Of that reduced budget, **39%** is now directed at **existing mine sites** rather than new greenfield discovery
- The largest copper supply **deficit in 22 years** is projected to worsen materially through 2030, meaning that price alone cannot unlock supply that takes **15+ years** to build

Time Constraint

A Mine Cannot Be Built on a Market Timeline

A 17-Year Development Process



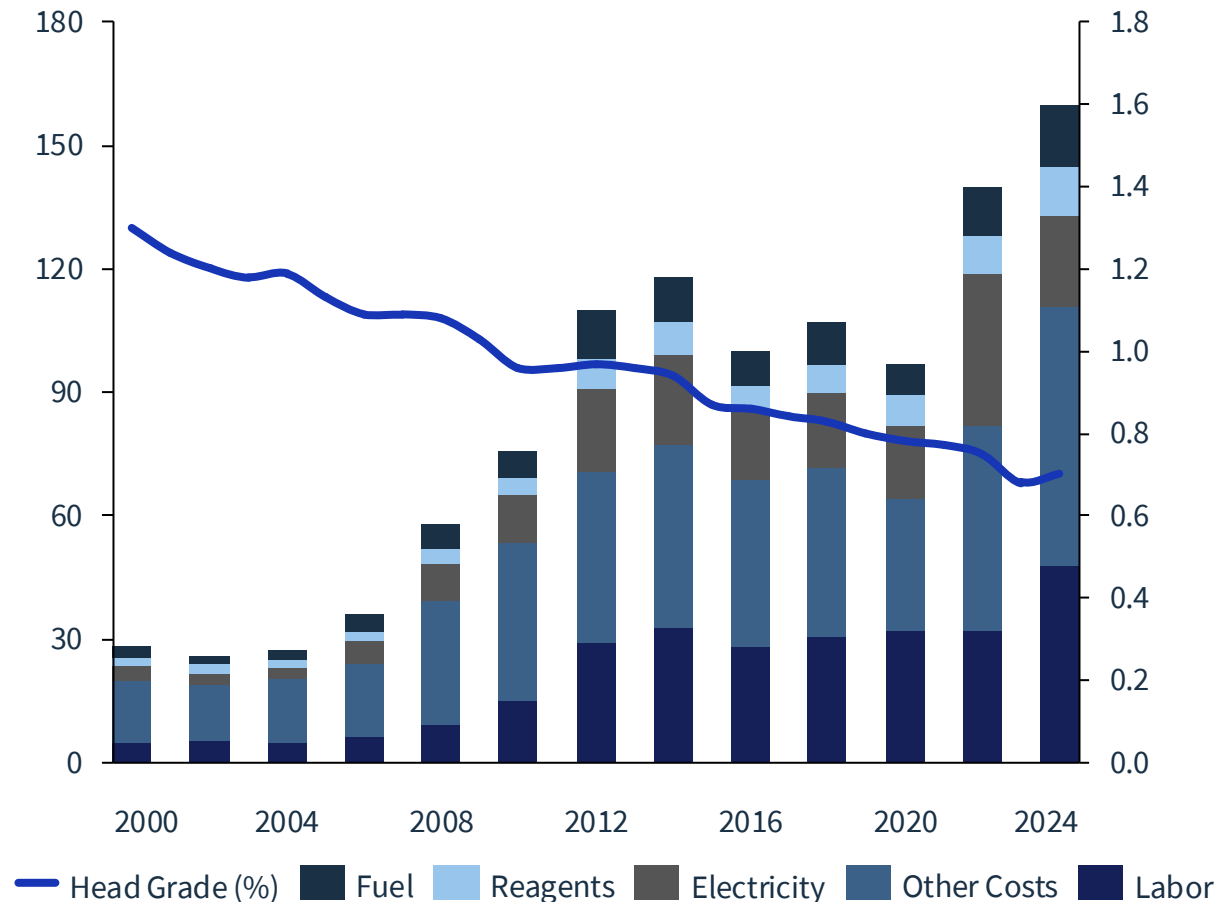
Why Speed Is Structurally Impossible

- From first discovery to first production, a copper mine requires an average of **17 years**, covering exploration, feasibility studies, permitting and construction
- Even **projects sanctioned today** cannot reach the market before the early 2030s, precisely when the structural deficit accelerates
- The **permitting phase alone** can span 7 to 18 years in the US under the NEPA process, and has lengthened significantly over the past two decades
- **No price signal can compress geology, regulation or construction**; time is the one constraint the market cannot buy its way out of

