



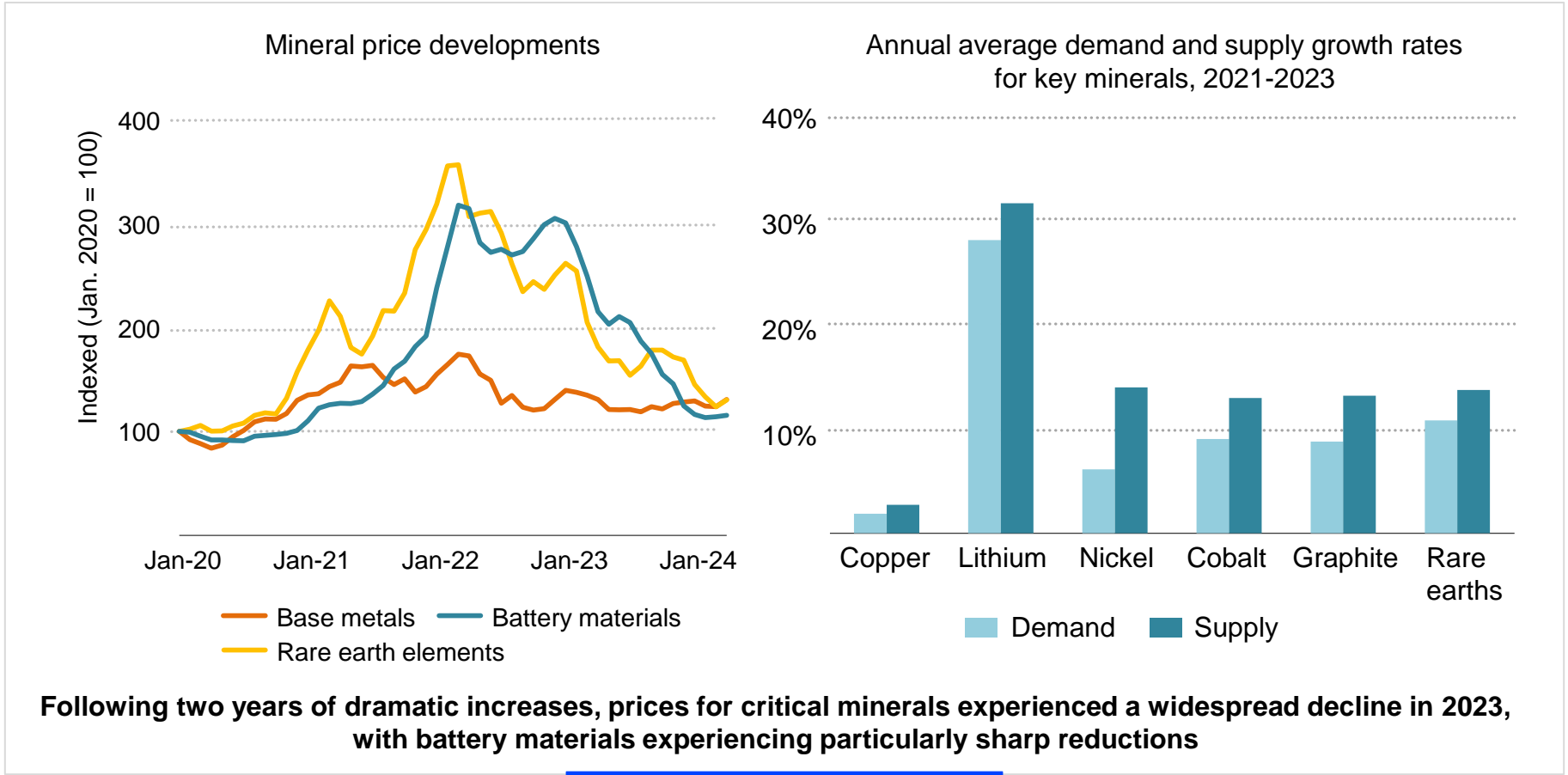
# Global Critical Minerals Outlook 2024

Launch webinar

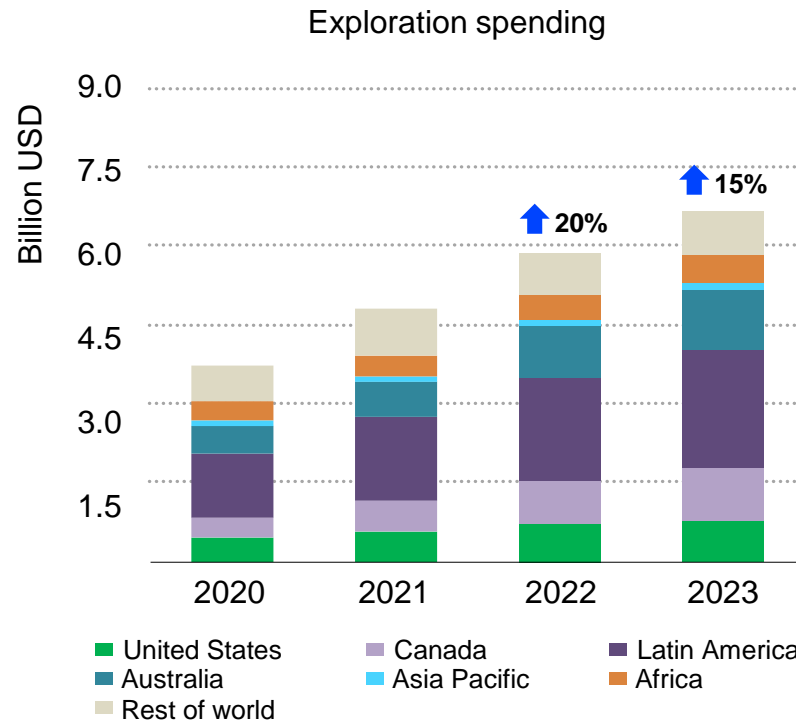
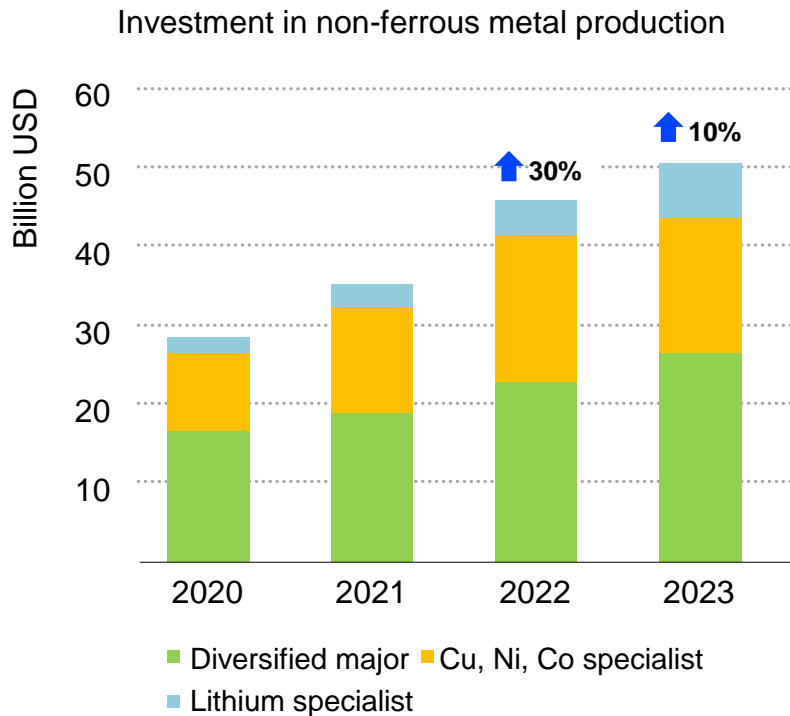
28 May 2024

