PERUMIN 37 CONVENCION MINERA | INSTITUTO DE INGENIEROS DE MINAS DEL PERÚ

FORO DE TECNOLOGÍA INNOVACIÓN Y SOSTENIBILIDAD

# How global trends are reshaping the supply & demand of metals

## A strategic context for investment & mineral policy

A presentation to PERUMIN 2025

Ruben Arratia – WOOD MACKENZIE – Sep 25th, 2025

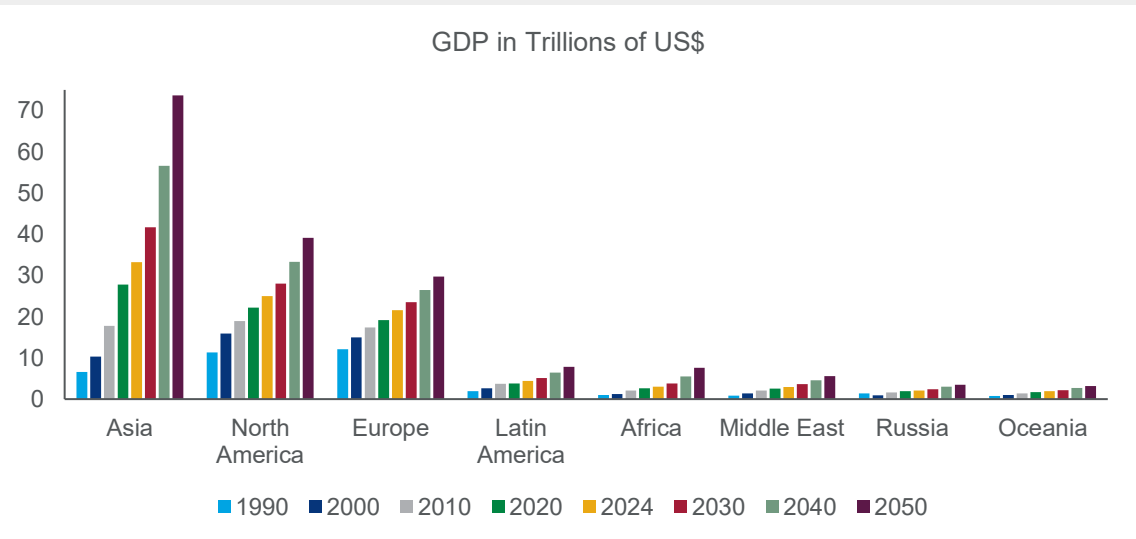
JUNTOS POR MÁS OPORTUNIDADES Y BIENESTAR PARA TODOS

# Agenda

1. The long-term context: A new economic gravity center, energy transition & ESG demands
2. Supply: How has the Cu cost structure evolved?: The Chile factor
3. How would the deregulation revolution affect the flow of investment and the cost competitive curve?
4. Demand: How could Asia and the energy transition impact long term Cu prices?
5. What are strategic minerals? Which metals to bet?

# Global economy: A new gravity center, energy transition and ESG demands

The locomotive that pulls everything (demand and supply of metals) is the global economy.



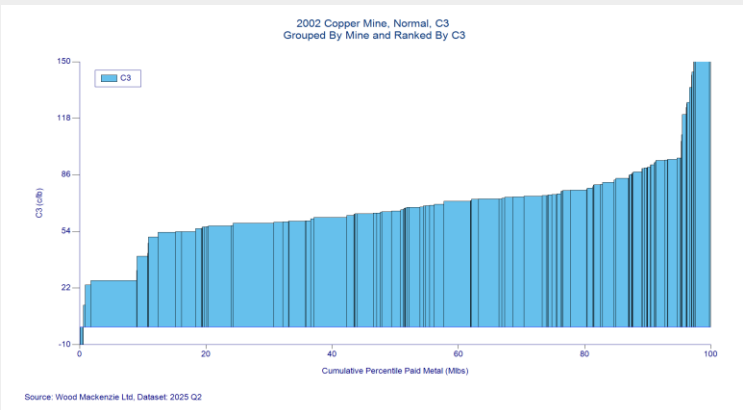

Source: Wood Mackenzie, CEIC

**Supply:** How has the copper cost structure evolved?: The Chile factor

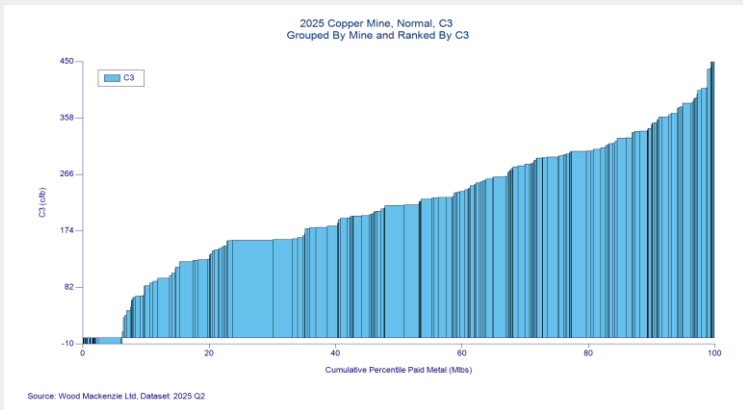
# The Cu marginal cost has increased 100% in 23 years and continues changing

Key factors: Lower head grades, E&S nightmare demands, cost escalation and water depletion in Chile

2002: Marginal cost $2.0/lb Cu in 2025 dollars




2025: Marginal cost $4.0/lb Cu

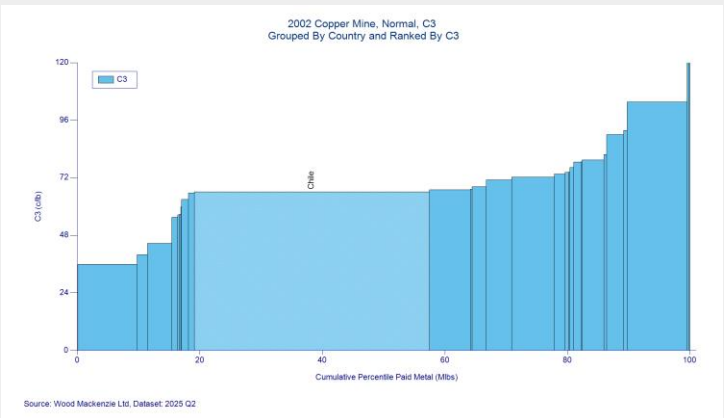



Source: Wood Mackenzie, CEIC

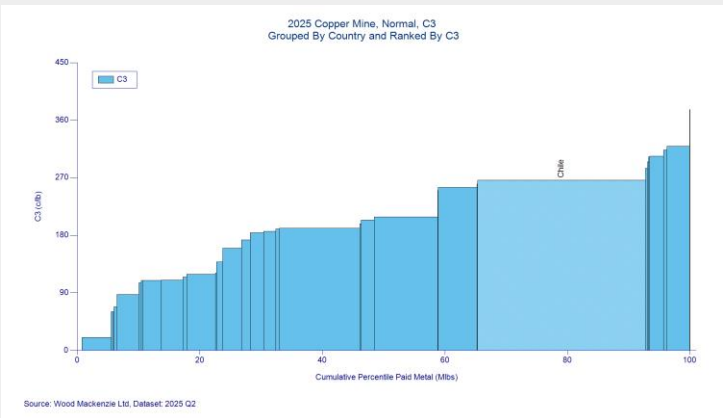
# Why is Chile losing competitiveness? & Why this is important?

