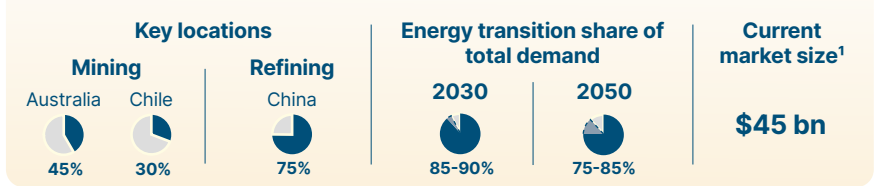


Lithium

for the energy transition



Outlook to 2030 and key challenges

Demand

- Lithium demand is almost entirely driven by batteries for electric vehicles: demand from passenger vehicles could grow 25x by 2030.
- Lithium is present in almost all current battery technologies, and is difficult to replace/substitute.
- Potential for sodium-ion (Na-ion) batteries to mitigate demand for lithium, but these will only have market share for smaller, lighter vehicles.

Supply

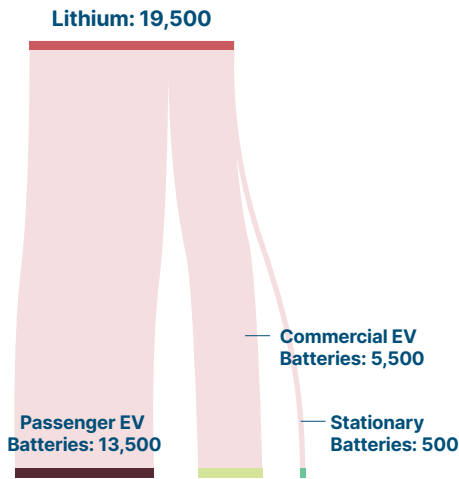
- Shorter timescales vs. other materials (4-7 years discovery to production).
- Global supply more than trebled between 2010-20, expected to grow even faster through to 2030.
- Some political uncertainty around lithium supply and resource nationalism in South American countries (especially Bolivia, Chile, Mexico).

Key challenges

- Lithium production has high water and carbon intensity – former is a concern for production from brines in arid regions in South America.
- Lithium refining is currently strongly concentrated in China (75% of production).

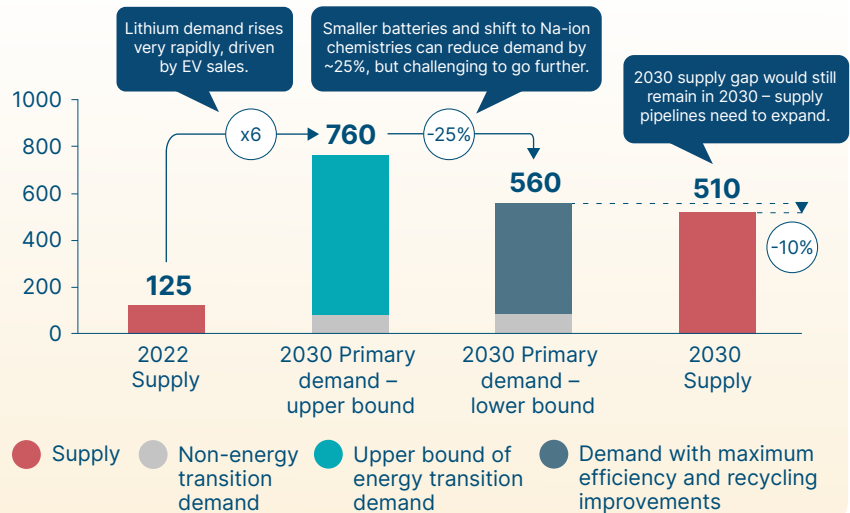
Cumulative demand 2022–50 from clean energy technologies

Thousand metric tonnes



Demand and primary supply in 2030

Thousand metric tonnes

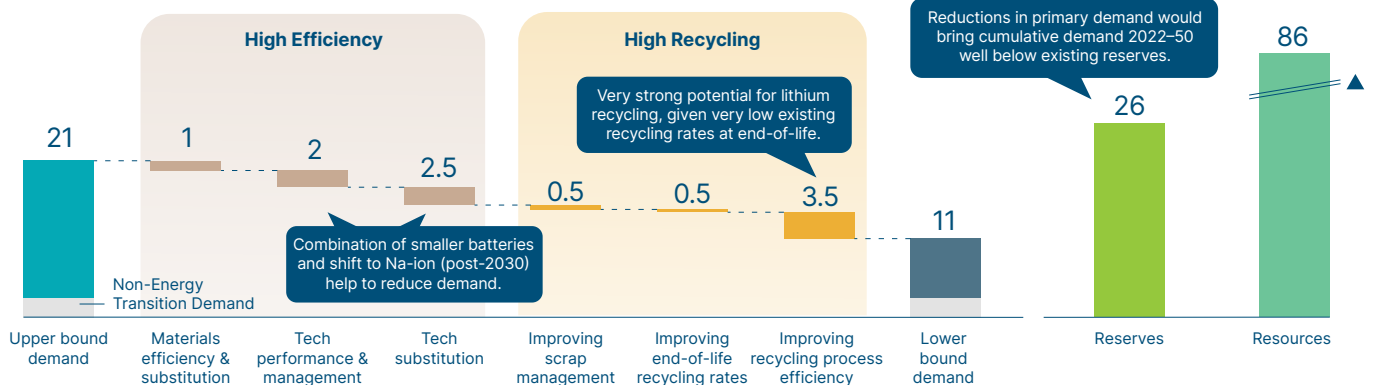


Strong potential to scale recycling, Na-ion batteries will help reduce demand beyond 2030

Cumulative primary demand 2022–50, reductions due to efficiency and recycling levers, and resources and reserves

Million metric tonnes

Potential for substitution (M) | Potential for recycling to meet supply (H) >60% of clean energy demand could be met by recycling by 2050



SOURCES: Systemiq analysis for the ETC; IEA (2021), *The Role of Critical Minerals in Clean Energy Transitions*; BNEF (2022), *2H Battery metals outlook*; IEA (2023), *Energy Technology Perspectives*.

NOTE: The upper bound demand is the ETC's Baseline Decarbonisation scenario, which assumes an aggressive deployment of clean energy technologies for global decarbonisation by mid-century, but materials intensity and recycling trends follow recent patterns. The lower bound demand is the ETC's Maximum Efficiency and Recycling scenario, which assumes accelerated progress in material and technology efficiency, and recycling clean energy technologies, thereby reducing requirements for the primary supply (i.e. mined supply) of materials. ¹Calculated assuming average 2022 price of around \$70,000 per tonne LCE, or roughly \$370,000 per tonne contained lithium – note that 2022 was a year with exceptionally high prices for lithium (average prices between 2018–21 were around \$20,000 per tonne LCE). L=Low, M= Medium, H = High.