International  
Energy Agency

# The main story of 2023 – falling prices



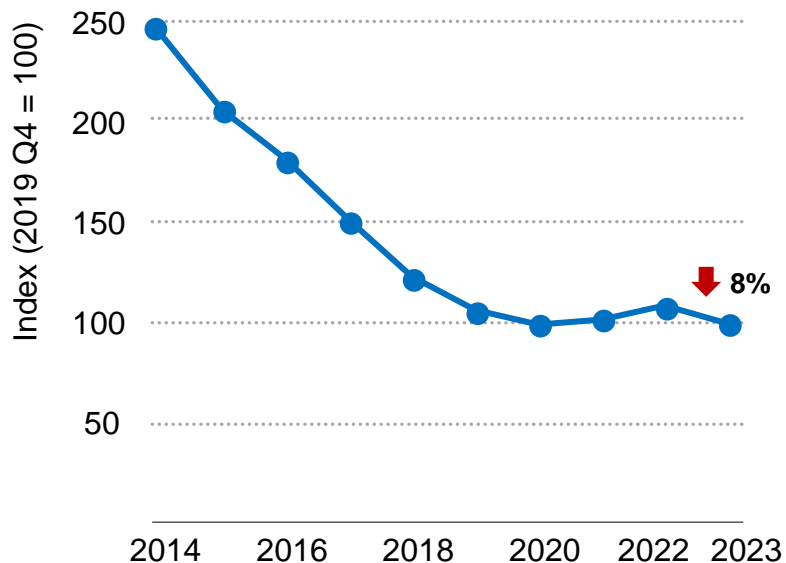
# The pace of investment growth slowed, but still healthy



**The recent fall in prices has affected investments in new mineral supply, but they are still growing; investment by lithium-focused companies saw a sharp rise of 60%, despite lower prices**