Key factors: Water, high labor cost, lower head grades, environmental demands

2002: 1st and 2nd quartile position




2025: 3rd and 4th quartile position

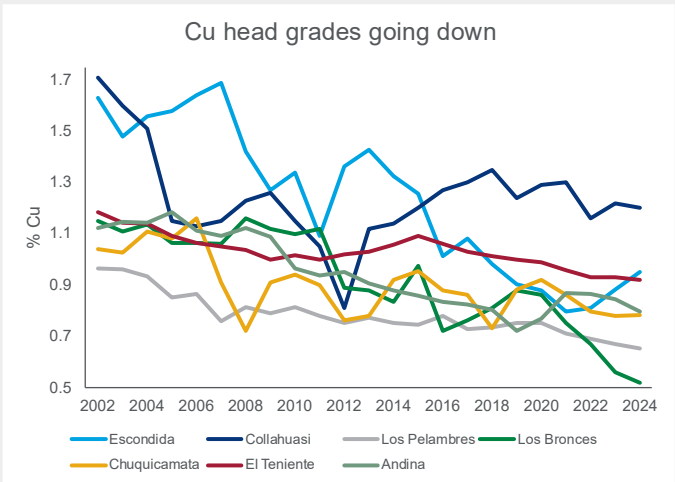



Source: Wood Mackenzie, CEIC

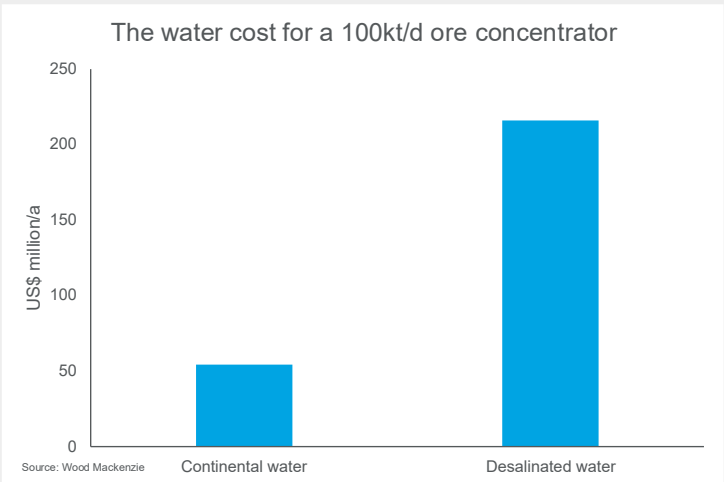
# Why is Chile losing competitiveness? – Two key factors

Other key factors: Increasing labor costs, electricity and more environmental demands

