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29 September 2025

Minerals critical for Climate Action – Sustainability, Equity and Resilience through a value chain approach

Second Global Dialogue on the Impacts of the Implementation of Response Measures (*Istanbul, Türkiye)*

Advancing the Implementation and Mainstreaming of Response Measures in the Context of NDCs: Managing Synergies and Trade-Offs to Create Jobs, Enhance Co-Benefits, and Promote Equitable Approaches to Critical Minerals

The Minerals-Climate Action sector linkages

In our economies, most of what is not farmed is mined ....

Minerals are used in Equipment and Infrastructure for:

- Mobility (vehicles, road, pipeline, shipping, air) - >50% of NDCs
- Energy (Renewable Energy, Energy Efficency, Energy Access) – 88% of NDCs
- Water and Sanitation
- IT, ICT and AI – nil in NDCs
- Nature, tourism
- Manufacturing
- Construction and Housing
- Mining – ca. 5% of NDCs

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Critical Energy Transition Minerals

Critical Minerals: No multilaterally agreed definition

Critical Energy Transition Minerals: "The UN Secretary General's Working Group on Transforming Extractive Industries for Sustainable Development refers to critical energy transition minerals to refer to mineral commodities that are necessary for the construction, production and storage of renewable energy."

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Critical Energy Transition Minerals

- **Mineral demand** is set to grow across all sectors, including in **clean energy**, **digital technologies**, buildings, construction and infrastructure development, etc.
  - For example, mineral demand for clean energy applications is set to **grow by 3.5 times by 2030** on the pathway to reaching global net zero by 2050 (IEA: Critical Minerals Market Review 2023).
  - The use of minerals is **essential for reducing climate change impacts**, but their extraction and processing can cause severe **damage to the environment and local communities** if not responsibly managed.
  - There is an urgent **need to ensure responsible, fair and just mineral value chains**.

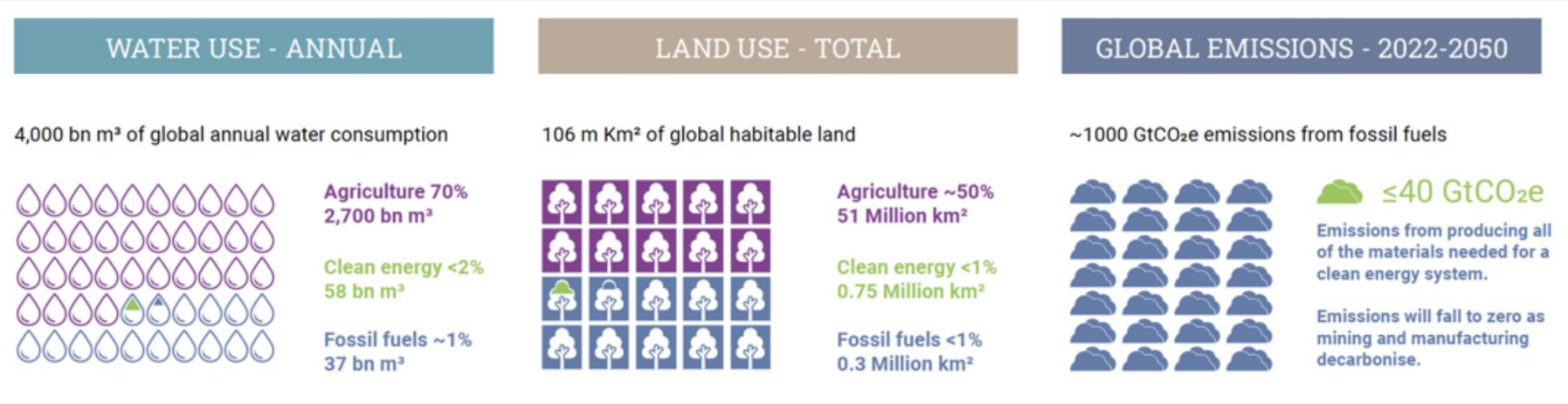

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Figure: Water, land, and greenhouse gas emission use of a clean energy system. Source: 2024 UNEP Publication, "Critical Transitions: Circularity, equity, and responsibility in the quest for energy transition minerals".

UN Goals - CETM

Why is the UN looking at Critical Energy Transition Minerals?

1. Build **trust and global cooperation** on CETM.
2. Develop and strengthen **CETM Knowledge and Data.**
3. Facilitate collective action towards a new kind of mineral development.
4. Enhance long-term **institutional capacities in developing countries.**

> "A world powered by renewables is a world hungry for critical minerals. For developing countries, critical minerals are a critical opportunity – to create jobs, diversify economies, and dramatically boost revenues. But only if they are managed properly. The race to net zero cannot trample over the poor. The renewables revolution is happening – but we must guide it towards justice."
>
> — UN Secretary-General António Guterres

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UN SG Panel on CETM

Resourcing the Energy Transition: Principles to Guide Critical Energy Transition Minerals Towards Equity and Justice

GUIDING PRINCIPLES

1. Human rights must be at the core of all mineral value chains.
2. The integrity of the planet, its environment and biodiversity must be safeguarded.
3. Justice and equity must underpin mineral value chains.
4. Investments, finance and trade must be responsible and fair.
5. Development must be fostered through benefit sharing, value addition and economic diversification.
6. Transparency, accountability and anti-corruption measures are necessary to ensure good governance.
7. Multilateral and international cooperation must underpin global action, and promote peace and security.