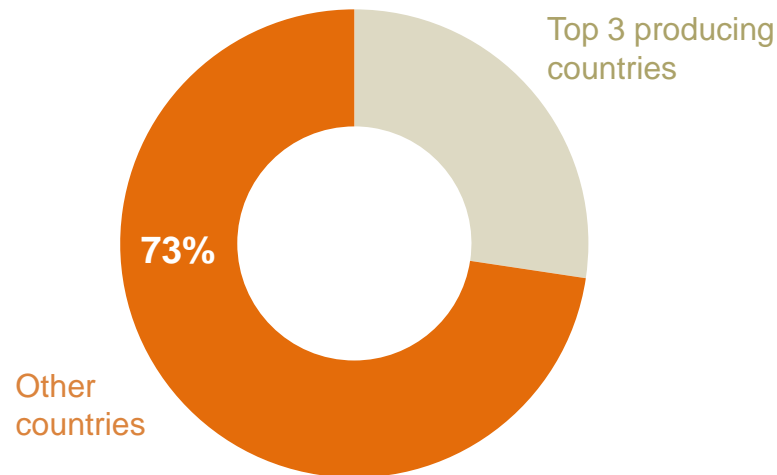
A boon for clean energy deployment

### IEA Clean Energy Equipment Price Index



A bane for mineral investment and diversification

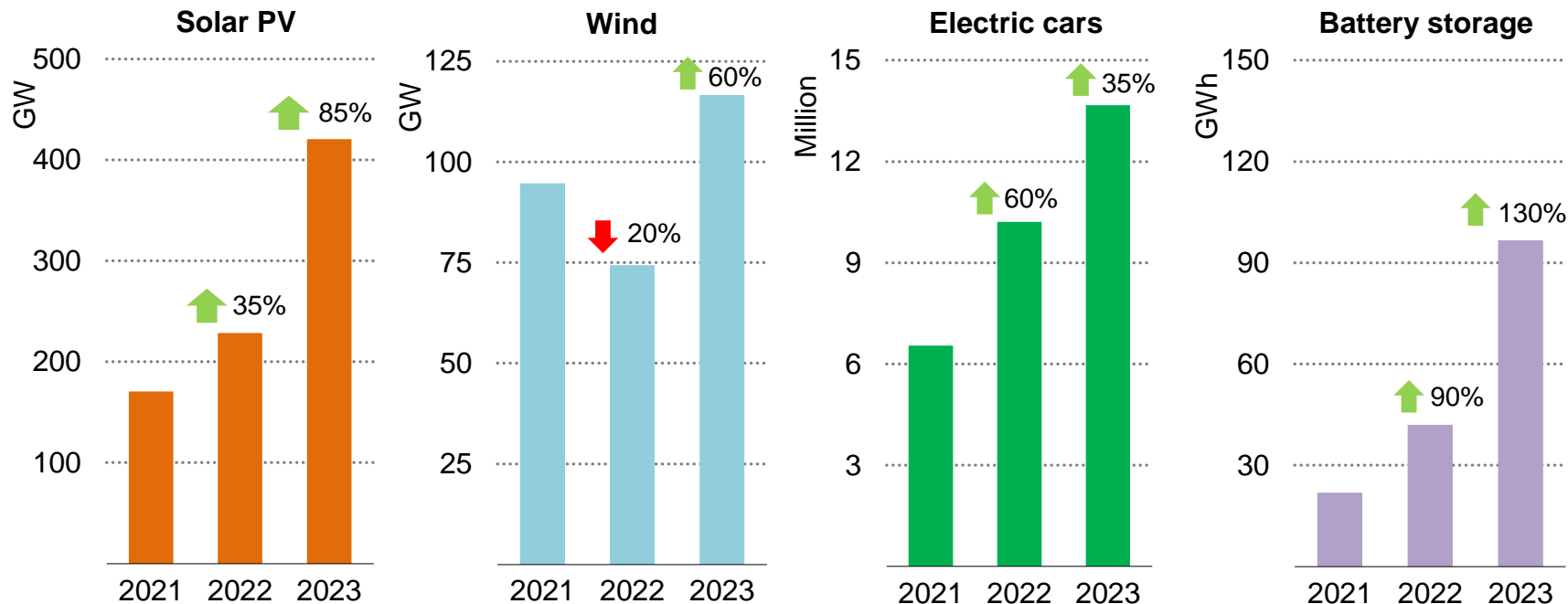
### Nickel mine production at risk



**Lower prices have been good news for consumers, bringing clean technology costs back on a downward trajectory, but they also make spending to ensure diversified supply less appealing to investors**

# Robust momentum for clean energy deployment...

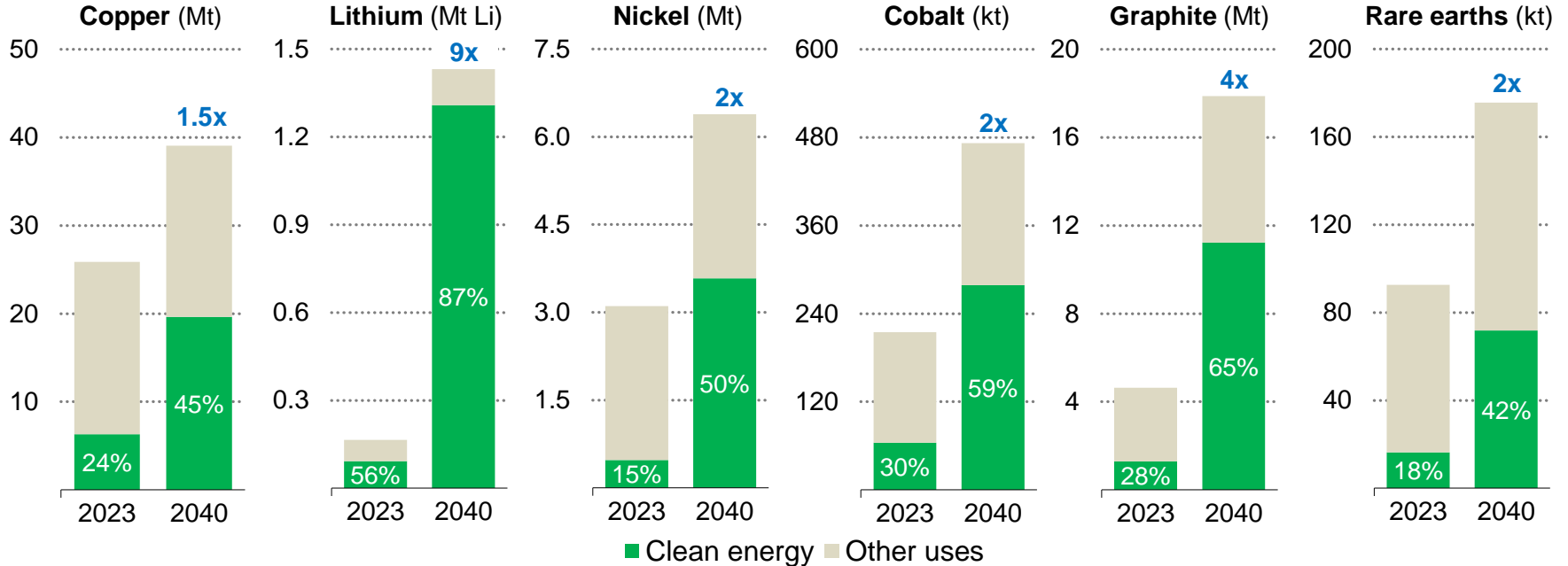
Annual capacity additions for selected clean energy technologies, 2021-2023



**Clean energy deployment continues to advance in all our scenarios for the future, including a strong growth story for solar, wind, EVs and battery storage**

# ....brings strong demand for critical minerals

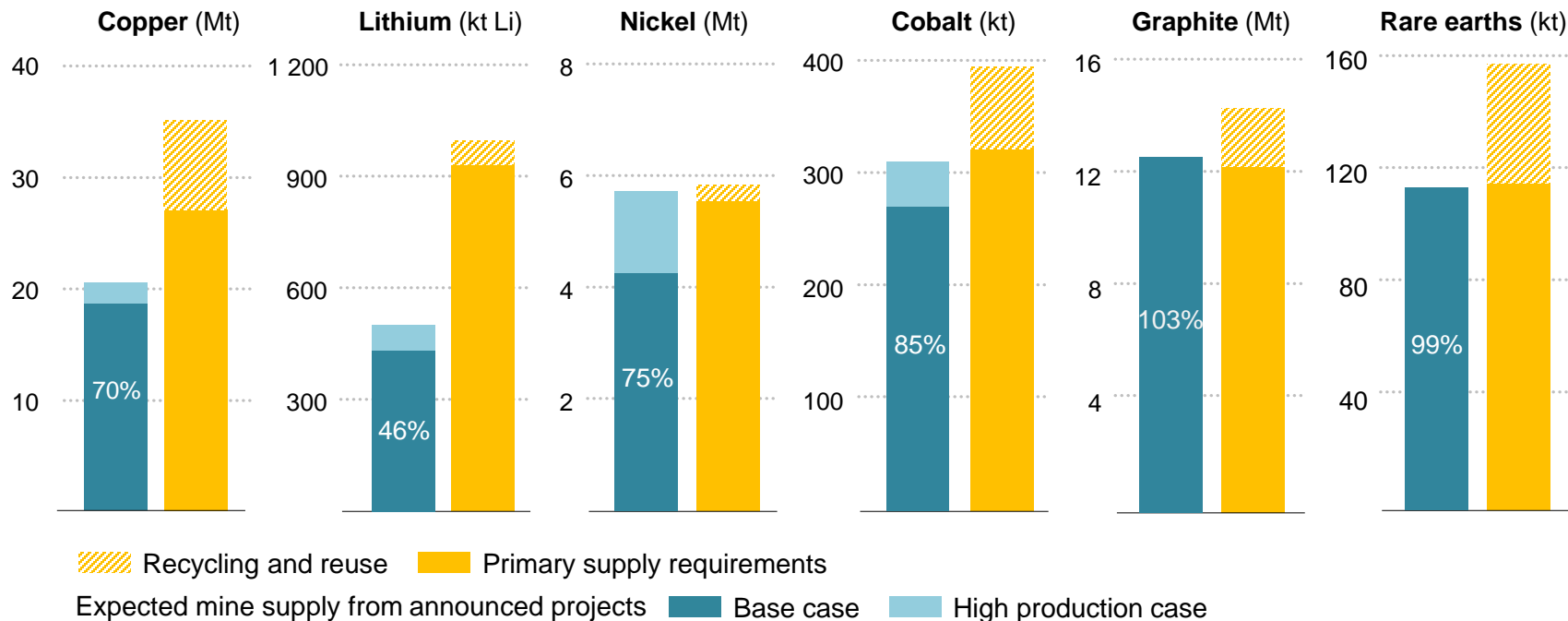
Growth in demand for key critical minerals in the Net Zero Emissions by 2050 (NZE) Scenario