## Cu grades falling and old mines



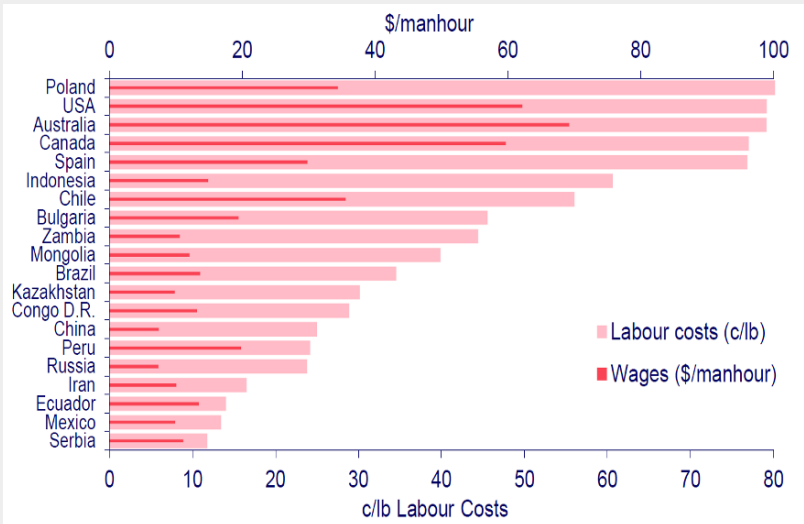

## The Water issue



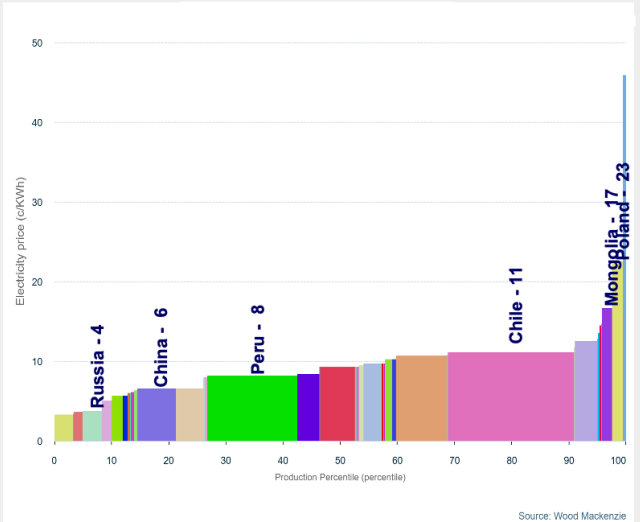

Source: Wood Mackenzie, CEIC

# Labour and electricity cost: key factors of cost competitiveness

Chile Labour cost is 5 times higher than Mexico



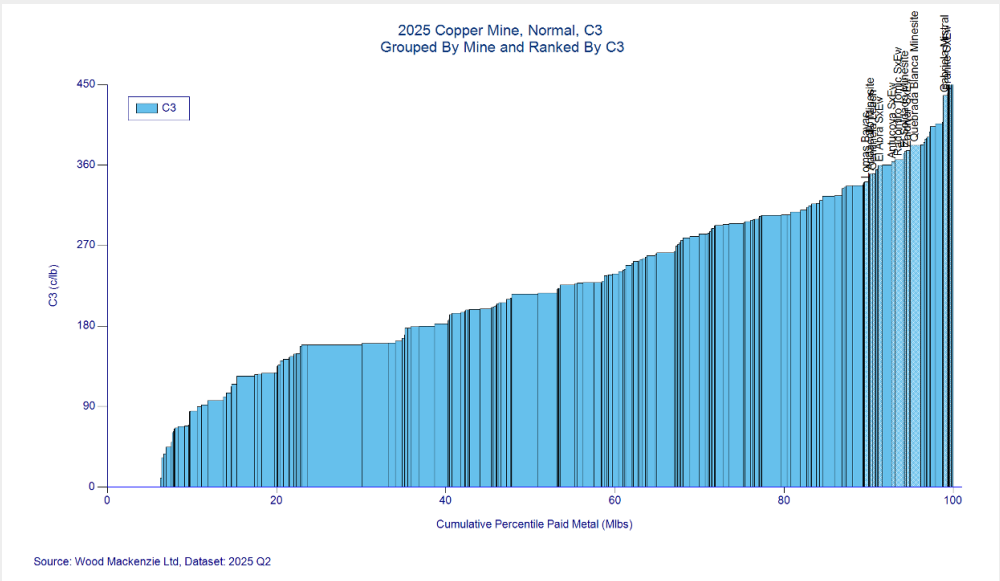

Electricity cost still high in Chile




Source: Wood Mackenzie

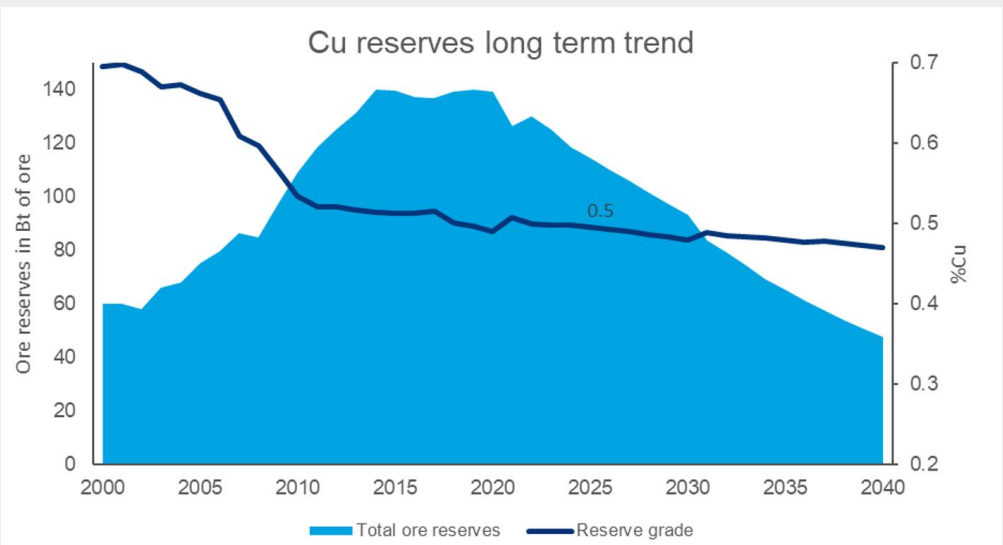
# Chile continues shaping the cost structure of the copper mining industry

And its marginal costs are now a proxy of the long-term copper price



# The pressure continues: Despite DR Congo, ore reserves and grades keeps going down

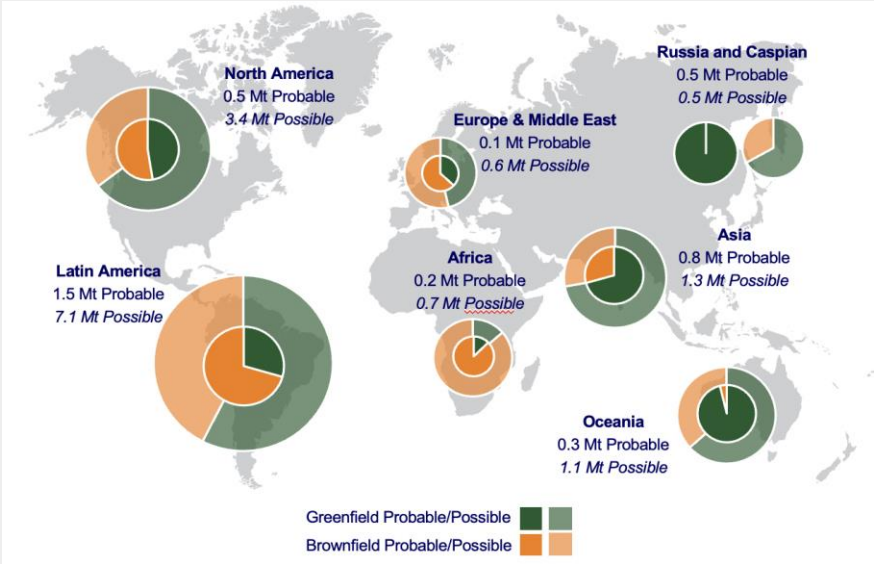
No disruptive technologies to overcome this geological fact



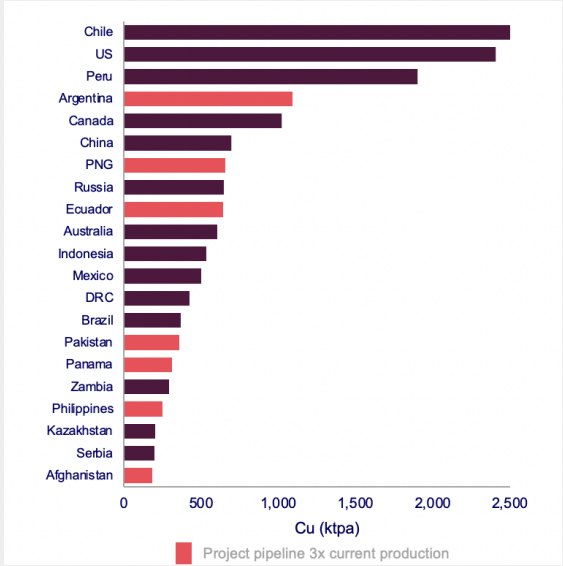

Source: Wood Mackenzie, CEIC

# 19Mt in Cu projects but in jurisdictions with mountain of environmental permits

Latin America & north America have near 70% of the project pipeline




Size of probable and possible project pipeline*




Source: Wood Mackenzie, CEIC

*Sum of average production between 2025 and 2050 for probable and possible projects