Geology Constraint

The Ore is Getting Harder to Find and Costlier to Extract

Head Grade & Cost Trends (2000-2024)



Source: S&P Global

4 May 2026

A Permanently Higher Cost Base

- The average head grade of major copper mines has fallen from ~**1.3%** in 2000 to ~**0.70%** today, miners now process **more than twice** the rock to produce the same metal
- The **global stripping ratio** (waste rock moved per unit of ore) has risen from **1.47:1 in 2021** to **1.80:1 in 2025**, driving up both capital and operating costs
- **Total cash costs** per tonne of ore surged **28%** between 2021 and 2024; **AISC (“All-in Sustaining Cost”)** climbed **23%** to 268.7 cents per pound
- Deteriorating geology sets a hard floor: lower grades mean higher costs, longer timelines and reduced project viability, **independent of copper price.**

Political and Operational Risk

Host Governments gain leverage after capital is deployed

Cobre Panama Mine Site



Source: S&P Global, WorldBank

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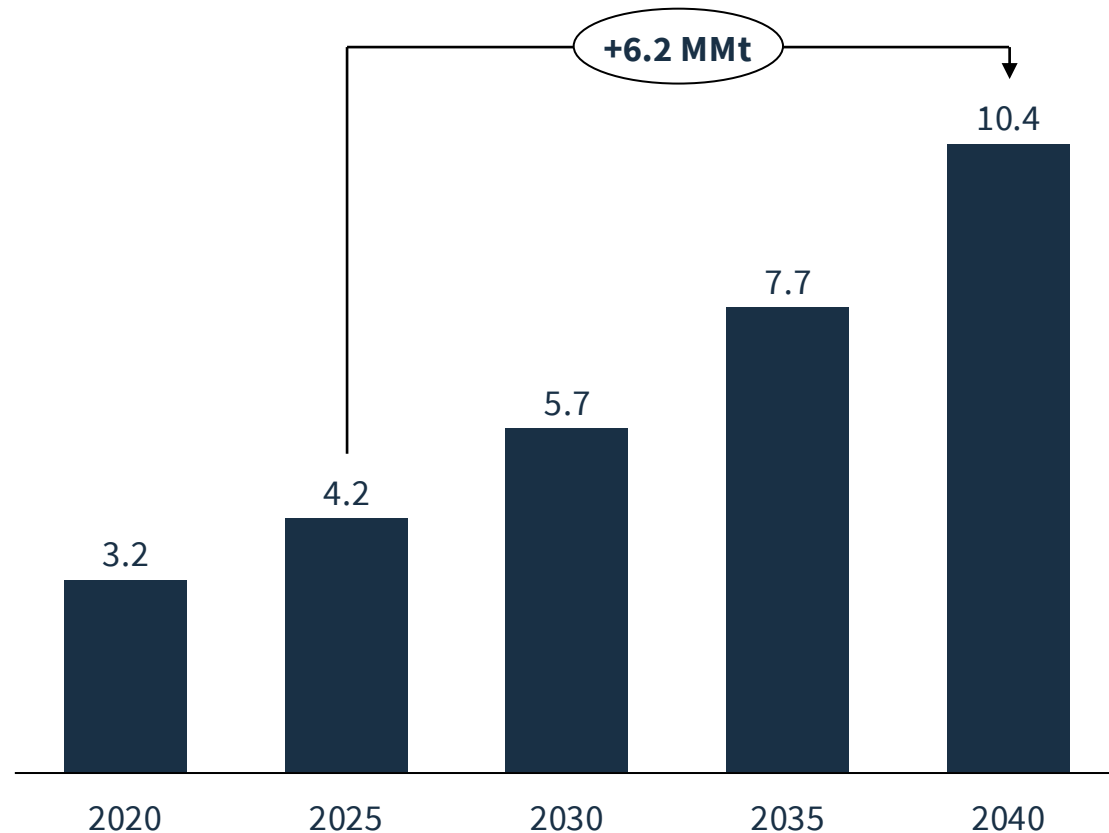
The Obsolescing Bargain

