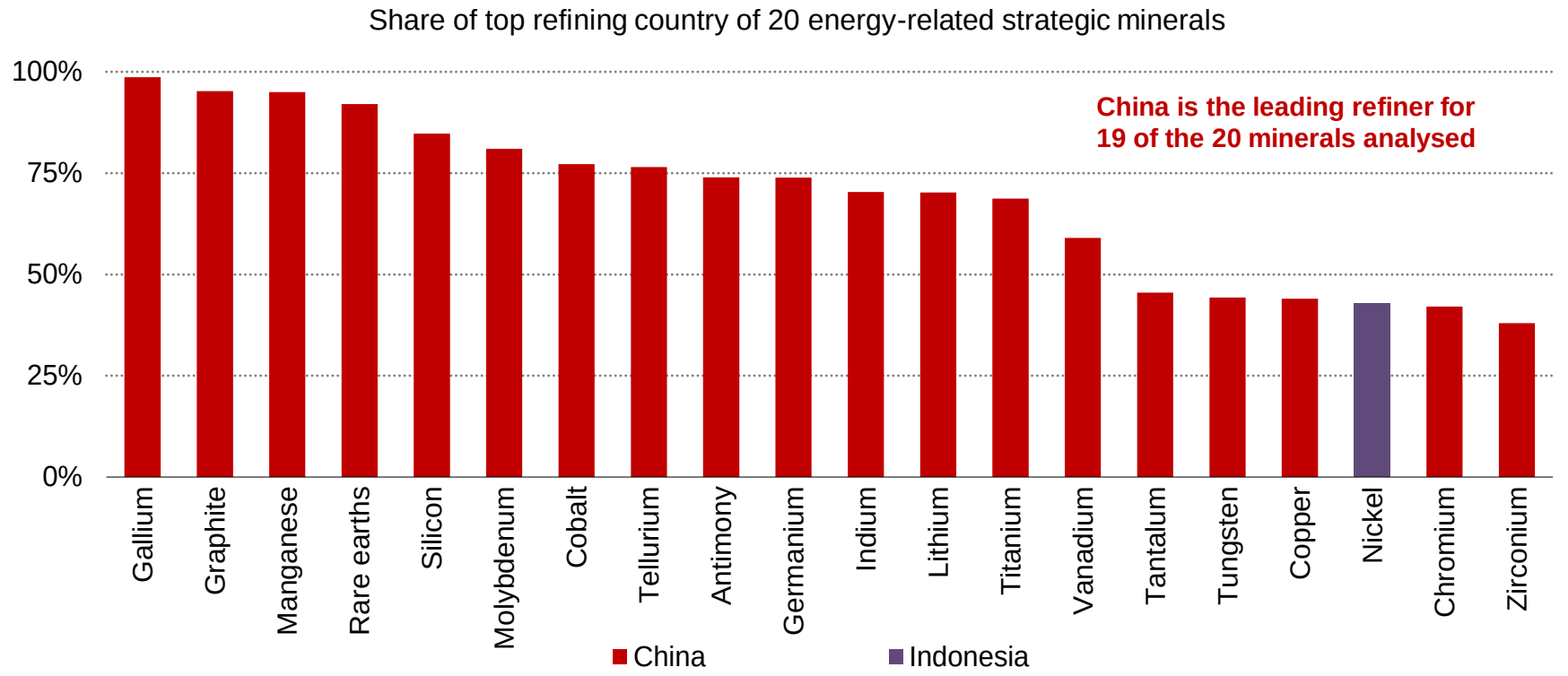
Global Critical Minerals Outlook 2030 and beyond

Milosz Karpinski, International Energy Agency

10 April 2026

International Energy Agency

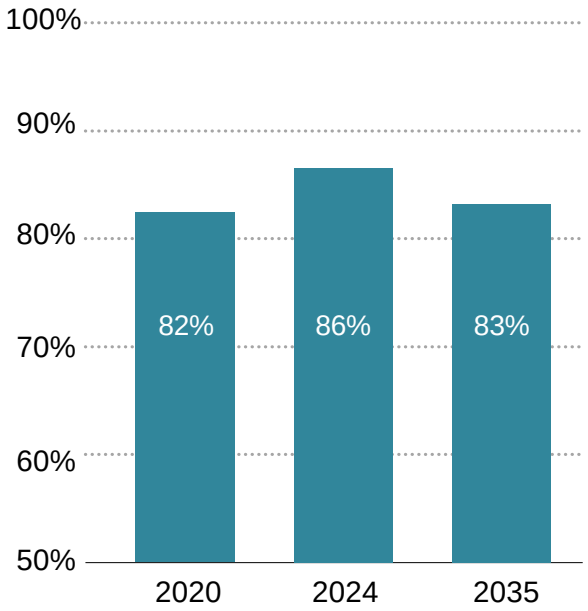
A broad range of strategic minerals presents deeper vulnerabilities



