

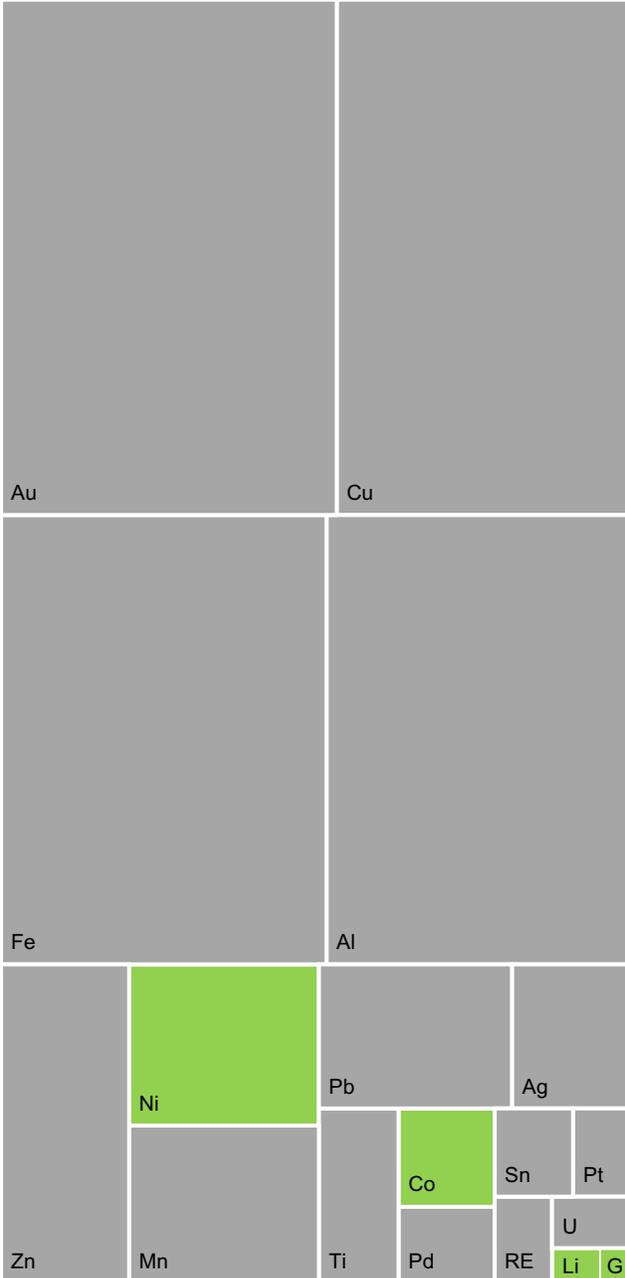


# FINANCING OF MINING INVESTMENTS FOR ELECTRIFICATION

# Mining's Energy Transition Challenge

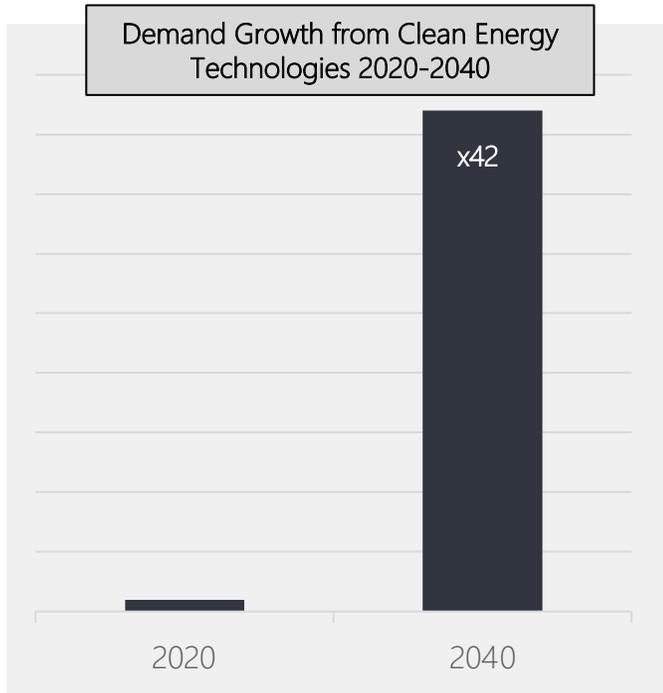
Value of global commodity markets 2018 (\$tr, to scale)