- The “**Obsolescing Bargain**”: once billions are committed, host governments renegotiate: the capital is sunk, the leverage has shifted
- **Cobre Panama**: \$11bn invested, 5% of Panama's GDP, 75% of merchandise exports → Supreme Court ruled concession unconstitutional in 2023. **Still shut.**
- World Bank attributed Panama's **2024 economic contraction** directly to the closure
- Recurring operational disruptions (Escondida, El Teniente, Constancia, Grasberg): **591,000 tonnes** removed; always negative, never offset by positive surprises
- Baseline disruption assumption rising from **5% to 6%** = **250–300 Ktpa** removed annually

The Recycling Limit

Secondary Supply is a Complement, Not a Solution

End-of-life recycled copper scrap supply (MMt Cu)



Source: S&P Global

4 May 2026

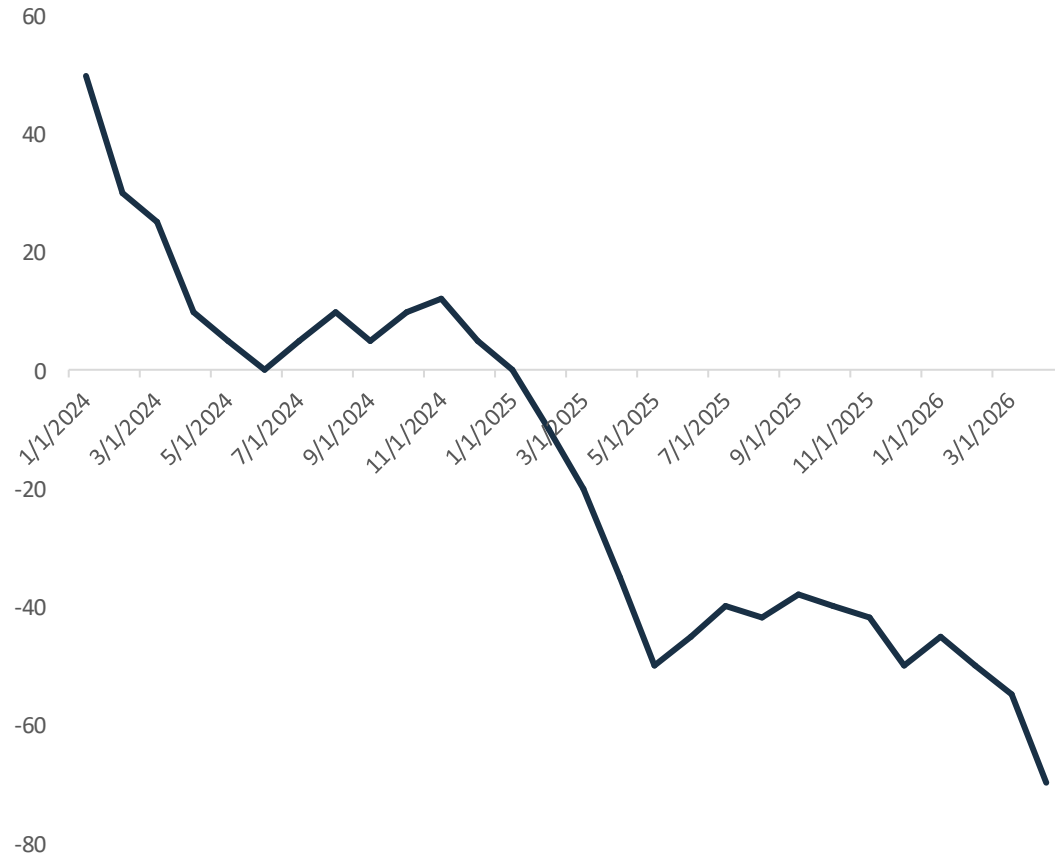
Recycling grows, but the supply gap remains