**Today's well-supplied market may not be a good guide for the future as demand for critical minerals continues to rise in all IEA scenarios; it almost triples by 2030 and quadruples by 2040 in the NZE Scenario**

# Mixed picture for future balances between demand and supply

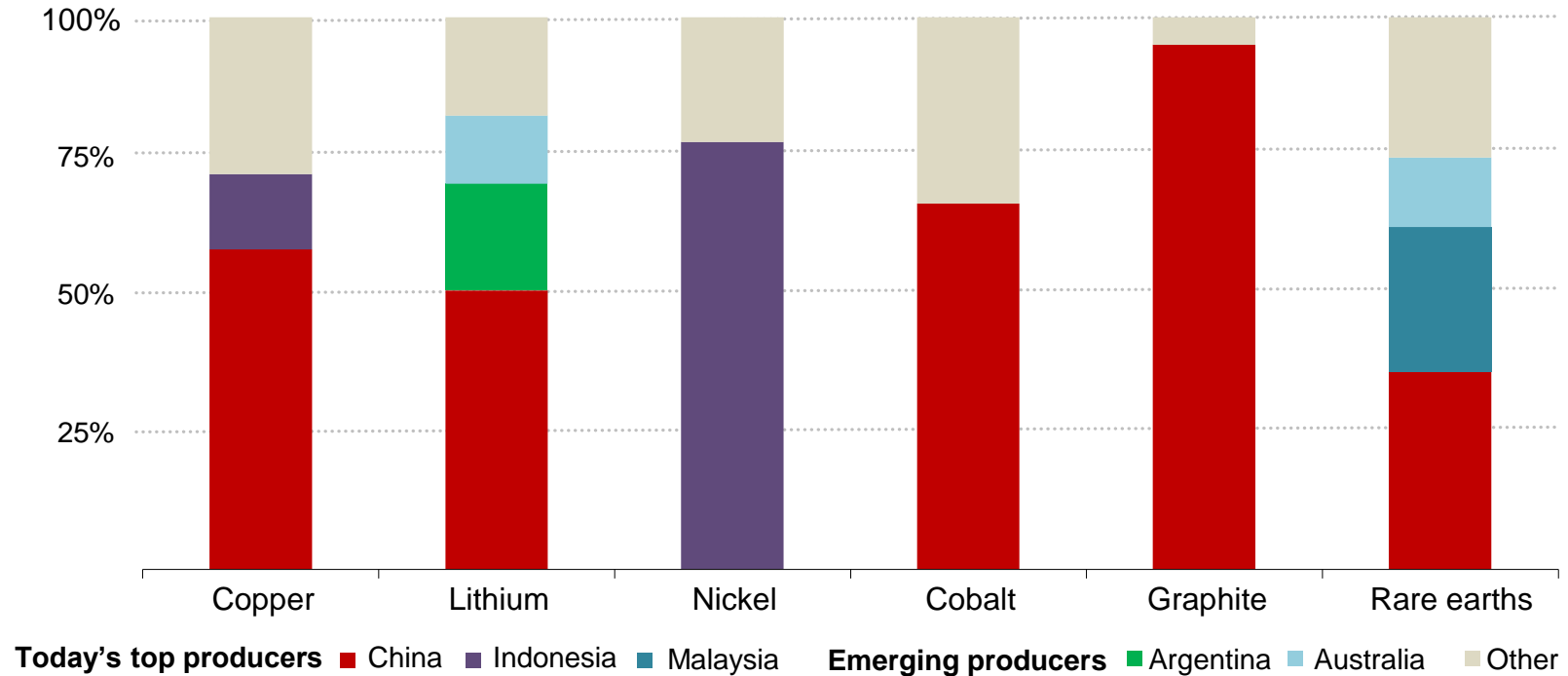
Expected mine supply from announced projects and 2035 requirements in the Announced Pledges Scenario (APS)



**Expected supply from announced projects is within range of projected 2035 requirements to reach national and global climate goals, with the major exceptions of copper and lithium**