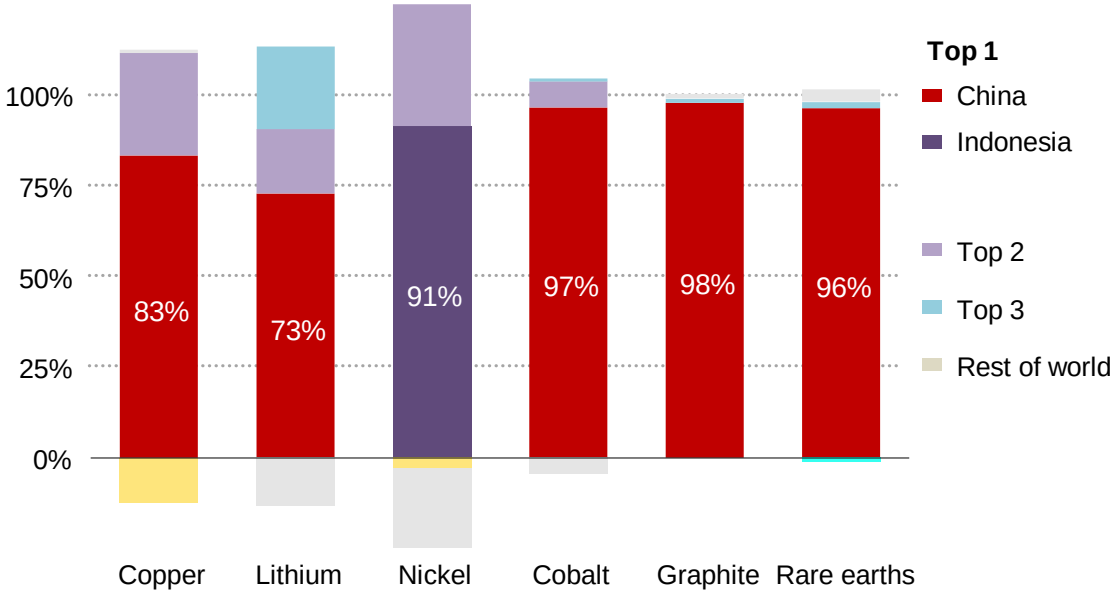
Many energy-related minerals are also critical to high-tech, aerospace, and advanced manufacturing, yet face major risks from supply chain concentration, price volatility, and by-product dependence

Diversification: Critical minerals are moving in the opposite direction

Average share of top three refined material suppliers



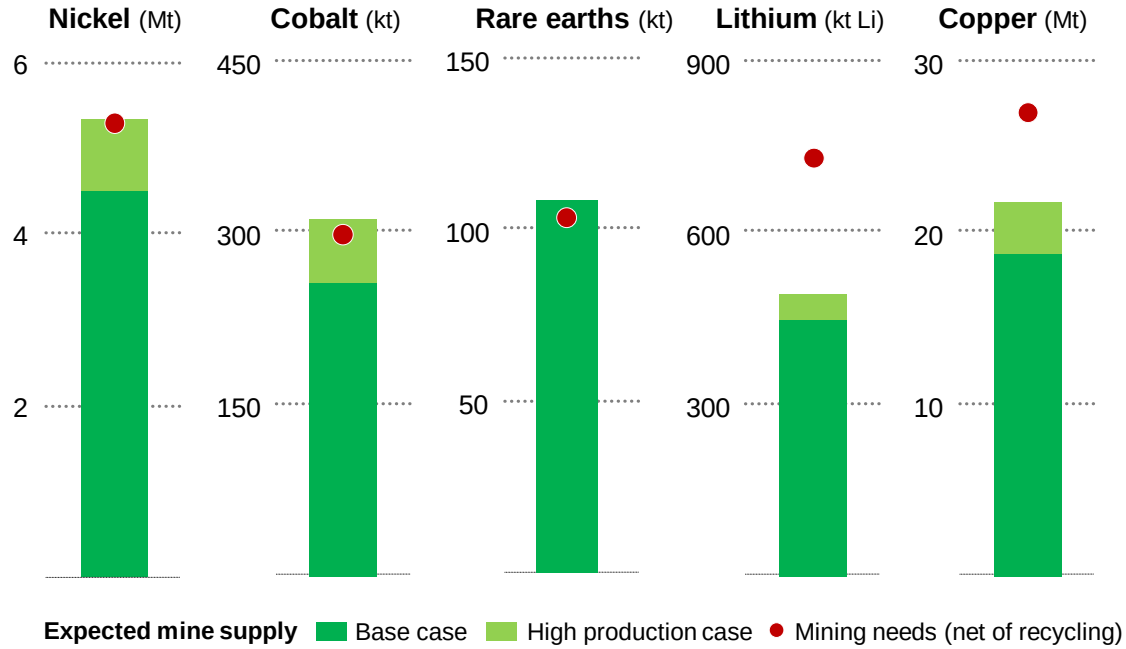
Sources of refined material supply growth, 2020-2024