# Peru suffers the twin nightmares (E&S) more than any other country

The Capex for its 20 projects is ~$40 billion

## How would the deregulation revolution affect the flow of investment & the cost competitive curve?

# A new trend: The deregulation revolution in Argentina & USA to attract $50 Bn investment

**ARGENTINA:** To create employment

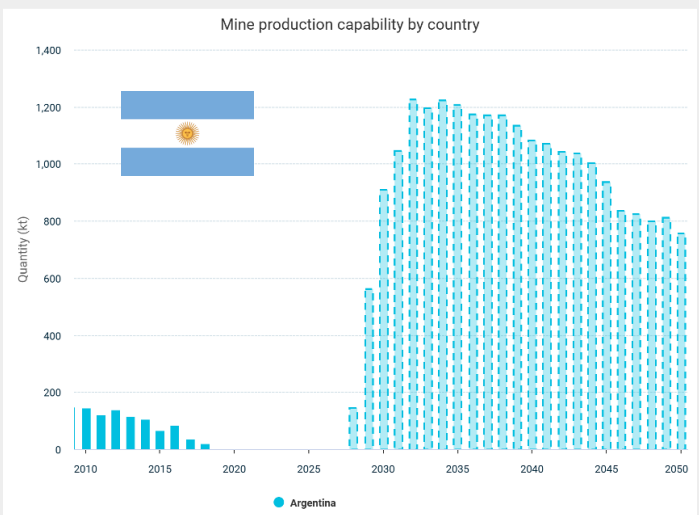
1. Comprehensive tax reform to promote investment (Rigi)
2. Ministry of deregulation
3. Income tax: To be reduced from 35% to 25%
4. Tax stability contracts of 30 years

**UNITED STATES: Key projects now under FAST TRUCK 41**

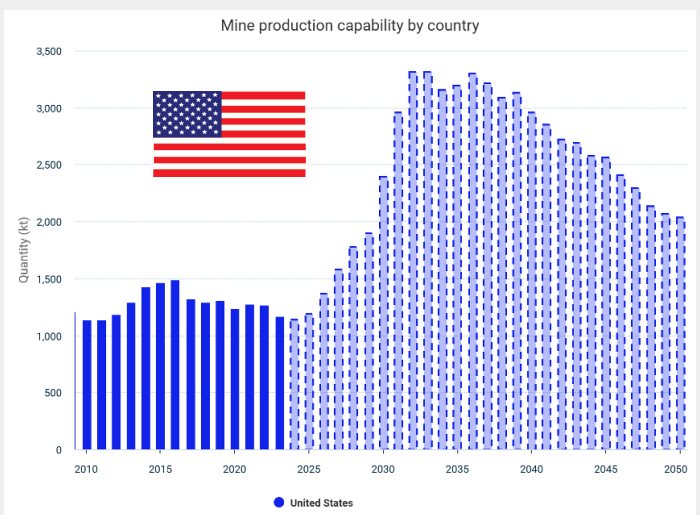
1. Comprehensive economic reform to promote investment
2. Deregulation via the Department of government efficiency (DOGE)
3. Income tax: To be reduced from 21% to 15%.
4. The government is remaking the environmental approvals

# Argentina and USA could produce 3.5Mt of new Cu.

Argentina production capability, 1.2Mt/a



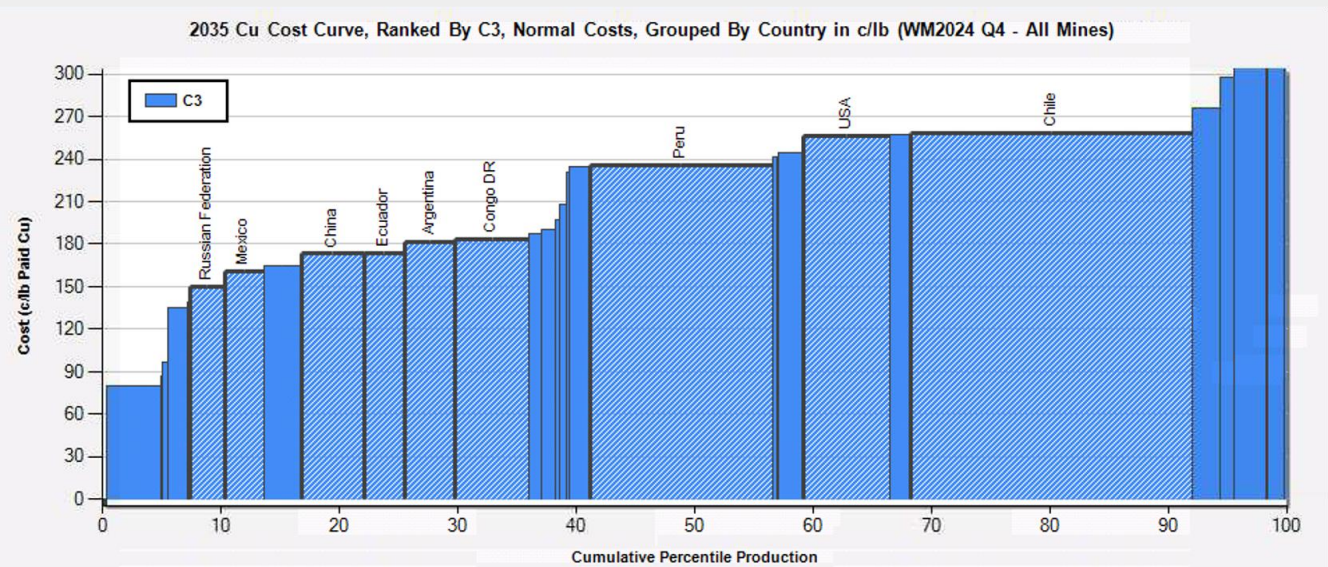

USA production capability, 3.3Mt/a




Source: Wood Mackenzie, CEIC

# New projects will push up to Chile and Peru to the higher cost quartiles

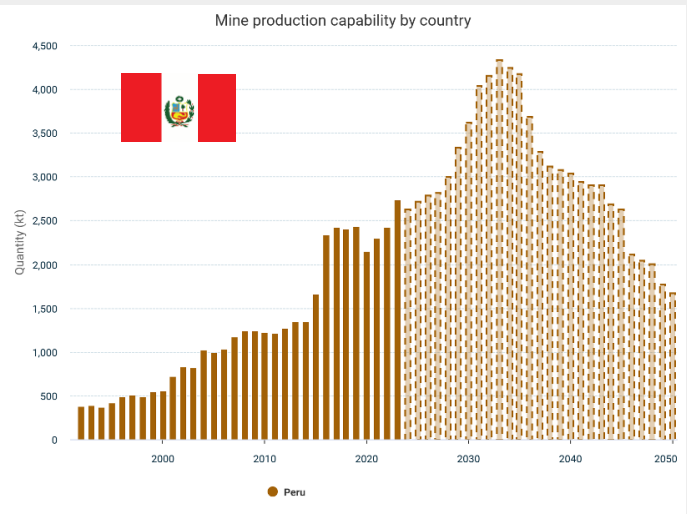
Countries like Chile may need to reduce corporate taxes and electricity cost



