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### **Critical minerals for clean energy transitions**

By

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# Critical minerals for clean energy transitions

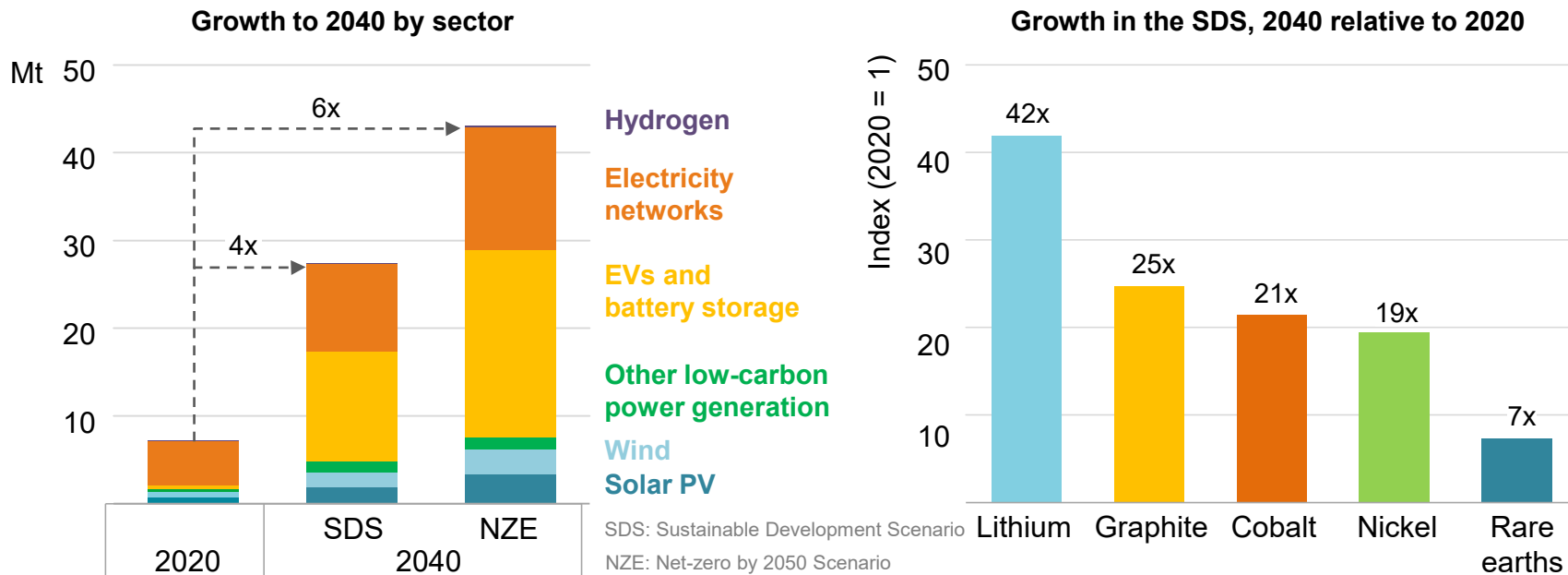
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- Treaty-based energy security mechanism
  - Collective assistance
    - Each Member has agreed to assist each other in times of energy supply disruption
  - Associated obligations
    - disclose and cooperate on energy data
    - consult with industry
    - peer-review Members’ national policies/legislations at regular intervals
- Concept of energy security has shifted over time
  - In addition to strategic oil stocks, IEA activities now encompass **gas security**, **electricity security**, and **clean energy transitions**