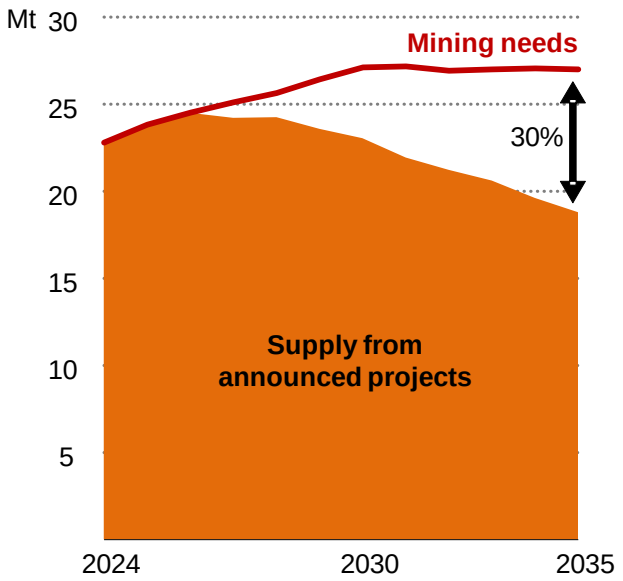
Growth in refined supply has been driven almost entirely by top producers, leading to increased geographical concentration of refined products across nearly all critical minerals

Supply gaps are narrowing, with copper a major exception

Expected mine supply from existing and announced projects and mineral supply requirements under today's policy settings, 2035



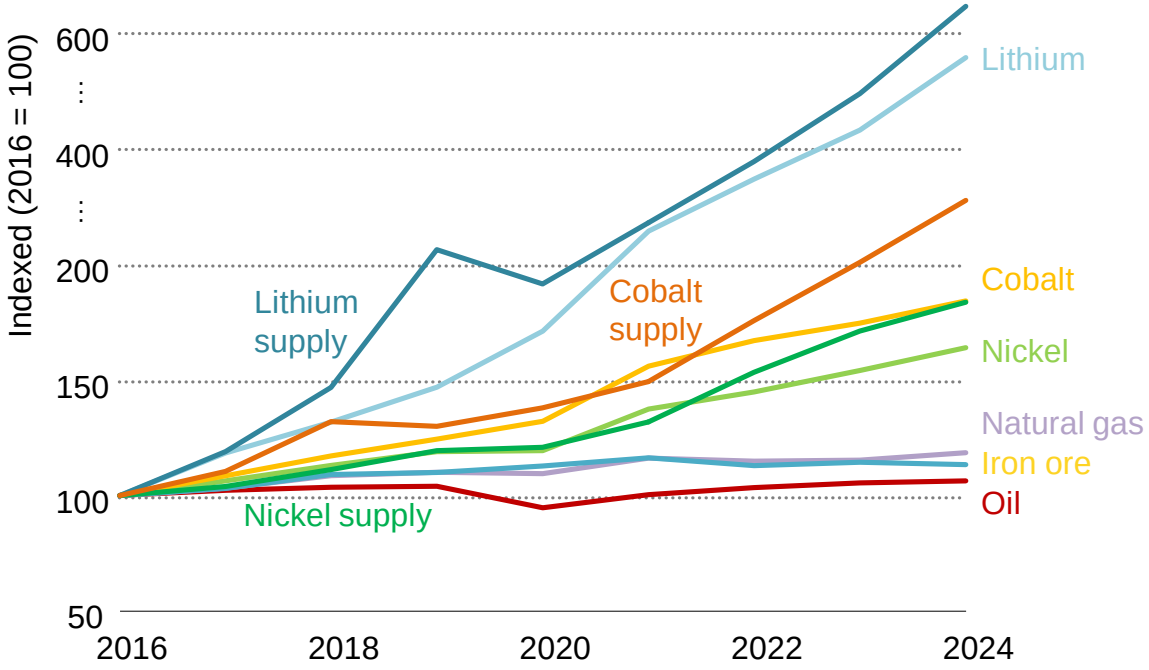
Case of copper



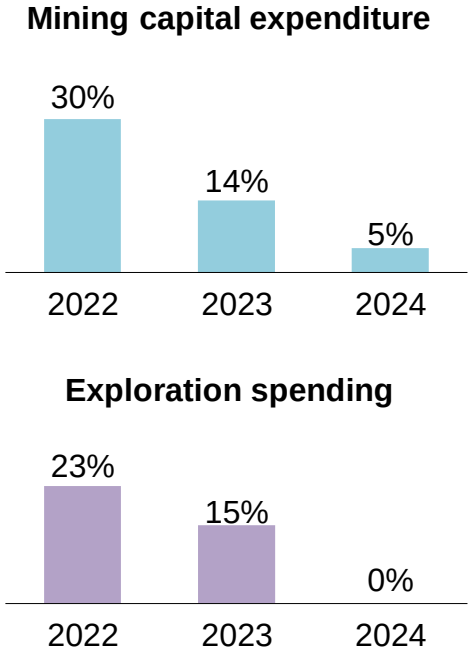
Projected supply-demand balances through to 2035 are improving compared to a few years ago, but copper remains a concern with a potential 30% supply shortfall by 2035