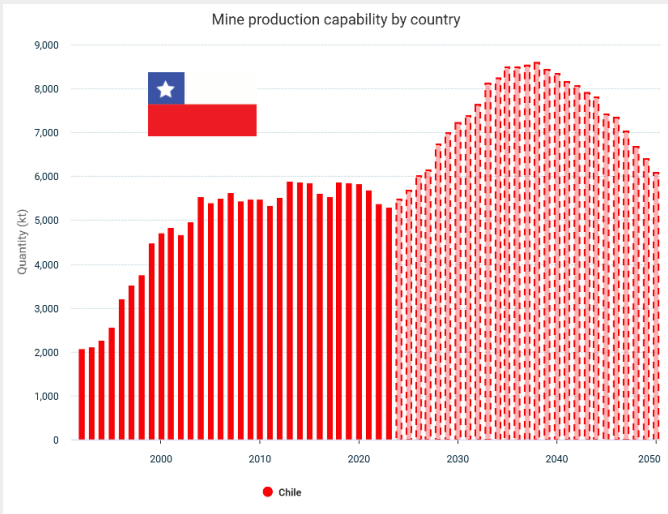

Source: Wood Mackenzie, CEIC

# Chile with more than double of reserves have the potential to produce twice as Peru

Peru has the potential to produce up to 4.3Mt Cu




Chile could produce up to 8.5Mt Cu

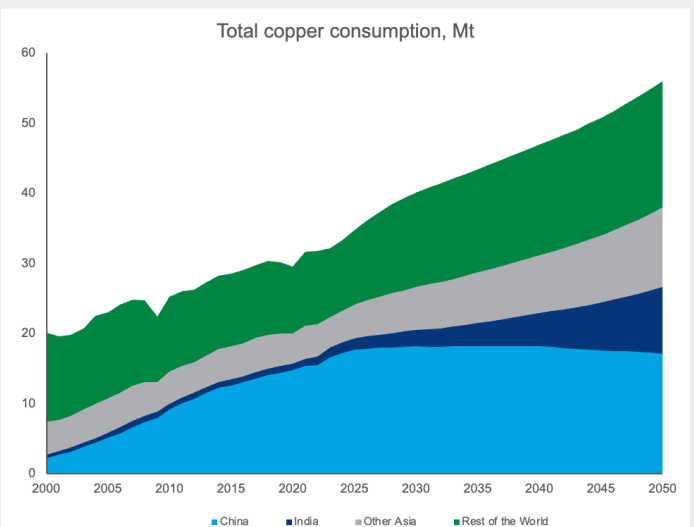


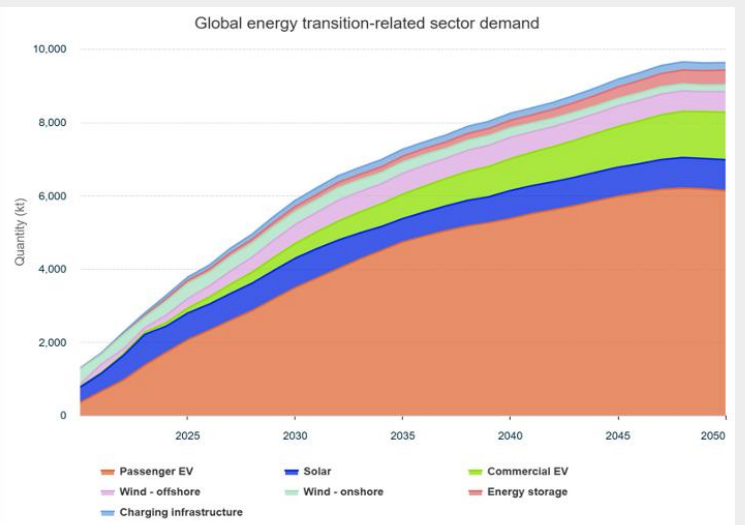

Source: Wood Mackenzie, CEIC

**Demand:** How could Asia and energy transition impact long term Cu prices?

# Cu consumption to 2050: Watch the incremental demand by the rest of Asia & the energy transition

By 2050 the rest of Asia incremental total demand would jump from 6Mt to 21Mt

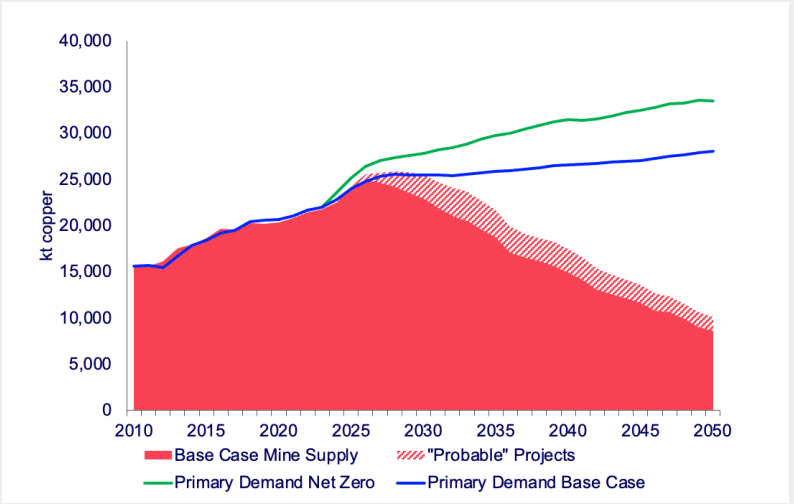


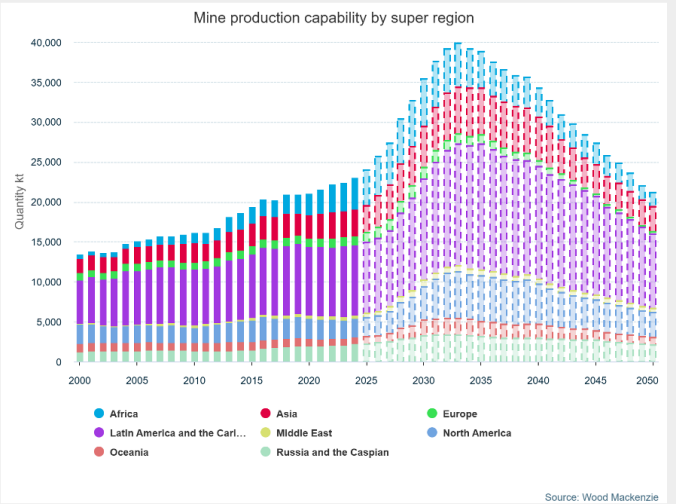




Source: Wood Mackenzie, CEIC

# The big copper challenge is the supply gap: 5Mt/a for 2034 and 18Mt for 2050

16Mt could be deliver from our green & brownfield projects; but the capability to 2035 reaches near 40Mt.




