IRENA
International Renewable Energy Agency

15 December 2022

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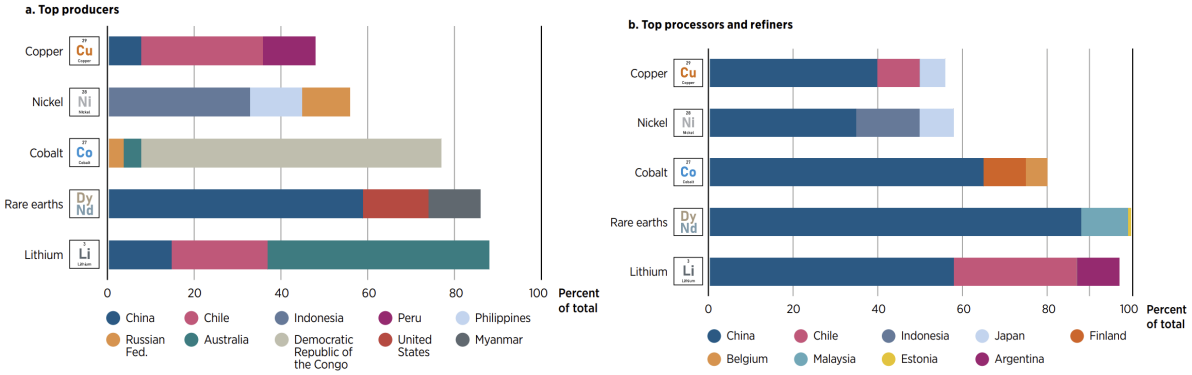
Background Note

Ministerial Dialogue

Critical materials for the Renewables-Centred Energy Transition: how to jointly harness opportunities

1. The growth in demand for minerals and materials needed for the energy transition is putting a strain on their supply. IRENA's analysis[1] indicates that critical materials are not deemed a showstopper of the energy transition in the medium and long term, but key bottlenecks in mining and processing must be addressed now. New capacity is not the only problem: the geographical concentration of where the mining and the processing are being done is the primary concern for countries. It is important to differentiate two aspects: i) the location of the material resources and their production and ii) the location of facilities to refine and process such materials. Currently, the location of mining and production is more broadly and geographically distributed compared to the location of refining and processing of materials which is densely, geographically concentrated (Figure 1).

Figure 1. Countries leading in a) the production and b) the refining and processing of critical materials for the energy transition



Source: IRENA (2022) World Energy Transitions Outlook

2. Resources are located across the globe, offering opportunities to diversify supply and help to create competitive markets. While geological deposits are a given, placement of processing plants is a political strategy choice and could be changed as a result of changing geopolitics. The top priority is the reliable supply of critical materials to sustain the energy transition. Equally critical is an environmentally and socially sustainable supply of critical materials that creates local benefits and aids the producing country.

[1] https://www.irena.org/Technical-Papers/Critical-Materials-For-The-Energy-Transition

3. It is also key to have a long view and reduce or eliminate demand growth through RD&D and innovation. In the short-term, technology improvements such as new battery chemistries and scaling down the use of critical materials in permanent magnets seem critical. Additional recommendations from IRENA's analysis on the topic can be found in Annex I to this note.

4. In response to the above, IRENA members requested the Agency to establish the Collaborative Framework on Critical Materials for the Energy Transition (CFCM) in 2022 as a platform for dialogue, to exchange knowledge and best practices and coordinate actions to address issues around critical materials to sustain the energy transition. The CFCM is currently co-facilitated by Peru and the United Kingdom. In support of the CFCM, the Agency has rapidly built knowledge on the topic in partnership with key stakeholders, and analysis has been conducted in several areas, including:

   - Technical Paper on Critical Materials for the Energy Transition,
   - Deep Dive Lithium,
   - Deep Dive Rare Earth Elements,
   - Editorials on critical materials in energy-post , smart-energy and mining review,
   - An assessment of the possible pathways to address the issues around critical materials in Chapter 7 of the report World Energy Transitions Outlook: 1.5°C Pathway.

5. IRENA has also launched a webinar series with invited expert guests to discuss burning issues related to the energy transition – such as lithium, rare earth and deep-sea mining.