Strong demand meets stronger supply, weakening investment momentum

Demand growth of selected commodities



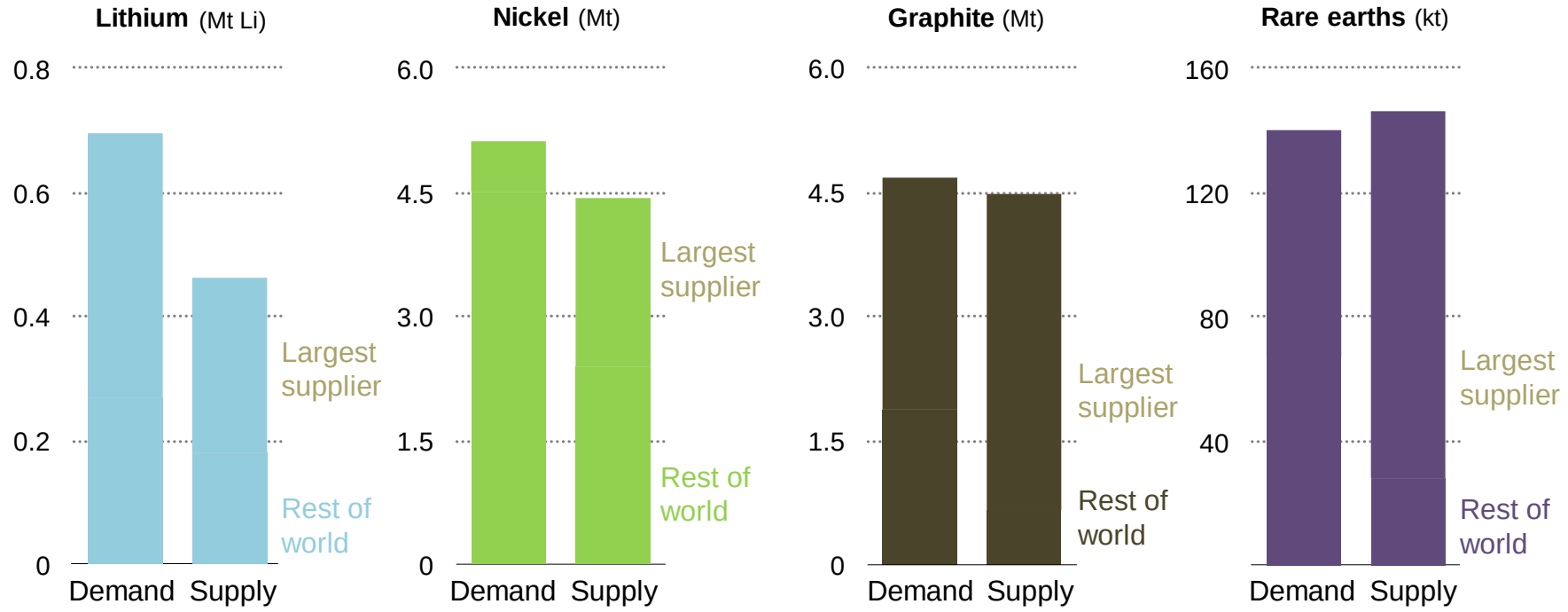
Annual investment growth rates



Demand for critical minerals continues to grow rapidly than for most other commodities, but significant supply increases have put downward pressure on prices, dampening momentum for new investment

Growing concentration trends pose major supply risks

Global mineral demand and supply balances excluding top supplier under today's policy settings, 2035



Reliance on a small number of suppliers increases vulnerability to shocks and disruptions even in a well-supplied market, with major implications for consumer prices and economic & manufacturing competitiveness