Source: Wood Mackenzie, CEIC

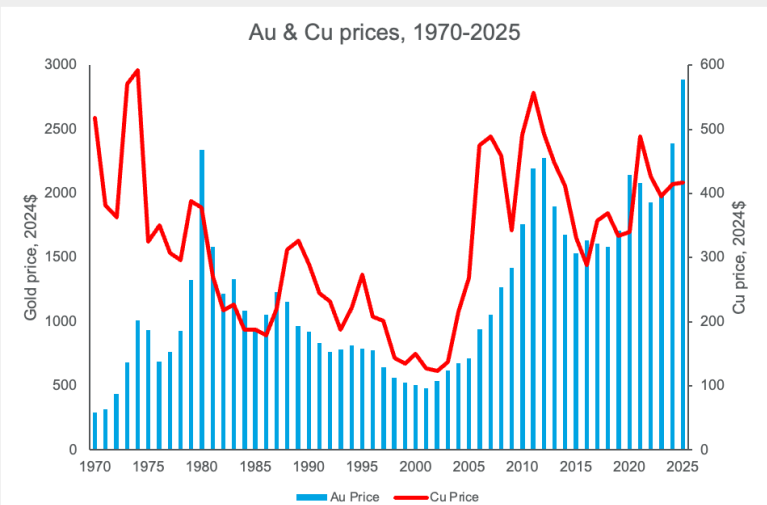
*Adjusted with a disruption allowance and including 70% brownfield probable projects and mine life extensions.

## What are strategic minerals?

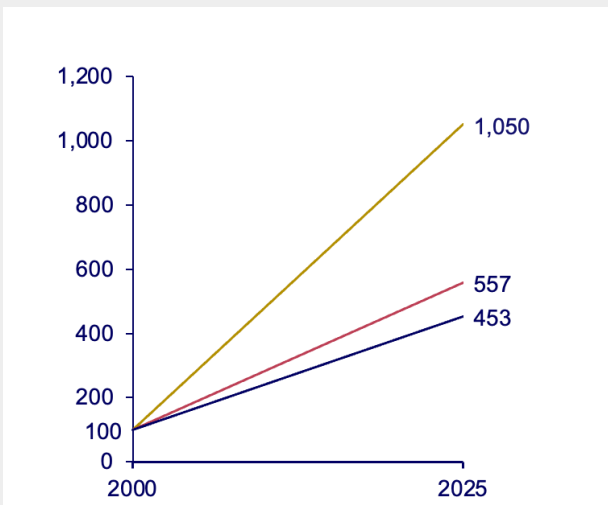
## Which metals to bet?

# **The blessing** gold & copper metals **for Chile and Peru**. Prices in 2024$

The China & the rest of Asia were the main drivers




An investment of 100$ in 2000 produce in 2025…

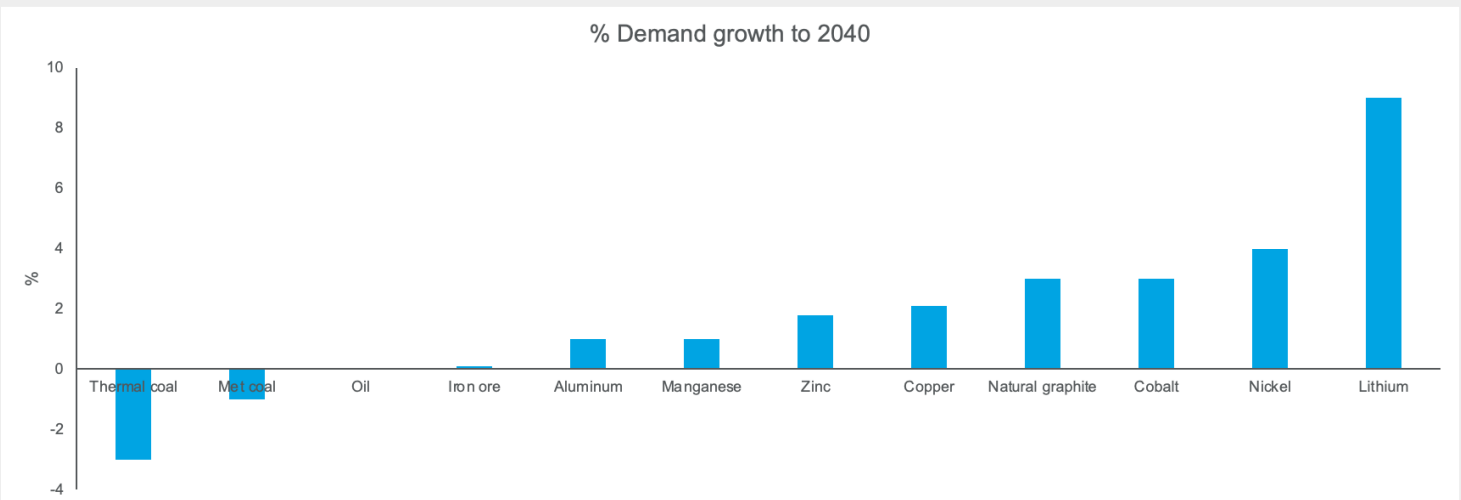



Source: Wood Mackenzie, CEIC

# Commodities demand: Winers and losers in the energy transition

Iron ore and coal comprised 77% of the Majors' 2023 EBITDA

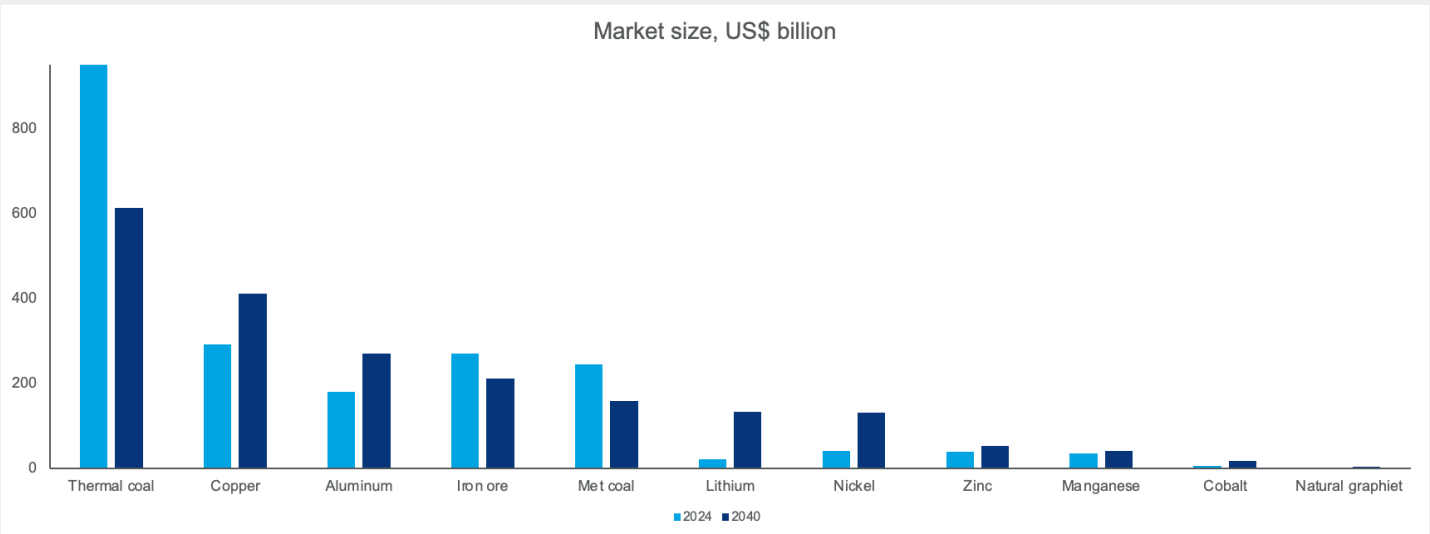
The long-term growth of copper is 2.0% and Zn 1.4%