# Limited progress in diversifying supply

Sources of supply growth for refined minerals, 2023-2030

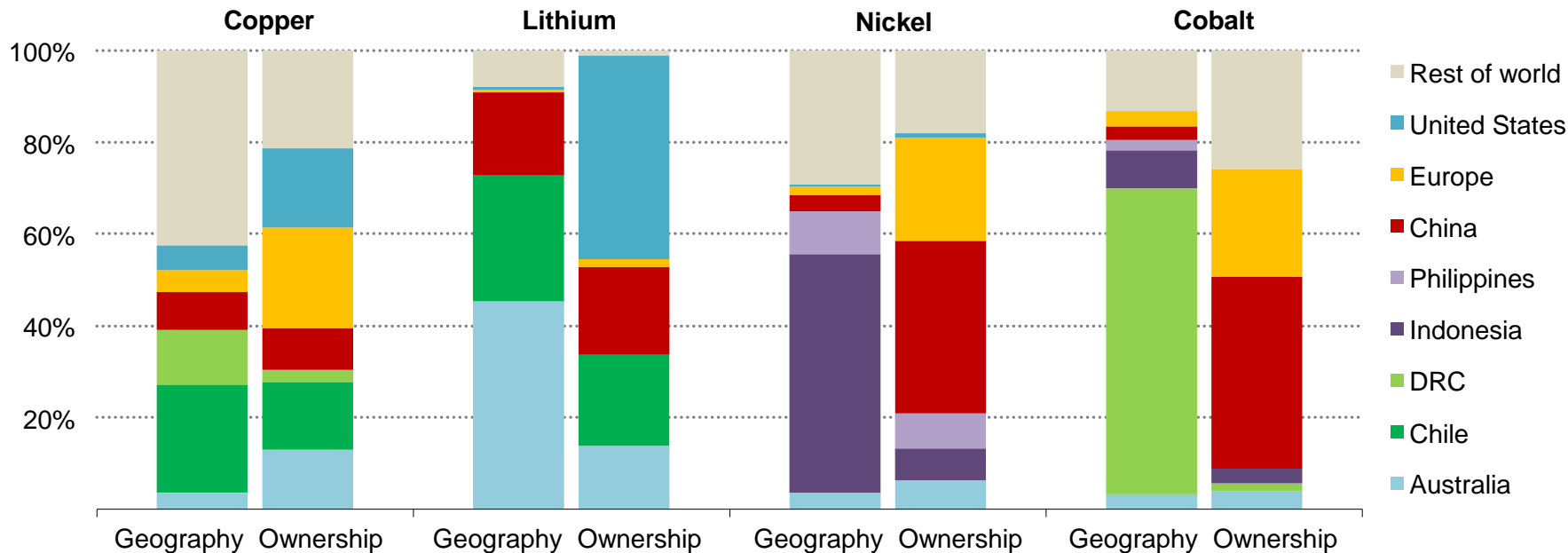


**As many refining projects are being developed in today's dominant producers, refined material production is set to remain highly concentrated in a few countries**



# Lens of asset ownership reveal a different picture

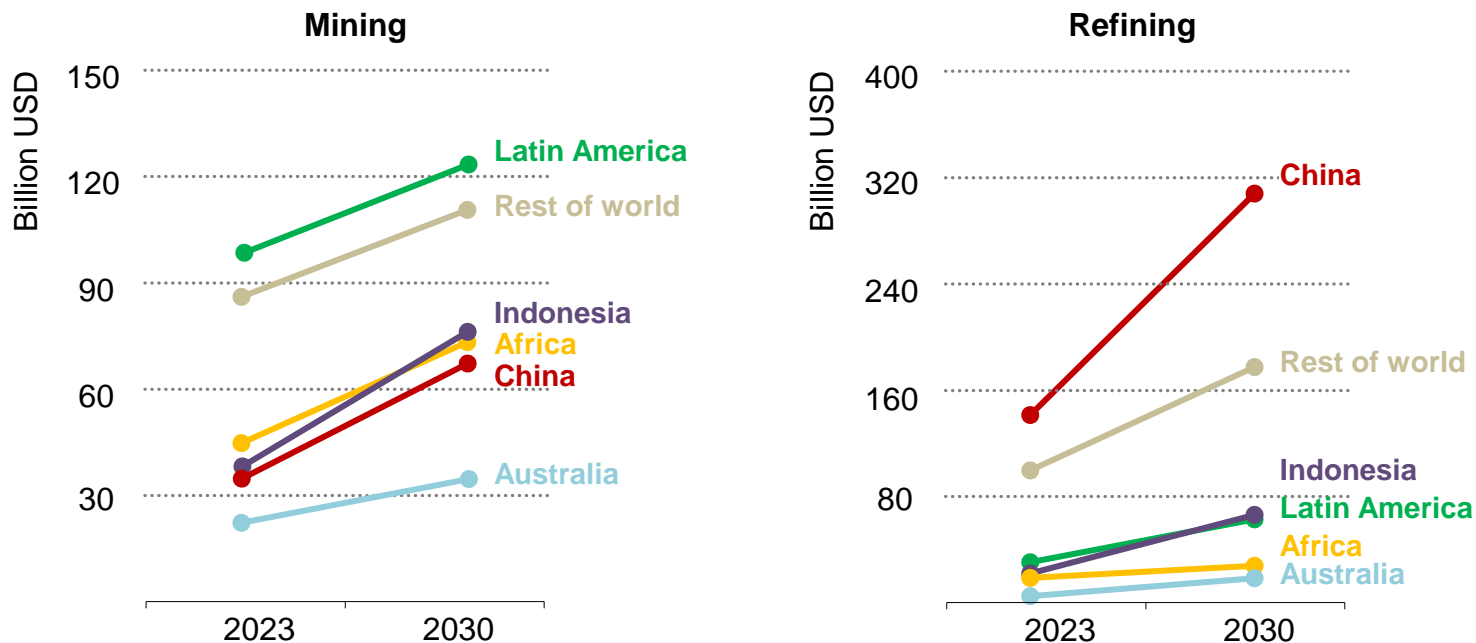
Global mining distribution by geography and ownership



**US and European companies play a major role for copper and lithium supplies whereas Chinese companies have a greater role for nickel and cobalt production than the geographical location of mines indicates**