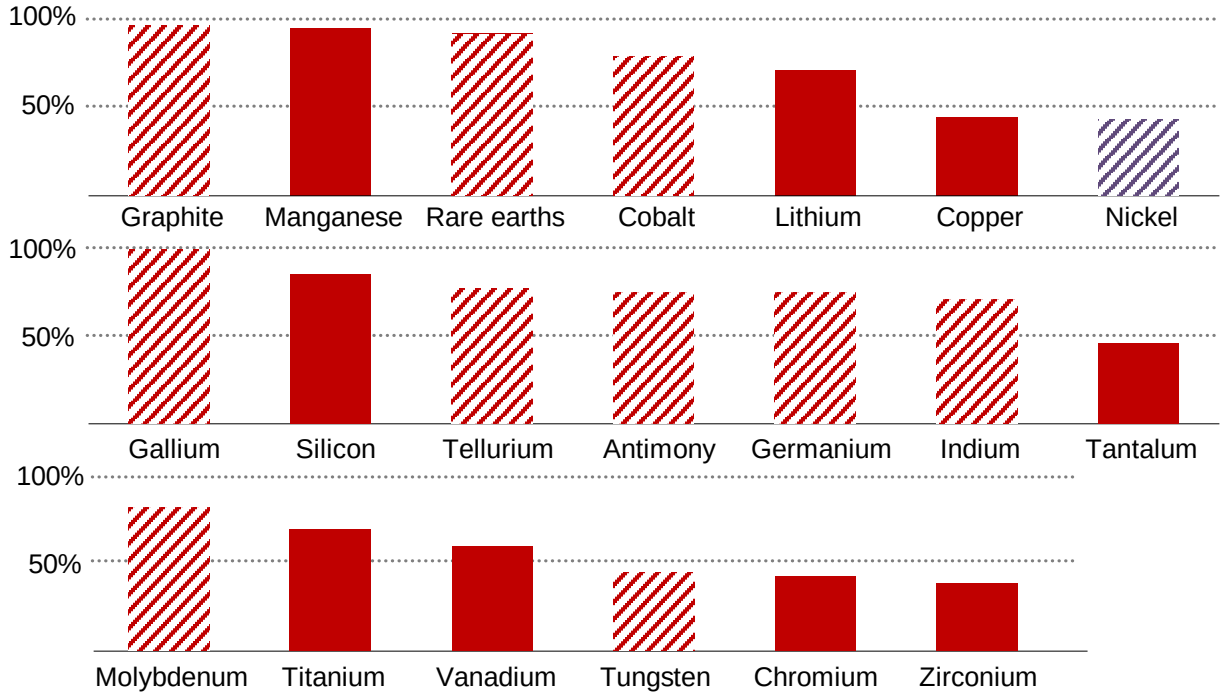
A broad range of strategic minerals presents deep vulnerabilities

Batteries, grids, renewables

AI, data centres, high-techs

Aerospace, industry, defence

Share of top refining country for energy-related strategic minerals, 2024



Critical minerals are vital not only for energy security but also for broader economic resilience, but the remarkably high level of market concentration leaves global supply chains vulnerable to disruptions

IEA Critical Minerals Security Programme – Action Framework

IEA Critical Minerals Security Programme

Emergency preparedness and response

- **Table-Top Exercises**
- **Market Disruption Monitoring and Emergency Response Procedure**