Oil



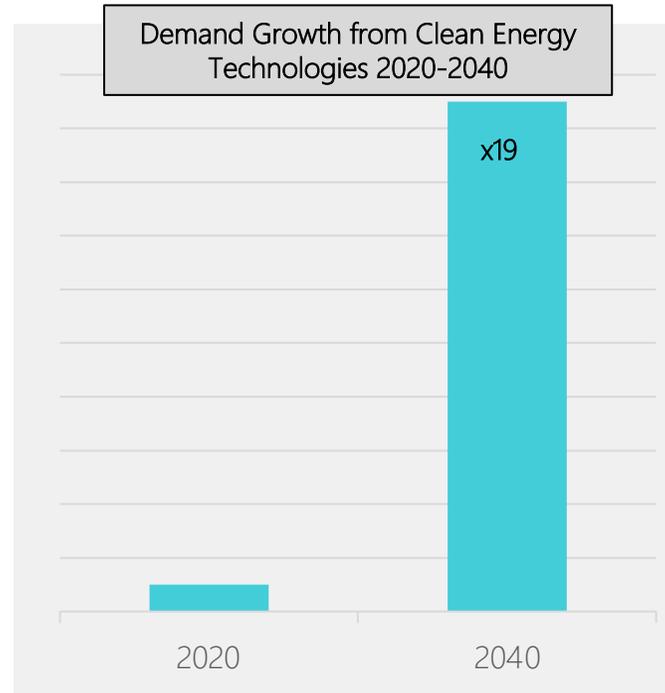
# How much capital is needed to build new mines?

## Li Lithium \$29B



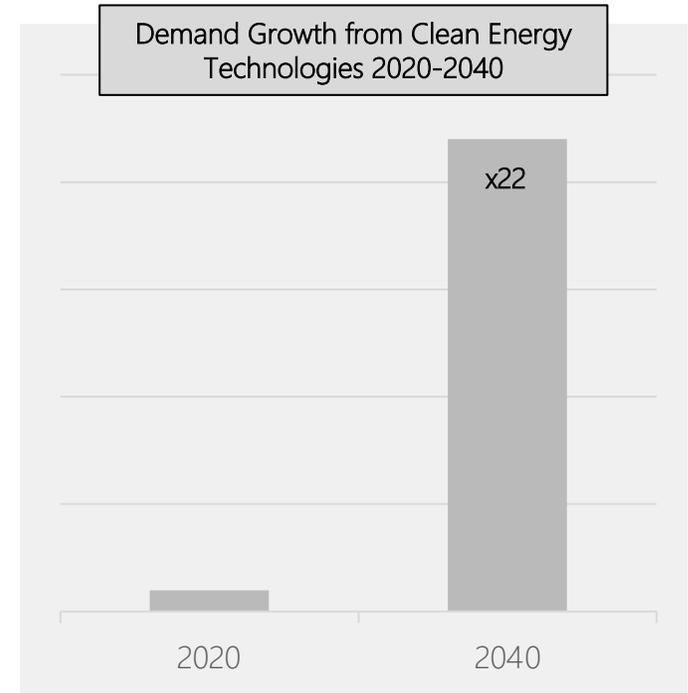
Lithium mining investment will be made across a range of hard rock and brine projects, spread between Australia, South America and Africa.

## Ni Nickel \$71B



New nickel projects will come primarily from Indonesia, Australia and South America. Indonesian supply will be financed by China and will be emissions intensive.

## Co Cobalt \$22B



Thriftiness has reduced demand projections, but zero cobalt is unrealistic. Nickel laterite development will address some supply growth, with the balance from DRC.

Source: Demand growth projections from IEA (assuming Sustainable Development Scenario) and internal analysis. Capital estimates based on a mix of capital intensity numbers applying a weighted average development cost between different asset classes (eg nickel pig iron vs HPAL vs sulphide; hard rock lithium vs lithium brines; lateritic cobalt vs copper/cobalt) and evolution of new cathode technologies. Investment in refining and processing is also required.