- End-of-life **recycled copper supply** is expected to grow significantly, from **4.2 MMt in 2025** to **10.4 MMt by 2040**
- But recycling depends on when copper-containing assets reach end-of-life: buildings, grids and infrastructure can keep copper locked in for decades
- Even with higher recovery rates, secondary supply cannot close the projected **~10 MMt structural deficit** alone
- Recycling is **essential** to improve market **resilience**, but the supply gap still requires a major expansion of primary mined copper

Smelting Costs Under Pressure (TC/RCs)

TC/RC collapse points to supply tightness and margin pressure

Copper Smelting Fees (TC/RCs)



Negative TC/RC

- TC/RS collapsed into negative territory (**-70\$/t in early 2026**).
- **Benchmark TC/RC at 0\$/t**, spot rates negative since 2025.
- Processing fees are the main revenue source for smelters.
- Production cuts (**~10%**) and **2Mt** of new capacity cancelled
- Sharp decline in TC/RCs (-38% in 2024)
- Greater reliance on by-products (on gold and silver) for profitability.

Geopolitical Situation



The East-West Divide

China does not control the mines – yet controls the copper market

China processes what the West mines



- **Western companies** own 5 of the 10 **largest copper mines** (China only 2) – yet all concentrate flows rely on Chinese melters
- **China controls 40% of global smelting capacity** and **66% of concentrate imports** – The US & Europe combined just 12%

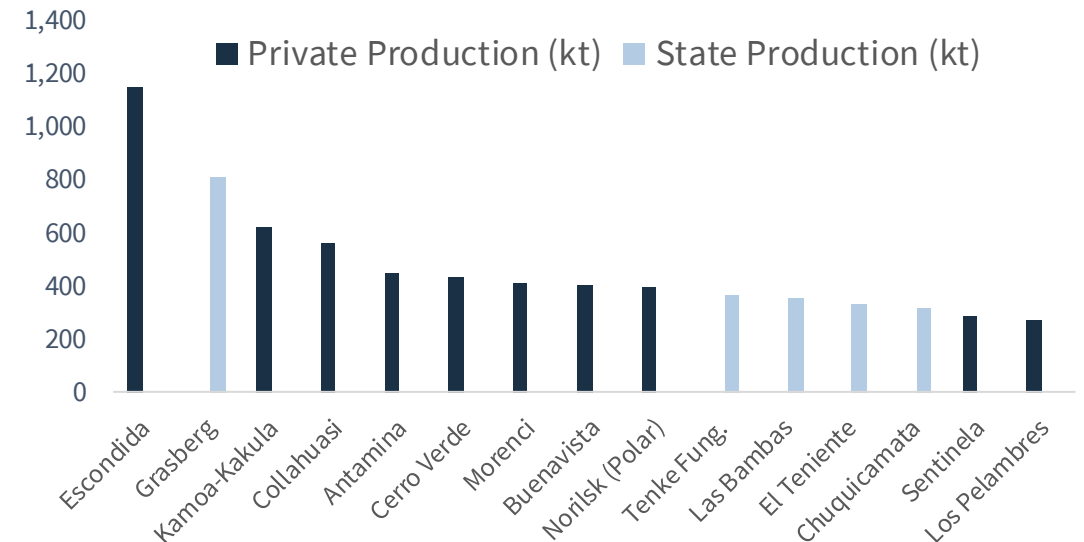
Sovereign Wealth & State Capital

State capital is accumulating copper supply — and keeping it off the open market

Key State Actors

- **Chinese state enterprises (Minmetals, CMOC, CNMC):** mine ownership across 3 continents (Las Bambas, Tenke Fungurume, Kisanfu); **~15% of global production**
- **Japan (JOGMEC):** no domestic copper resources but huge equity investments and **offtake agreements**
- **Saudi Arabia PIF:** building strategic copper exposure, part of broader minerals expansion ("Vision 2030")
- **Chile Codelco:** World's **largest copper producer** (7% of global supply); directly state-owned
- **Indonesia (MIND ID):** acquired majority control of Grasberg in 2018