Supply chain resilience and diversification

Short-term resilience

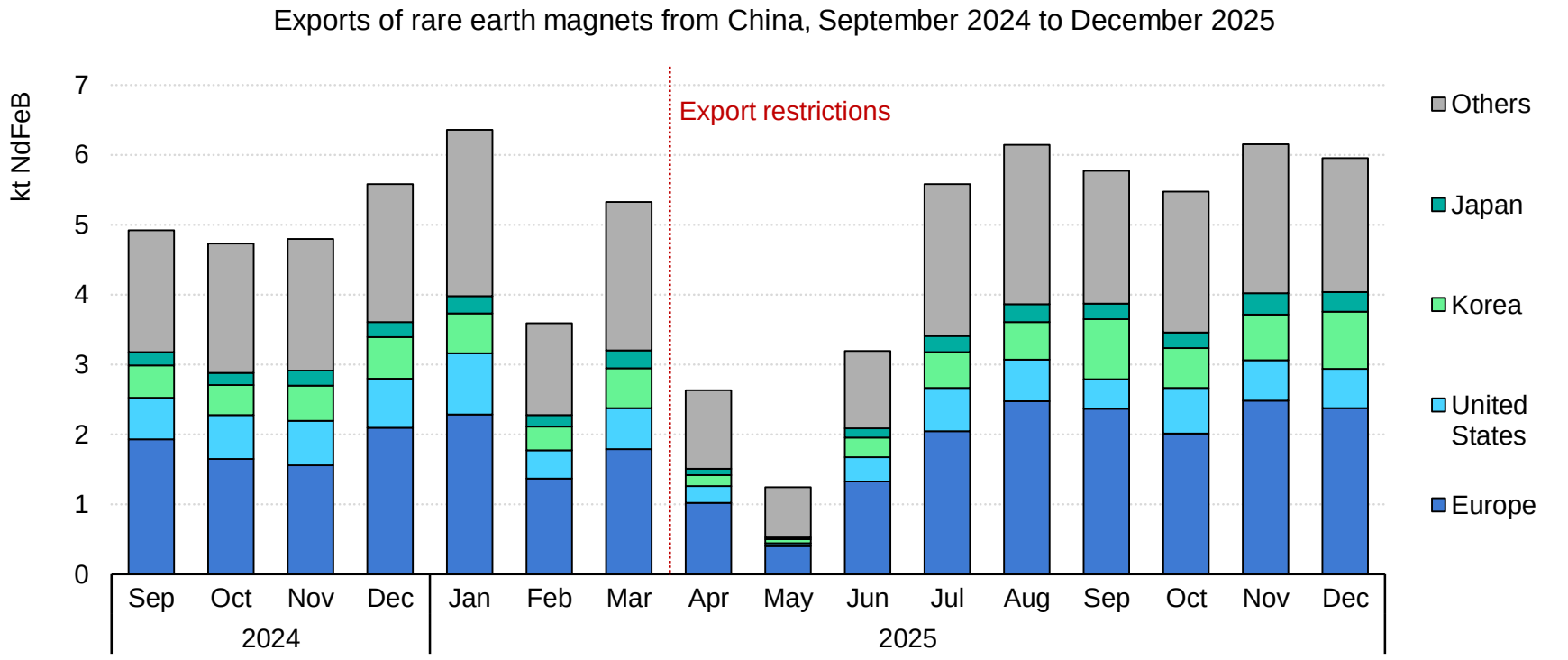
- **Stockpiling**

Longer-term diversification

- **Critical Minerals Information Dashboard**
- **Policy Tools for Diversification**

Critical minerals country reviews

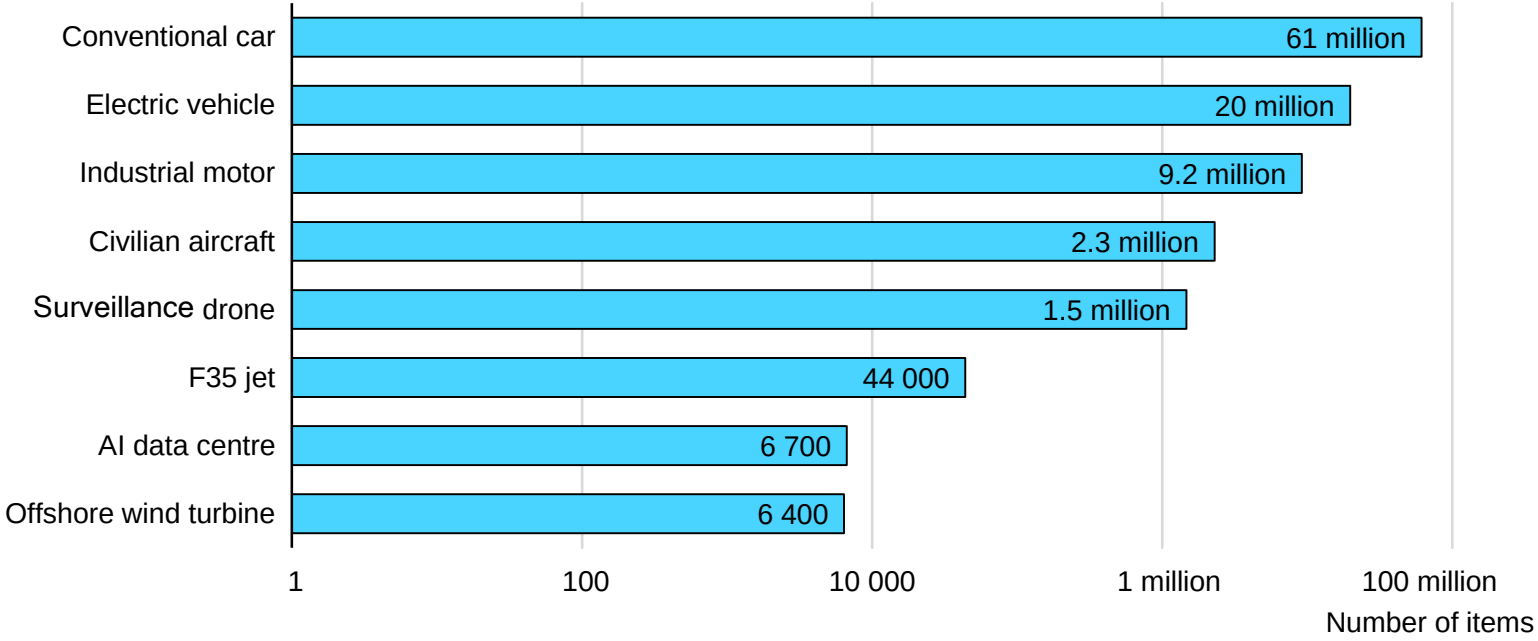
Export controls in April 2025 disrupted rare earth trade flows



Export volumes from China dropped sharply in April and May, leaving many automakers in the United States, Europe and beyond struggling to procure permanent magnets