**BHP**

**RioTinto**

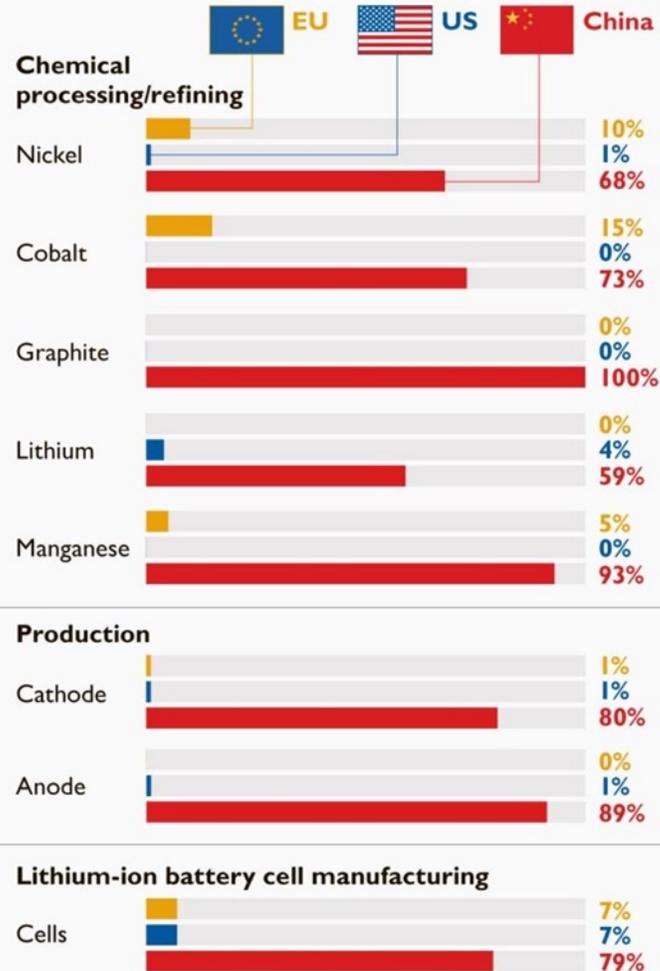


GLENCORE



Annual capital investment of  
**~US\$25B**  
growing volumes at 2-4%pa

# China dominates the processing of key minerals



Graphic: The Times and The Sunday Times •  
Source: Benchmark Mineral Intelligence

## THE PROBLEM

China controls both primary and secondary processing for most green metals

China's commitment to renewables is based primarily on building energy independence, not emissions abatement

With control over raw materials, China controls the new energy supply chain to an extent that even OPEC cannot match



# WHERE IS WESTERN CAPITAL?

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1. The major western mining companies are not prioritizing investment in green metals
2. Public equity and debt markets are risk averse
3. China has strategically crowded-out western investment by pre-empting demand growth
4. Industrial end-users in the West have been slow to recognise the risks to supply and the importance of vertical integration as supply chains fragment (e.g. auto)

# What have we learned from China's policy settings?

## CHINA'S 'GO OUT' POLICY

China commences its outward expansion to identify raw materials to feed local industry



1999

2013



## BELT AND ROAD INITIATIVE

Signature initiative of President Xi's international engagement, the BRI also serves as a key domestic policy lever for export-focused SOEs

## MADE IN CHINA 2025

China prioritizes investment in technologies that will be key for global leadership in the 21<sup>st</sup> Century