Copper Mine Ownership



- **Increased State activity** in copper mines -> Governments prioritize **long-term stakes in Copper**
- 8 out of 15 largest Copper mines in Chile & Peru -> only 2 of them owned by Chilean State (none by Peru)

Political Interventions

Political decisions are fragmenting the copper market in real time

The Death of the Unified Global Market?

- **US:** New **50% tariff** on (semi-finished) **Copper imports** in effect since August 2025
- Cathode copper (exempt from tariffs) currently under review for phased tariffs (15% in 2027; 30% from 2028)
- **China: Exports of Sulphuric Acid informally on hold effective May 1** -> necessary for Heap Leaching
- China world's largest Sulphuric Acid producer (>35%) -> **immediate supply shortage** for Chilean and African copper production
- **Near-zero inventory buffer** -> LME Copper stocks at historic lows -> **no margin for error**

Policy Initiatives

Japan – Australia Critical Minerals Partnership (2022)

Japan second largest smelter – Australia undeveloped reserves

Argentina RIGI – Los Azules (2024)

30Y fiscal stability & tax incentives for mining investment

EU Critical Raw Materials act (2024)

Target of 10% domestic Copper extraction by 2030

US Project Vault (2026)

\$10bn loan to establish strategic mineral reserve (incl Copper)

EU Critical Minerals Procurement Platform (2026)

Joint critical minerals platform; Copper will be added soon

The Iran Variable

A geopolitical shock hitting a market with no buffer

Supply Shockwave

- **Sulphur Chokepoint:** 50% of global seaborne sulphur transits Hormuz -> critical for copper leaching
- Qatar suspended sulphur production following severe infrastructure damage (~7% of total exports)
- Market prices fear premium -> real impact is the **freezing of Final Investment Decision** -> 17-year mine development cycle -> **long-term supply deficit**
- Higher energy & freight costs have shifted production costs permanently upwards -> **structural price floor**
- War unmasked fragility of low LME inventories -> **global copper markets zero margin for error**

The Cascade Effect

- 1) **Trigger:** Strait of Hormuz disrupts sulphur shipments
- 2) **Amplifier:** China blocks sulphuric acid exports
- 3) **Direct Impact:** Heap leach operations in Chile & DRC acute acid shortage
- 4) **Structural Damage:** Geopolitical uncertainty freezes FID
- 5) **Result:** Supply deficit deepens & price floor rises permanently

Macro Context

04 May 2026

Spring 2025



Price Context & Dollar Weakness

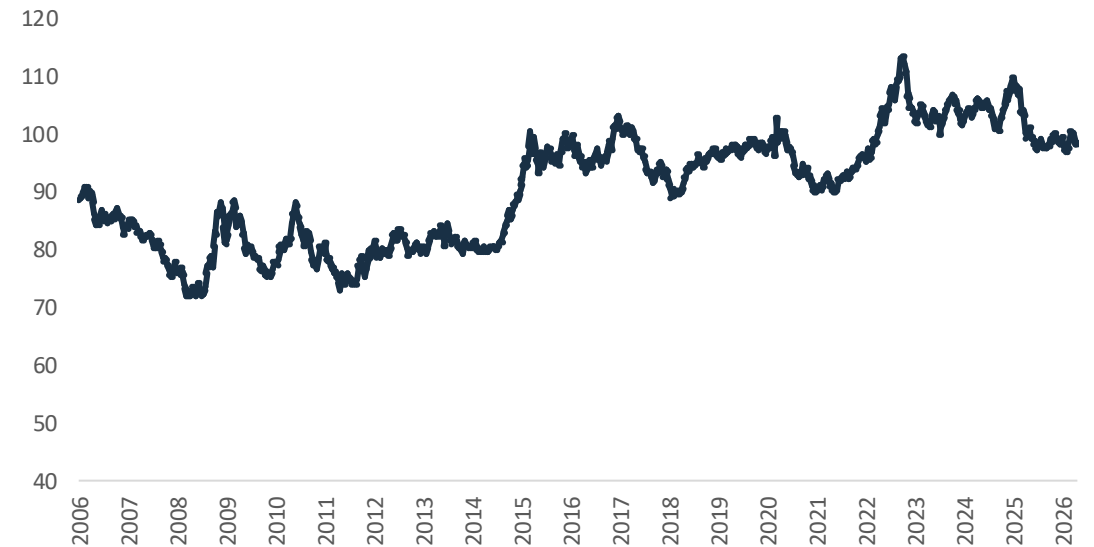
A structural deficit amplified by dollar weakness