# Who captures the benefits?

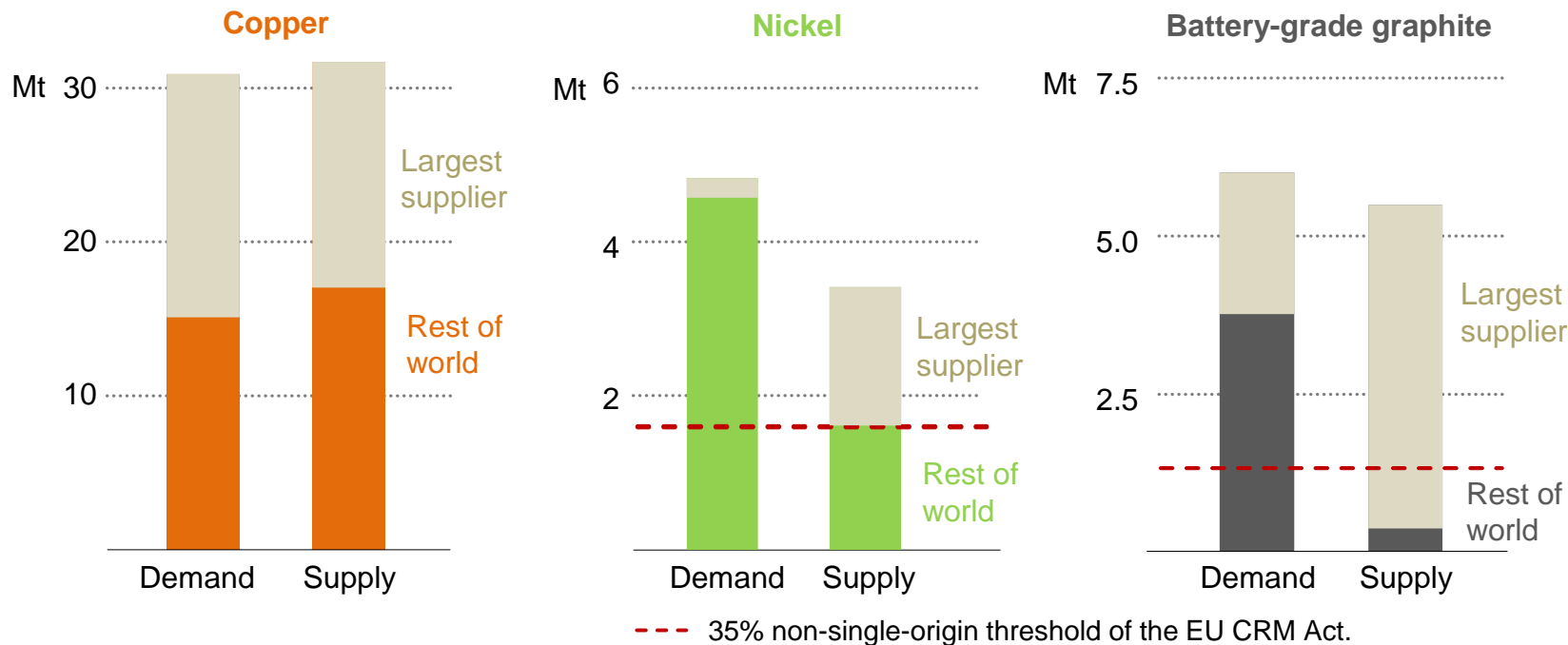
Market value of key energy transition minerals production by region (based on announced projects)



**Announced projects indicate that Latin America, Africa and Indonesia see a growing market value from their mining operations; nearly 50% of the market value from refining is concentrated in China by 2030**

# Resilience analysis reveals significant vulnerabilities

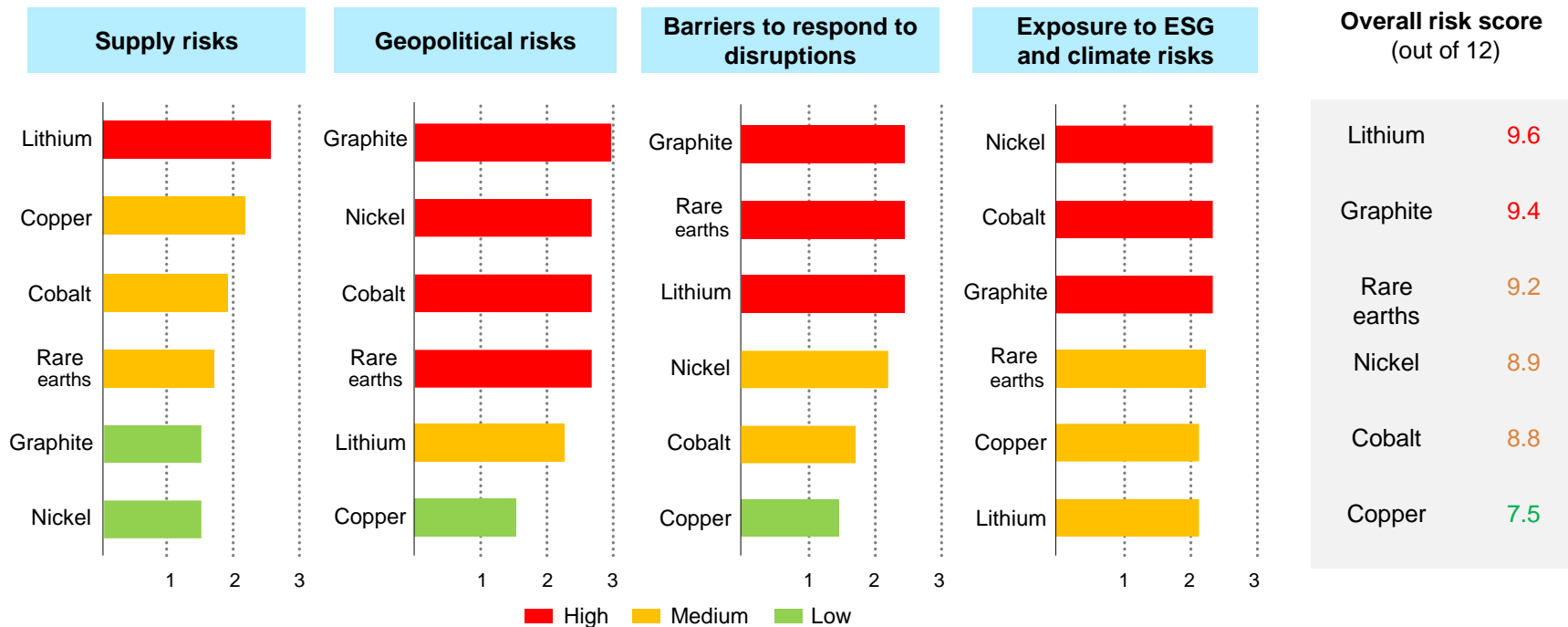
Mineral demand and supply outside of the largest supplier in the APS, 2030



**If the largest supplier and its demand are excluded from market balances, available "N-1" supply of all key energy transition minerals would fall significantly below material requirements**