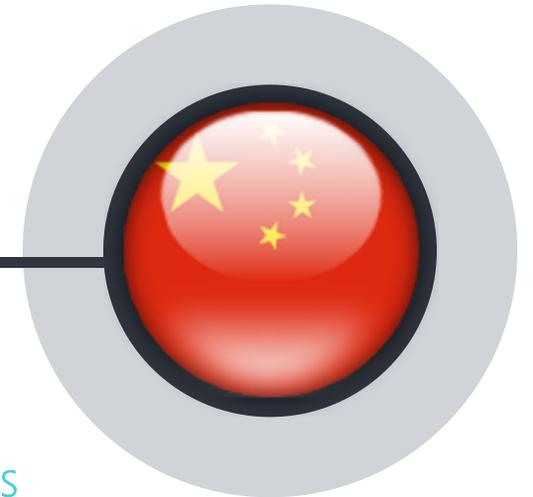
2015

2019

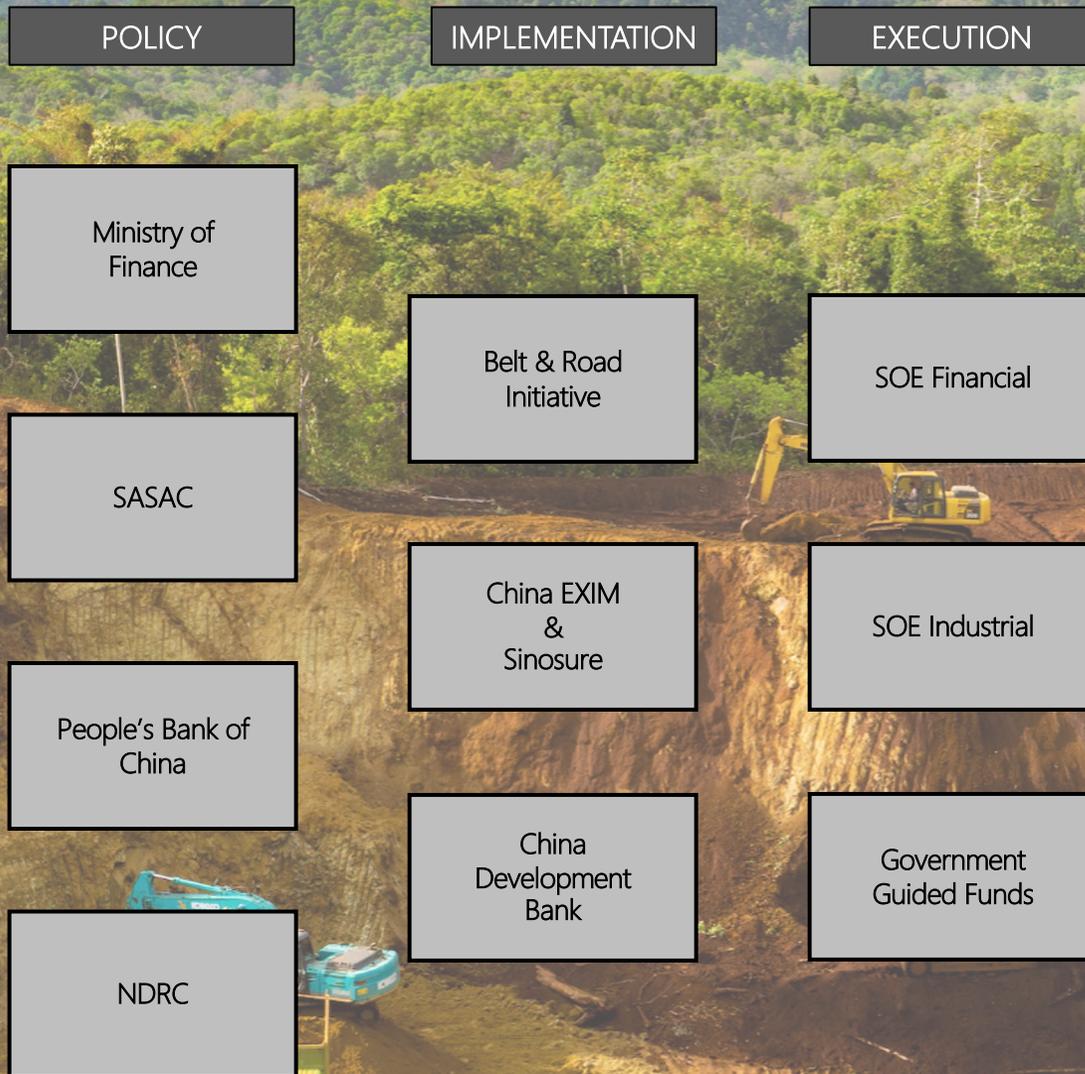


## SUPPLY SIDE STRUCTURAL REFORMS

Responding to increasing state debt and emerging problems with 'zombie' SOEs, policy shifts to encourage greater participation from the private sector



China's project financing ecosystem is opaque and complex  
But it is also flexible and allocates capital extremely quickly