Historical Copper Prices (Price per ton)



The incentive price of **\$11,500/t** the level needed to make the full development pipeline viable has been crossed, but the **17-year mine development timeline** means new supply only arrives in the **late 2030s**. The price signal is being sent however the **physical response is structurally delayed**.

DXY



Copper is **priced globally in US dollars**. Fed's rate cutting cycle would put **downward pressure on the DXY**, directly **increasing purchasing power** for every **non-dollar buyer** in the market.

Russell 2000 & Global PMI

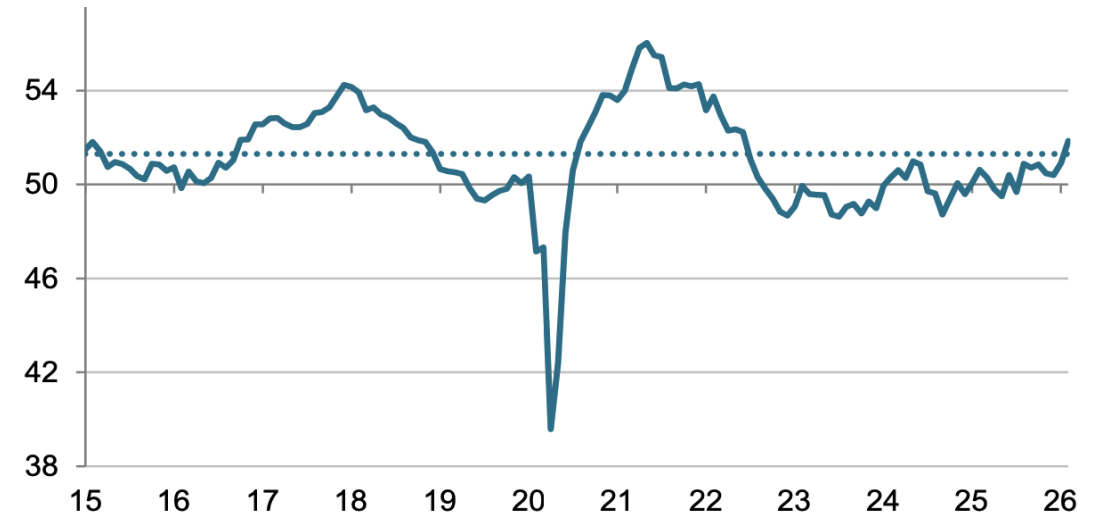
Cyclical tailwinds reinforcing the structural thesis

Russell 2000 Performance



- The Russell 2000 at all-time highs reflects **improving domestic economic conditions, expanding risk appetite, and lower rate expectations**. It signals that the macro environment is becoming **increasingly constructive for hard assets**.

J.P. Morgan Global Manufacturing PMI



- The **Global Manufacturing PMI** is in expansion territory and trending higher: the **classic cyclical tailwind for copper**. What makes it significant here is that it is **arriving simultaneously with the structural deficit**.