# Mineral-specific “clean energy transition risk assessment”

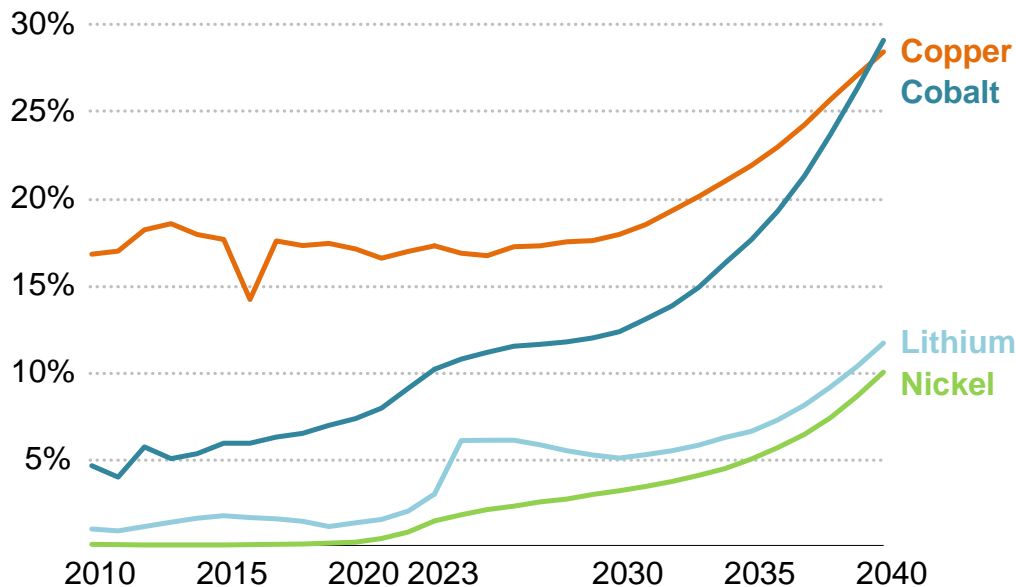
Risk score by category and mineral



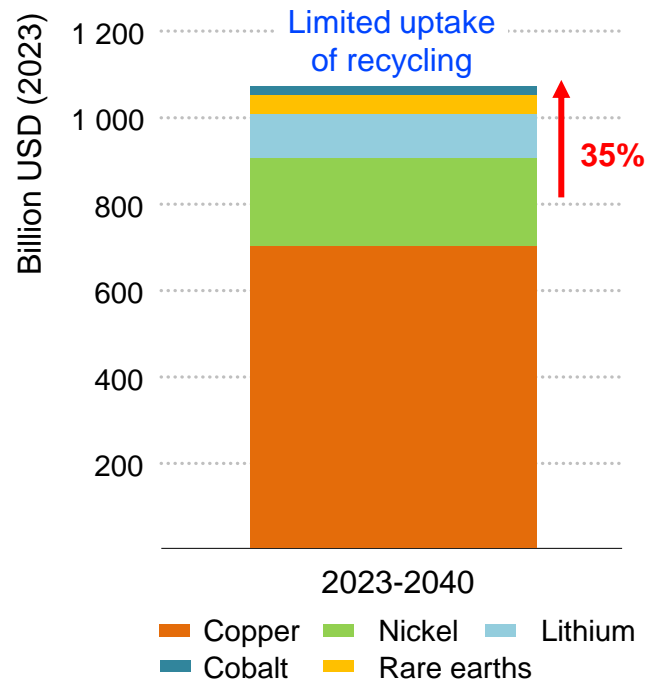
**Lithium and copper are more exposed to supply and volume risks whereas graphite, cobalt, rare earths and nickel face more substantial geopolitical risks**

# Vital to step up efforts on recycling, innovation and behavioural change

Share of recycling in total supply in the NZE scenario



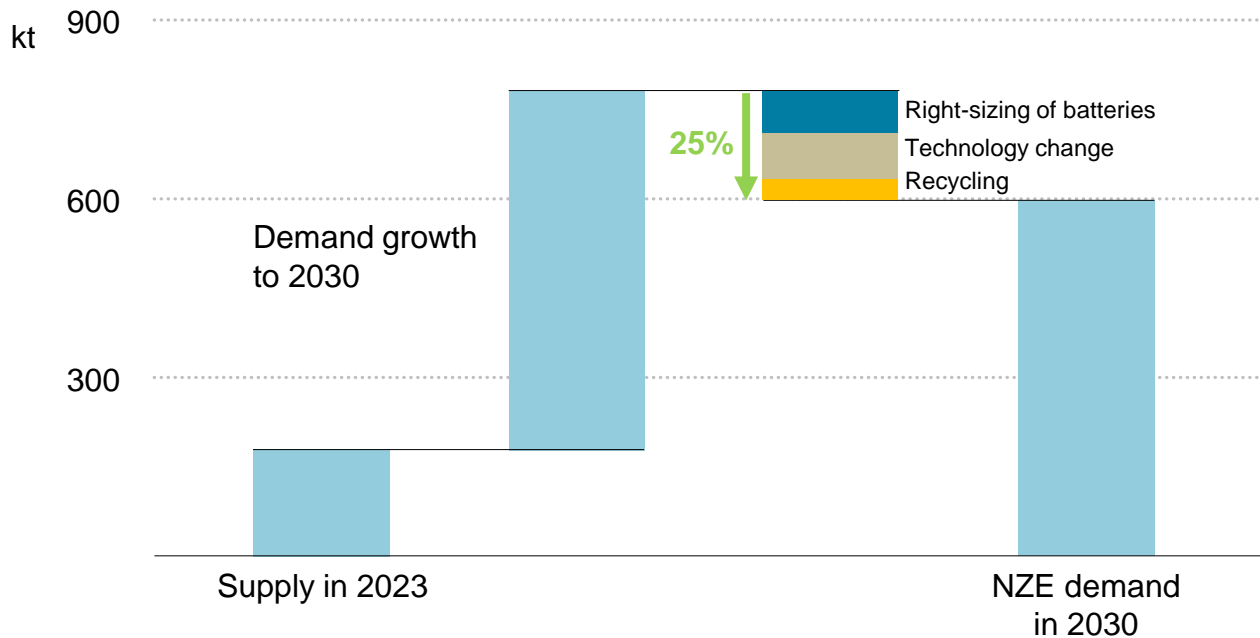
Mining capital requirements in the NZE Scenario



**Recycling rates increase substantially with growing policy attention and the rise of battery recycling; Without the uptake of recycling and reuse, mining capital requirements would need to be one-third higher**