Source: Wood Mackenzie, CEIC

# Market size: Copper is the king…

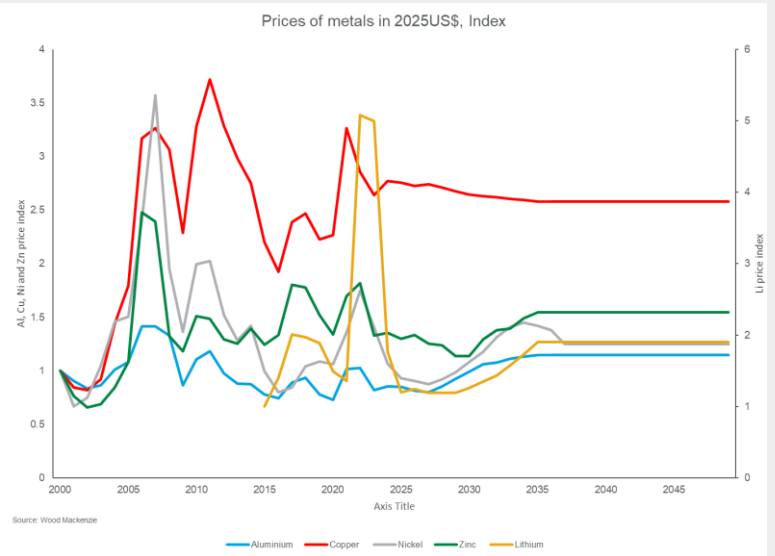
But Li and Ni are forecast to become $100+ billion markets by 2040




Source: Wood Mackenzie, CEIC

# At the end investors want to bet on metals with bright future

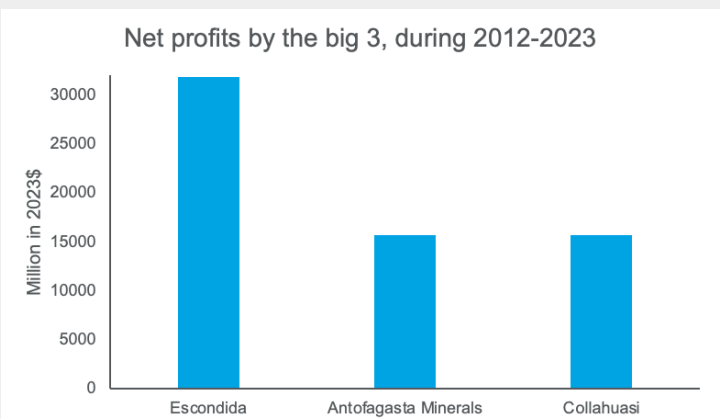
And copper have both a bright demand and the “new” cost structure that supports minimum prices



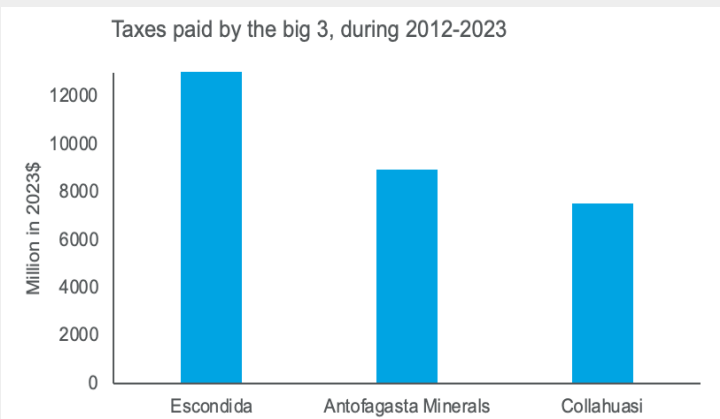
# Copper transformed the Chile economy: The big 3 and Codelco made a huge difference!

In addition, the salaries of the 280,000 workers more than doubles the tax and royalty revenues

The big 3 made in profits more than $63 billion




And paid in taxes near $30 billion

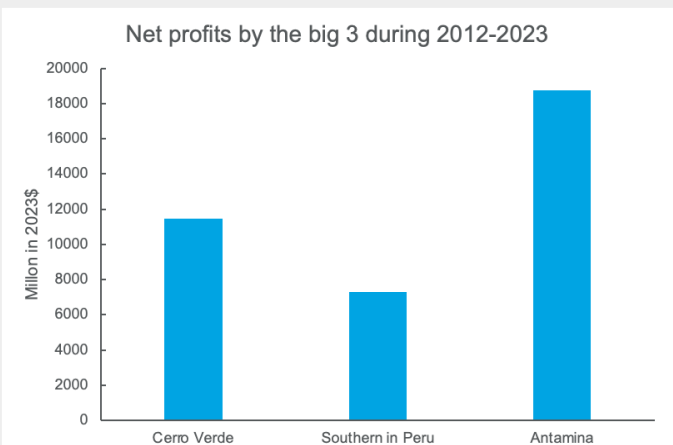



Source: Wood Mackenzie, CEIC

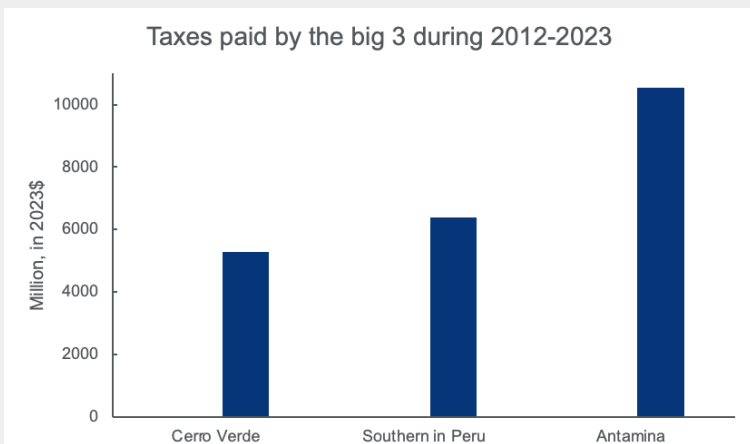
# Peru: A competitive mining produced huge economic resilience capabilities