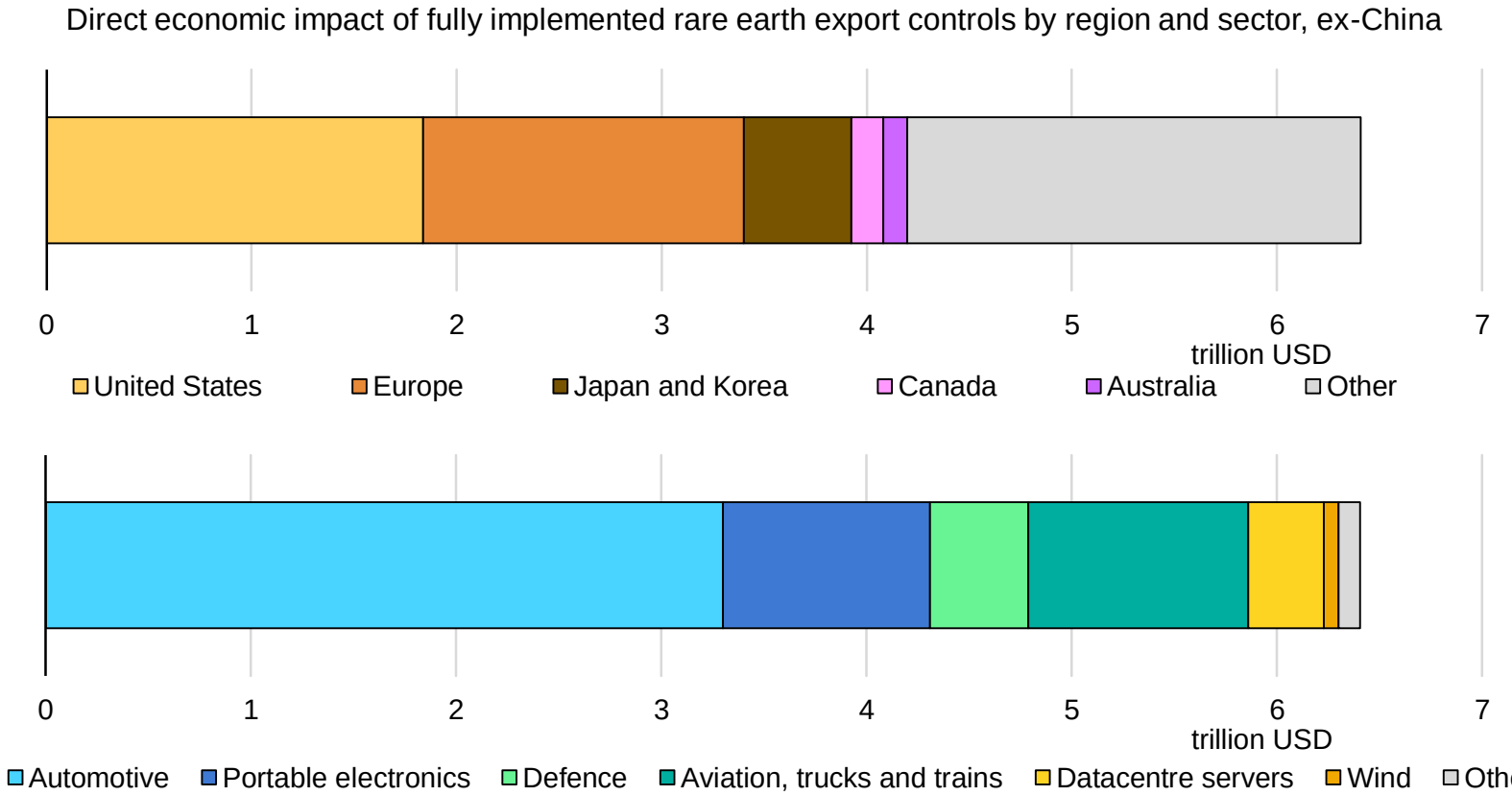
A crucial importance of rare earths on economic security

Number of items containing rare earth oxides equivalent to China's rare earth magnet export volumes, 2025



Despite their relatively small market sizes, rare earth elements are essential inputs to a range of strategic applications from energy and automotive to high-tech and defence

More than USD 6 trillion of economic value at risk



Possible critical minerals stockpiling governance models

Stockpiling governance models

Government-held stocks



Direct management

Government owns and manages strategic stocks.



Public agency

Public agency(s) purchase and manage strategic stocks on behalf of the government. Costs are entirely covered by the government through subsidies and guarantees.

Industry-held stocks



Government-owned

Industry manages stocks that are owned by government through contractual arrangements.