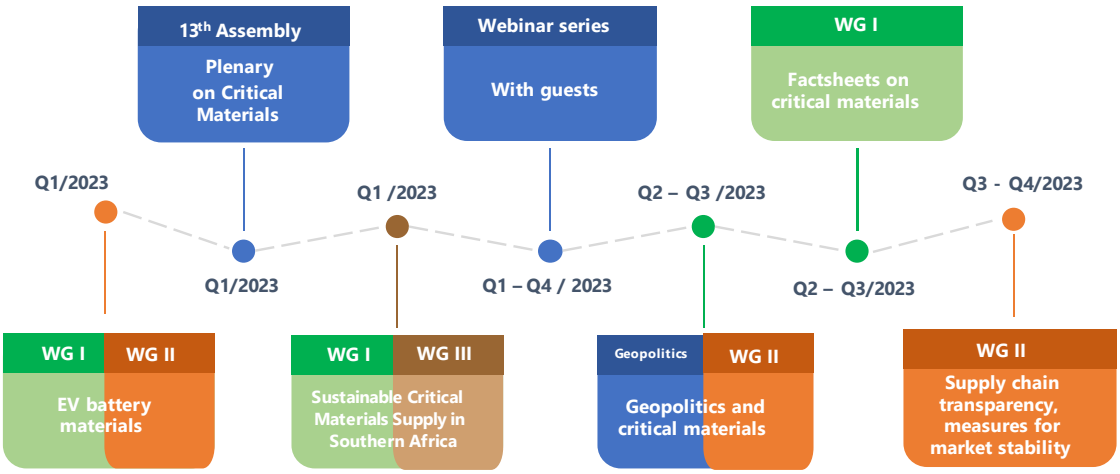
6. Upcoming work includes a Deep Dive into EV battery materials and a Deep Dive into sustainable critical materials supply in Southern Africa together with the World Bank.

7. The CFCM has agreed to focus its activities around three working groups (WG):

   - **WG I. Observatory for critical materials and minerals:** To collect data to help understand scarcity & potential supply shortages that may affect the energy transition by 2030
   - **WG II. De-risking critical minerals and materials supply:** To identify and apply strategies to de-risk supply
   - **WG III. ESG for critical minerals and materials supply:** To identify strategies to raise acceptance for new mining projects

8. IRENA surveyed its members to understand the most critical issues to support their work, and based on that, IRENA proposed the 2023 work plan with several activities (Figure 2).

Figure 2. Planned 2023 work plan under each WG and crosscutting of the CFCM



Objective of the session

9. To facilitate an exchange among IRENA Members on:

- The latest developments in instruments to mitigate the emerging risks associated with the supply of critical materials for the renewables-centred energy transition;
- Strategies to diversify materials production, refining and processing, creating opportunities for developing countries; and
- Emerging innovations to decrease the dependency on critical materials for key renewable and enabling energy technologies.

10. To obtain further guidance from Members on how the existing work of the Agency can be effectively disseminated to them and how the future work of the Agency can better support them in addressing their challenges concerning critical materials for their national energy transitions.

Guiding Questions

- What are countries' and companies' experiences and key bottlenecks in developing strategies on critical materials along the supply chain and considering mining, refining and processing?
- What are the instruments and innovations being pursued by countries and companies to mitigate risks associated with potential shortages of supply of critical materials?
- How can IRENA and its CFCM continue to support members to address those issues?

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Annex
Strategies that governments may pursue to enhance supply security for lithium

Extracted from: Gielen, D. and M. Lyons (2022), Critical materials for the energy transition: Lithium, International Renewable Energy Agency, Abu Dhabi.

Increase market transparency

- Track current supply in more detail.
- Develop scenarios for future demand.
- Assess mining developments and their likely commissioning date and supply contribution.
- Public prices and future prices of key lithium products.
- Ensure international quality standards and certification to facilitate market formation.

Deepen the international dialogue regarding critical materials

- Consumer countries must build new avenues of trust and co-operation with developing countries.
- Deeper state and industry investments in the areas of exploration, recycling, substitution and supply chain diversification, complemented by appropriate legislation, the prioritisation of critical materials and further promotion of innovation.

Invest in mining, processing, infrastructure and human capital

- Streamline the permitting process for new mines while adhering to stringent compliance measures in the areas of environment, society and transparency/anti-corruption regulations, regardless of whether they are operating domestically or internationally.
- Private sector cooperation to lessen perceived investment risks in mining, including through long-term supply contracts, and both human capital and technology investments to generate expertise and lower technology costs.

Ensure that supply is diversified

- Resources are widely distributed; the development of mines in different parts of the world and diversified ownership can help to create competitive deep markets.

Build critical materials stocks

- Countries maintain various types of strategic stockpiles, including some metals. Opinions differ as to whether strategic stockpiles constitute an effective response.