& the salaries of the 240,000 workers more than doubles the tax and royalty revenues

The last 12 years the big 3 made profits of near $38 billion



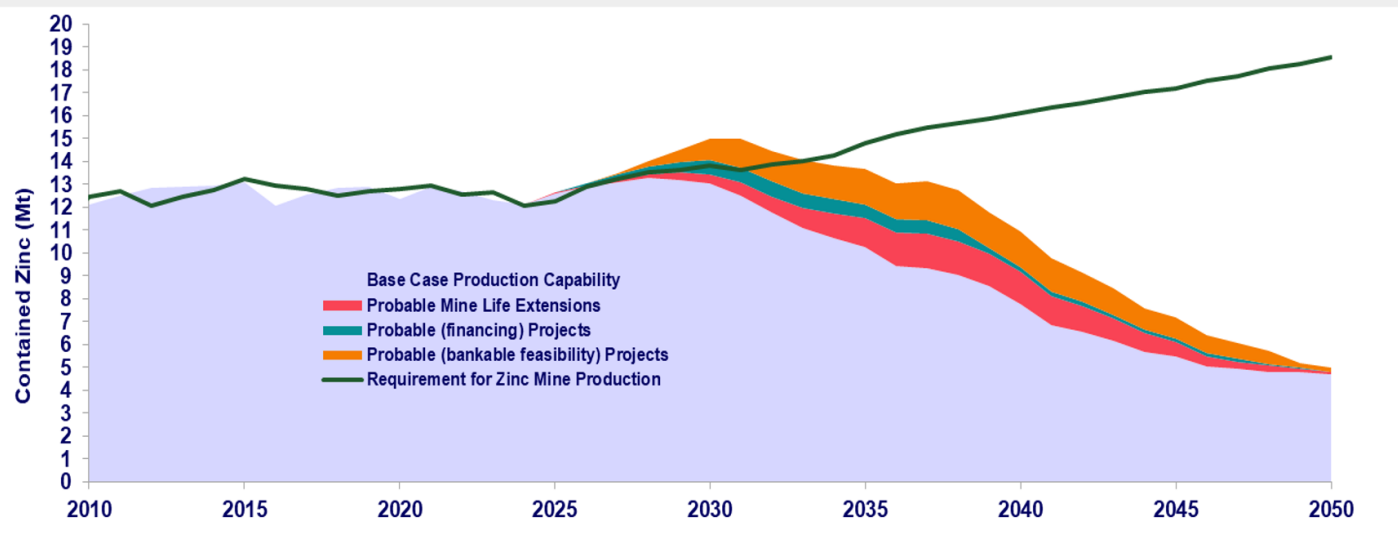

And paid in taxes more than $22 billion




Source: Wood Mackenzie, CEIC

# Zinc: By the early 2030s new mines from our probable projects will need to be developed

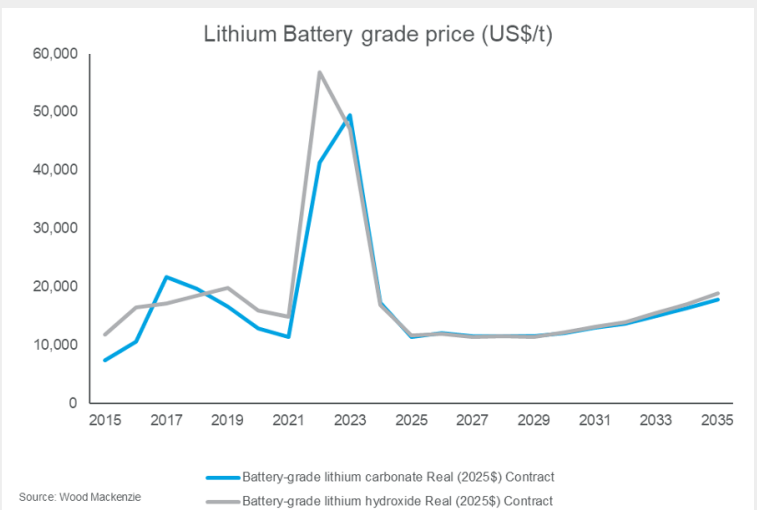
Global mine production capability



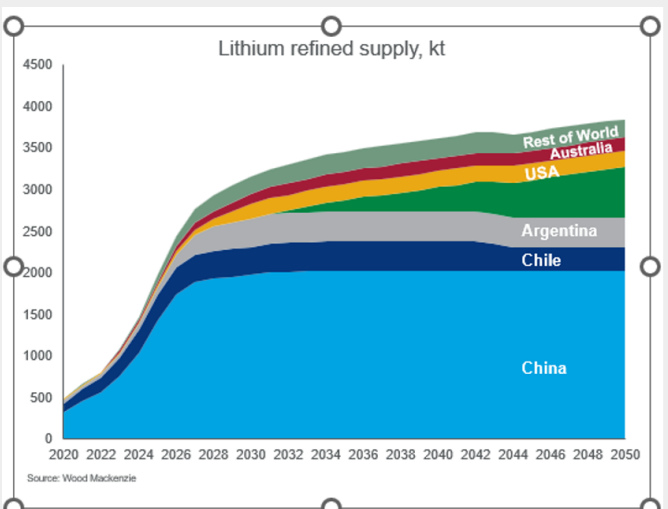

Source: Wood Mackenzie

# The Lithium is becoming a mature mining industry

The Li prices drop heavily since 2022-2023




Since 2022 Lithium refined supply jumped




Source: Wood Mackenzie, CEIC

## Conclusion…

- The mining industry of almost all metals enjoys a relative new scenario: A new strong economic gravity center, an energy transition and ESG demands.
- All this has created a new mining cost structure that in some cases like copper, support relative high copper prices.
- The strong demand of copper growing at higher rate than mine supply could keep pushing long term prices up. This offers an excellent opportunity for the development of projects, even current marginal projects.
- Copper and gold are the metals to bet. But the market size of lithium has become of interest of important corporations. Zn: The significant supply gap since early 2030s offers opportunities for development of competitive projects.
- To compete, countries need to drastically reduce the number of environmental permits, offer good mining policies, attractive fiscal regimes and cheap electricity cost.

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