# CHINA'S FINANCING MODEL

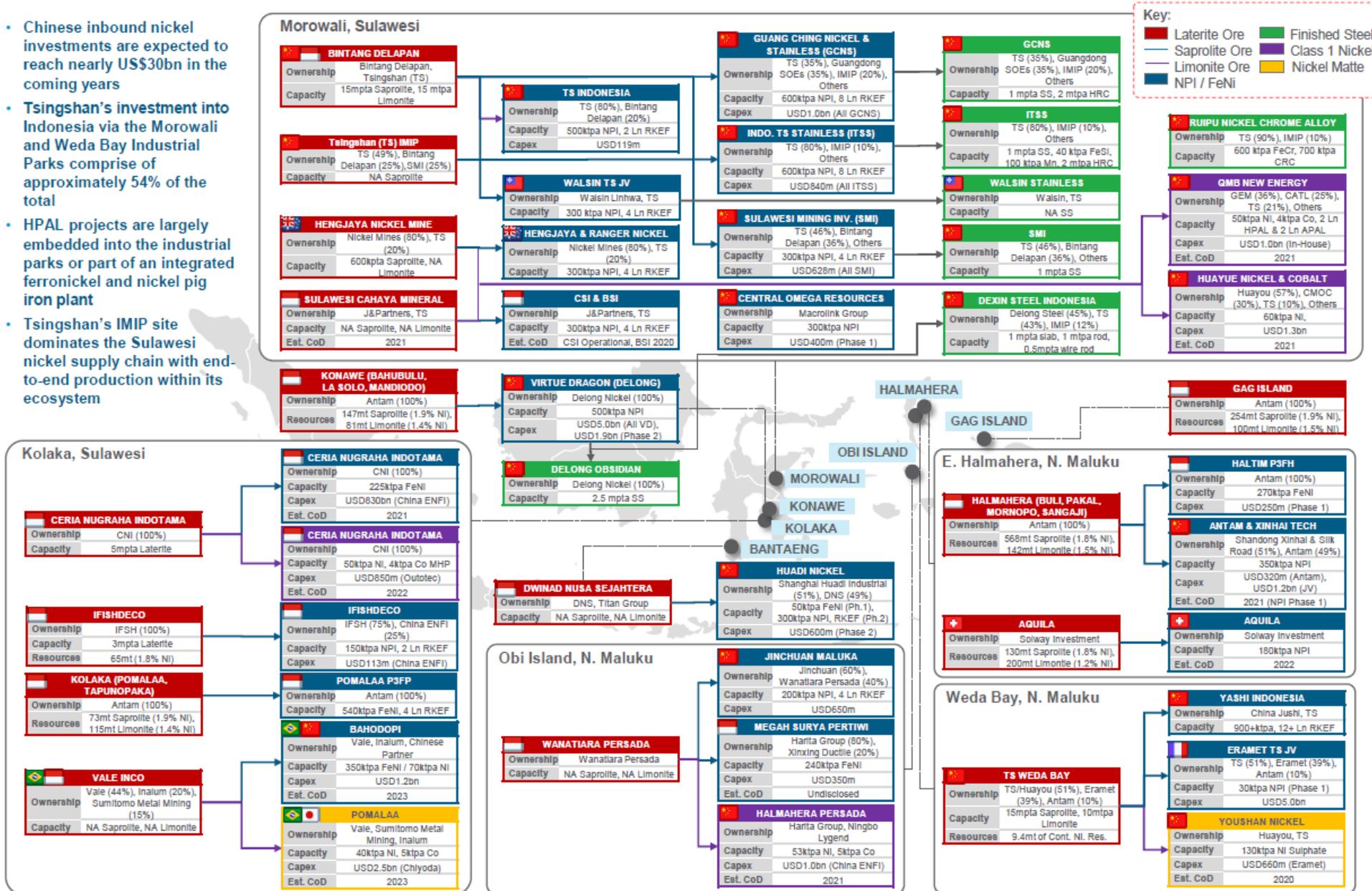
Prioritizes speed of construction and vertical integration, but:

1. Project quality is often poor
2. Shortcuts on environmental standards and community engagement
3. Poor health and safety outcomes
4. Final products often leave a large emissions footprint

# Indonesia's Dynamic Nickel Landscape

China invested and committed over US\$30bn in the Indonesian Nickel supply chain

- Chinese inbound nickel investments are expected to reach nearly US\$30bn in the coming years
- Tsingshan's investment into Indonesia via the Morowali and Weda Bay Industrial Parks comprise of approximately 54% of the total
- HPAL projects are largely embedded into the industrial parks or part of an integrated ferronickel and nickel pig iron plant
- Tsingshan's IMIP site dominates the Sulawesi nickel supply chain with end-to-end production within its ecosystem





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