# Meeting climate goals will turbo-charge demand for minerals

Mineral demand for clean energy technologies by scenario



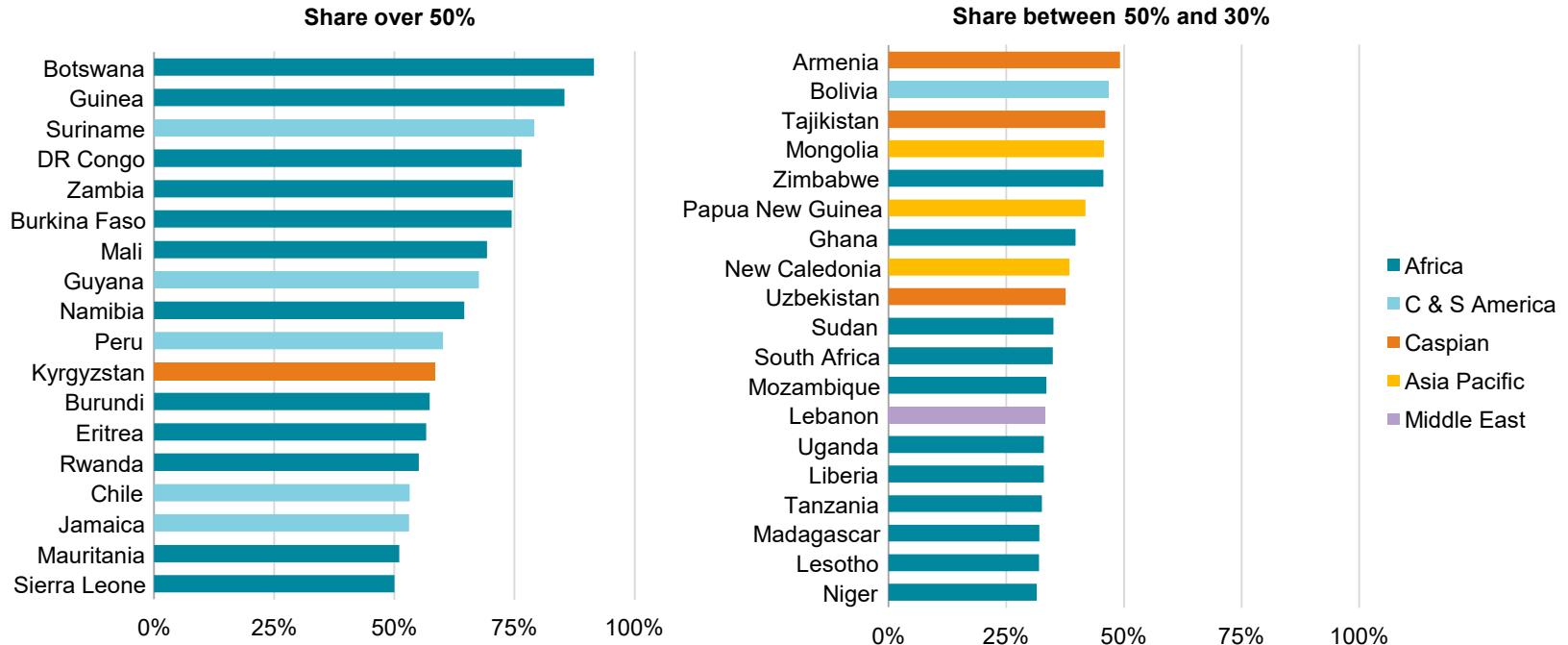
**Demand for critical minerals is set to soar over the next two decades as the world pursues net zero goals; overall requirements rise by as much as 6 times, but individual minerals, led by lithium, rise even faster**

Building on the IEA's leadership role in energy security, these six key areas of action can ensure that critical minerals enable an accelerated transition to clean energy

- 1. Ensure adequate investment in diversified sources of supply**
- 2. Promote technology innovation at all points along the value chain**
- 3. Scale up recycling**
- 4. Enhance supply chain resilience and market transparency**
- 5. Mainstream higher environmental, social and governance standards**
- 6. Strengthen international collaboration between producers and consumers**

# Minerals represent a large share of the economy in many countries

Share of minerals and metals in total product exports for mineral producing countries, 2019



**Many mineral-producing countries rely heavily on revenue from mineral extraction, underscoring the need for transparent management of mineral wealth**

# Environmental and social impacts must be carefully managed

Selected environmental and social challenges related to energy transition minerals

Areas of risks	Description
<b>Climate change</b>	With higher greenhouse gas emission intensities than bulk metals, production of energy transition minerals can be a significant source of emissions as demand rises
<b>Land use</b>	Mining brings major changes in land cover that can have adverse impacts on biodiversity and communities
<b>Water management</b>	Mining and mineral processing require large volumes of water for their operations, and pose contamination risks through acid mine drainage, wastewater discharge or the disposal of tailings
<b>Waste</b>	Declining ore quality can lead to a major increase in mining waste (e.g. tailings, waste rocks); tailings dam failure can cause large-scale environmental disasters (e.g. Brumadinho dam collapse in Brazil)
<b>Governance</b>	Mineral revenues in resource-rich countries have not always been used to support economic and industrial growth and are often diverted to finance armed conflict or for private gain
<b>Health and safety</b>	Workers face poor working conditions and workplace hazards (e.g. accidents, exposure to toxic chemicals)
<b>Human rights</b>	Mineral exploitation may lead to adverse impacts on the local population such as child or forced labour

- International co-ordination already plays a vital role in encouraging companies to identify and address risks across their entire supply chains
- Multilateral efforts to enhance capacity building and knowledge sharing can be particularly effective at addressing key resource gaps between countries.
  - Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF)
  - Energy Resource Governance Initiative (ERGI)
  - Extractives Industries Transparency Initiative (EITI)
- Despite many success stories, the proliferation of international initiatives increases the risk of duplication and inconsistency
  - A high-level forum for co-ordination could play a key role in standardising environmental and social standards while ensuring security of supply



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