# Addressing supply challenges will need a focus on demand

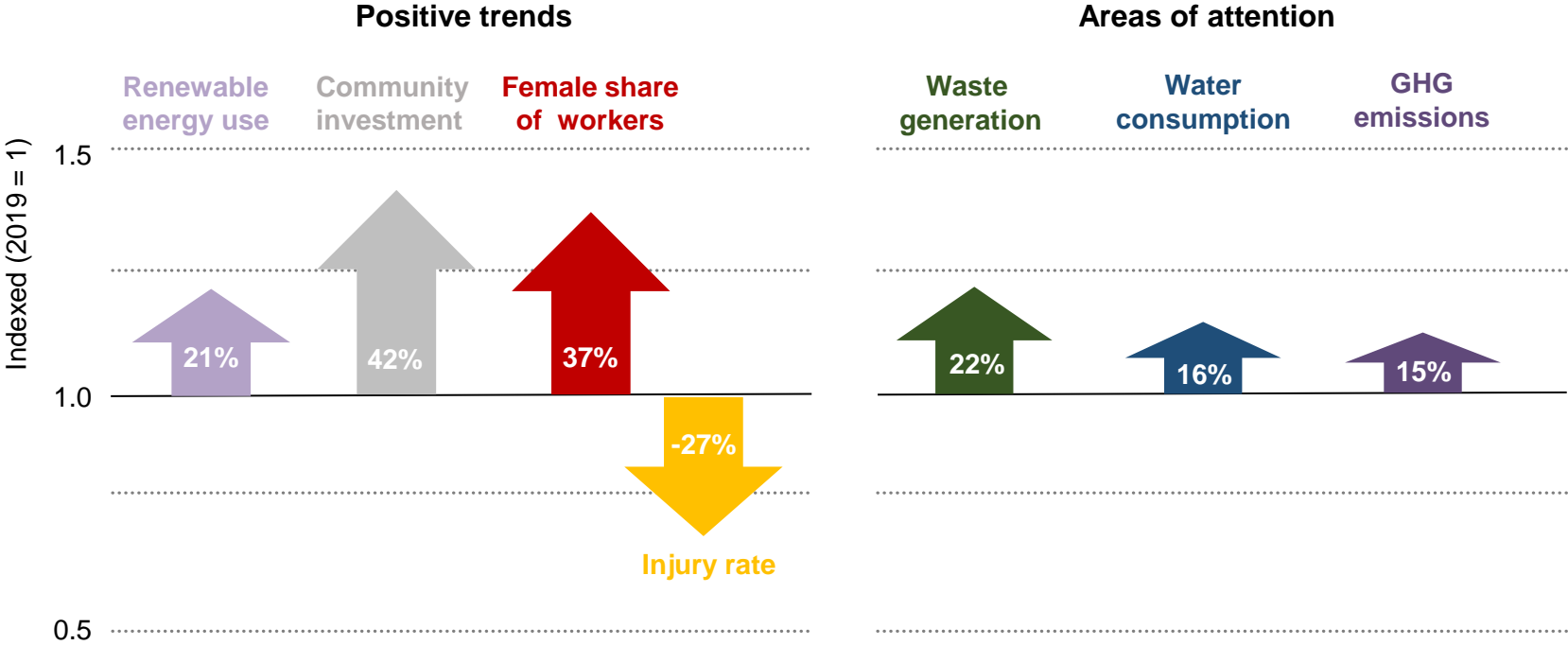
Global lithium chemical supply in 2023 and NZE demand for lithium used in EV and storage batteries in 2030



**Besides investments in supply, demand-side measures also help bridge the gap: right-sizing EV batteries, scaling up recycling and continued investments in technology innovation reduce lithium demand by 25% in 2030**

# Progress towards sustainable and responsible supplies

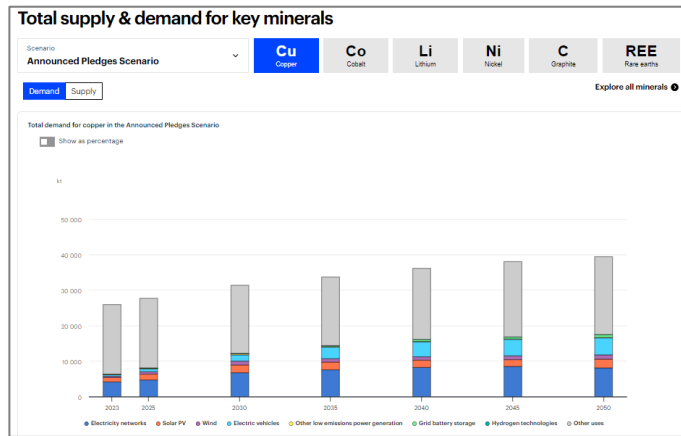
Change in selected ESG performance indicators, 2019 to 2022



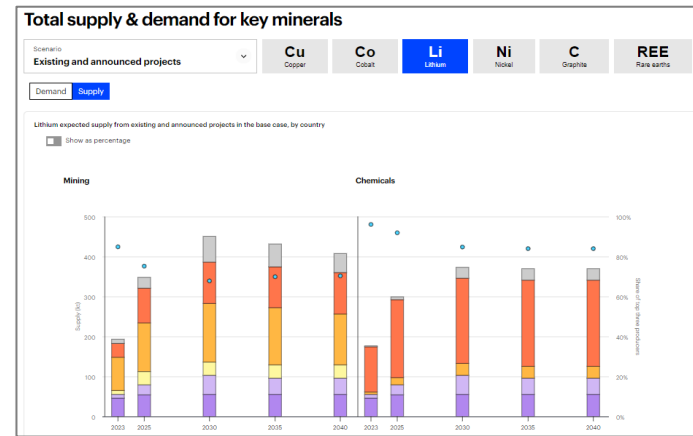
Although the industry is making progress on sustainability reporting, it paints a mixed picture with some positive trends but substantial room for improvement

- An interactive online tool that allows users to easily access the IEA's scenario data for critical minerals
- Provides full access to the demand projections under various energy scenarios and alternative technology cases
- **New additions:** mining and refining supply projections based on existing and announced projects

## Total demand for focus minerals



## Supply projection results



<https://www.iea.org/data-and-statistics/data-tools/critical-minerals-data-explorer>





<https://www.iea.org/topics/critical-minerals>