Macro Team

Thesis and Recommendation

24 November 2025

Fall 2025



Catalysts & Risks

Evaluating the Drivers and Vulnerabilities of the Thesis

Catalysts (+)

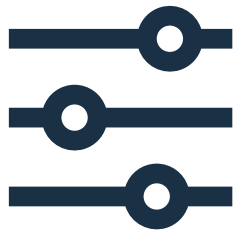
- **Inventory drawdown:** Once physical tightness becomes visible, repricing accelerates rapidly
- **China stimulus at scale:** Any major Chinese infrastructure, grid modernization, or property sector stimulus would immediately translate into a demand surge given China's 50% share of global consumption.
- **Accelerated energy transition policy:** New federal mandates on EV adoption, grid modernization spending, or renewable energy targets in the US or EU.
- **Major supply disruption:** A large unplanned mine shutdown, a smelting capacity reduction in China, or a new resource nationalism episode
- **Dollar structural weakening:** A sustained decline in the dollar driven by the Fed's easing cycle and US fiscal expansion would amplify copper prices for every non-dollar buyer simultaneously, adding a powerful cyclical layer on top of the structural deficit.

Risks (-)

- **Synchronized global recession:** A severe and sustained contraction across multiple major economies simultaneously compresses demand across all five vectors at once, temporarily erasing the shortfall
- **Chinese demand disappointment:** A structural shift in Chinese growth away from copper-intensive activity, whether through property sector collapse, slower infrastructure spending, or a faster-than-expected pivot to a services-led economy.
- **Technology substitution at scale:** A breakthrough in aluminum cable technology, solid-state cooling systems, or wireless power transmission that renders copper non-essential in one or more major end uses. Not currently foreseeable however
- **AI efficiency breakthrough:** If AI computing proves dramatically more energy-efficient than current projections, through new chip architectures or model compression, data center power demand growth slows materially, removing one of the fastest-growing demand vectors.

Portfolio Fit

Strengthening the portfolio with hard assets



Strategic Edge

Adds a **real-asset hedge to a portfolio concentrated in equities and bonds**, improving resilience to fiscal and monetary stress without increasing core risk



Hedging

Provides exposure to **long-horizon demand** from electrification and grid expansion, capturing a structural trend without taking stocks or mining risk.



Industrial Alignment

Balances our **light industrials allocation** with a liquid asset tied to **industrial fabrication and energy-transition supply chains**, diversifying beyond tech-heavy weights

Recommendation: Buy

Strengthening the portfolio with hard assets

We set our targets using a **volatility-scaled framework**. CPER's **annualized volatility is 25.6%**, which scaled to a **4-year horizon** via the square-root-of-time rule gives a **one-standard-deviation range of $\pm 51\%$** . The bands are set asymmetrically: a **wider upside** captures the full deficit-repricing scenario, while a **tighter downside** reflects that the structural floor under copper limits realistic downside. The **Take Profit is set at $+1.0\sigma$ ($+51\%$)**, corresponding to copper at approximately **\$19,900/t**. The Stop Loss is set at -0.5σ (-26%), corresponding to copper falling below the \$10,500/t structural support floor. Final risk/reward of **2.0x**.

Investment Horizon:

4-5 years

Entry Price:

\$35.56

Risk\Reward

2.0x

Take Profit / Stop Loss:

\$53.77 / \$26.46

Proposed Allocation:

4%

United States Copper Index Fund (CPER) Price History (2021 – Present)



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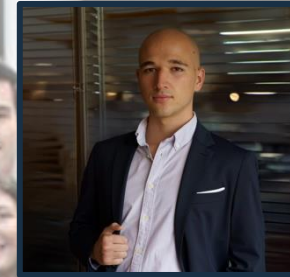


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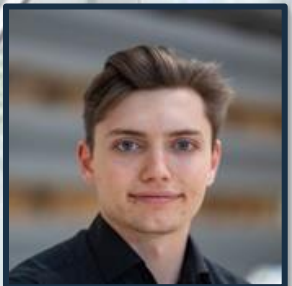


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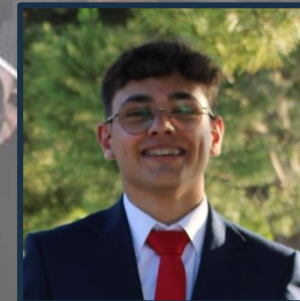


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