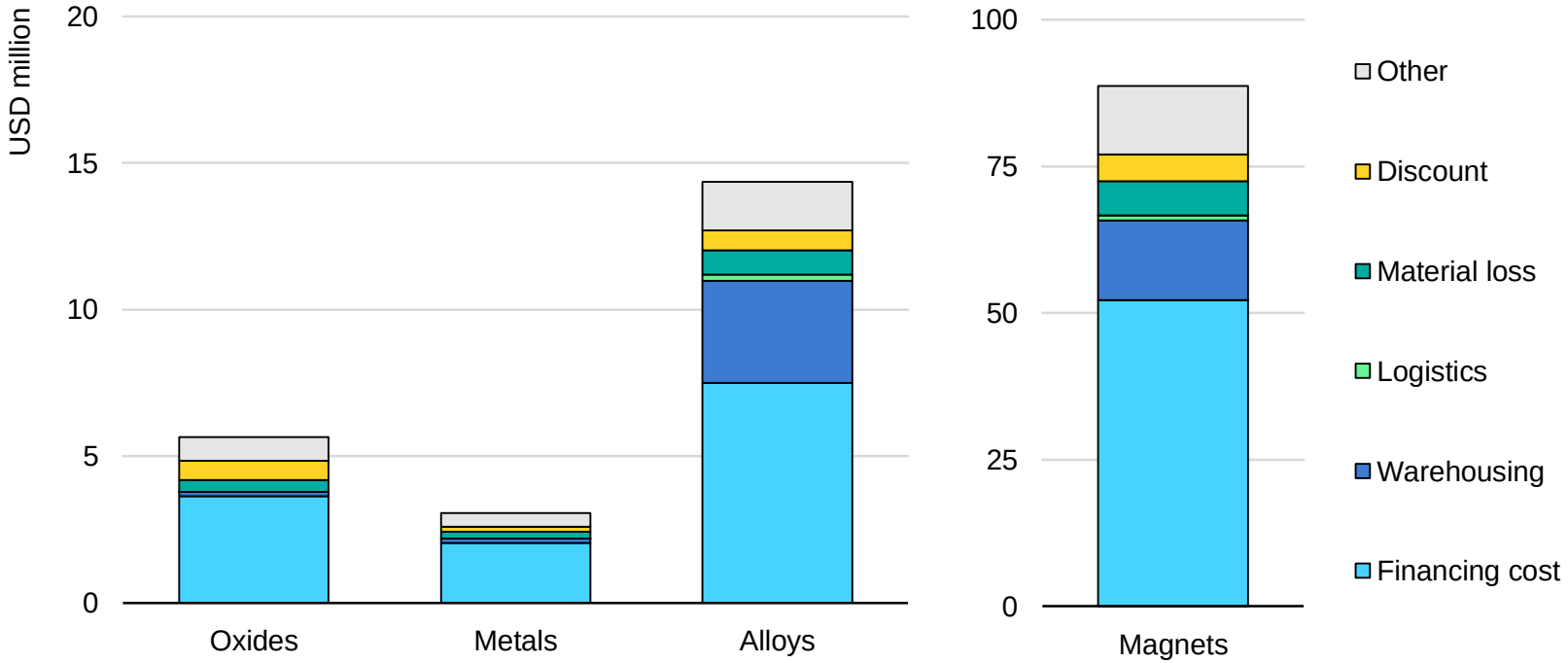


Industry-owned

Industry owns and manages strategic stocks, at a level set by the government through a mandate.

Stockpiling cost is modest compared to potential impact

Operating cost of stockpiling magnet rare earth materials to cover one year of exposed imports for G7 + Australia



Total stockpiling cost for G7 + Australia is USD 112 million.
Rare earth magnets have the largest exposed imports and are imported by all G7 countries and Australia

Implications of events in the Middle East on the mineral markets

Aluminium

- Gulf region produce around 8% of global aluminium supply
- Around 5 Mt of aluminium shipped each year from smelters in Bahrain, Qatar, Saudi Arabia and UAE
  - Smelters also import alumina and bauxite transiting through the Strait
- Force majeure announcements from Aluminium Bahrain and Qatalum smelter in Qatar
- Already tight market where global inventories are depleting

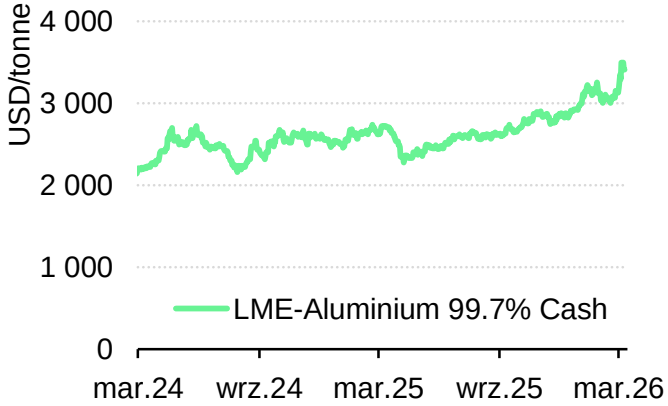
Sulphur

- Gulf countries produce 24% of global supply
- Half of global seaborne sulphur trade moving through Hormuz
- Sulphuric acid used to refine copper, nickel and zinc, and its cost can account for more than a fifth of total refining cost of these materials, with potential impacts also on LFP batteries, fertiliser, etc.

Others

- Less significant impact on direct trade of critical minerals such as copper, lithium, nickel and graphite (low % of trade transiting the Gulf)

Aluminium price trend



Sulphur price trend