ACTIONABLE RECOMMENDATIONS

1. A High-Level Expert Advisory Group to facilitate a multi-stakeholder dialogue on 'Accelerating Critical Energy Transition Minerals Value Addition Towards Equity' (ACTIVATE)
2. A global traceability, transparency and accountability framework
3. A Global Mining Legacy Fund
4. An initiative that empowers artisanal and small-scale miners
5. Equitable targets and timelines for material efficiency and circularity approaches

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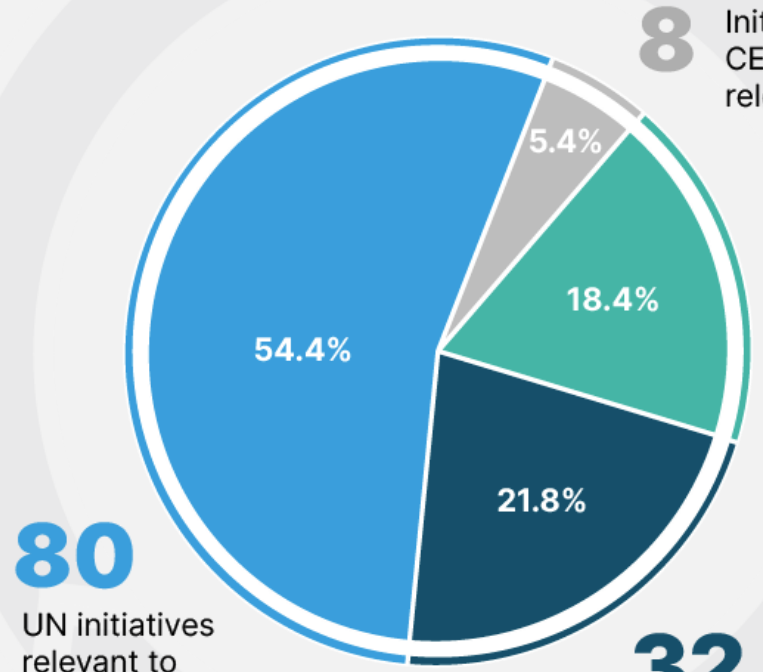
Principle 7: International Cooperation on CETM

147 initiatives were mapped, based on their alignment with CETM Panel Principles, relevance to ARs, minerals/geographical focus, stakeholders, activities, and outputs.



8 Initiatives without a specific CETM programme but relevant for CETM roadmap

27 Initiatives specifically for CETM or critical minerals

80 UN initiatives relevant to CETM

32 Broader initiatives and institutions with programmes or projects on CETM

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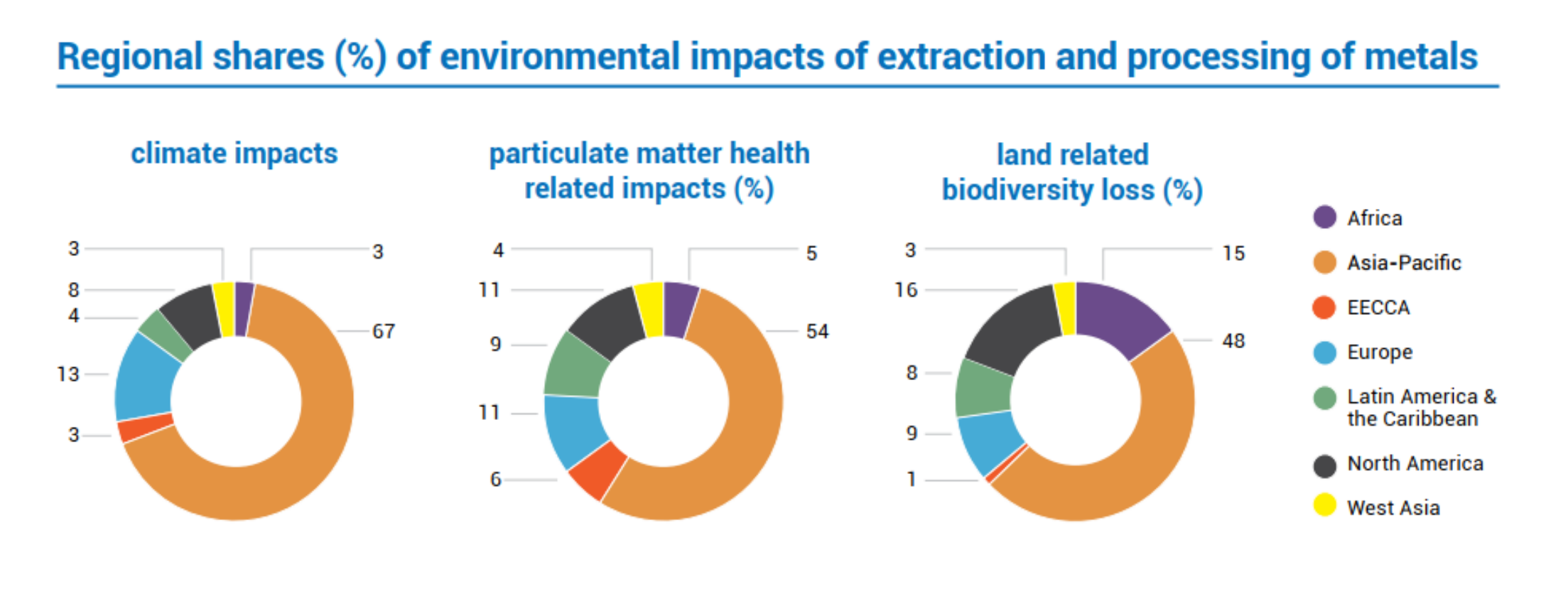
Geographical distribution of environmental impacts for metals – Upstream



Mining and the Triple Planetary Crisis: Climate Change

Adaptation

Climate change disrupts mining through floods, droughts, and extreme weather, raising costs and risks.

Mitigation

- Sourcing CETM is essential for climate mitigation;
- **Increasing circularity** reduces the need for primary extraction, which is more carbon-intensive than secondary extraction.

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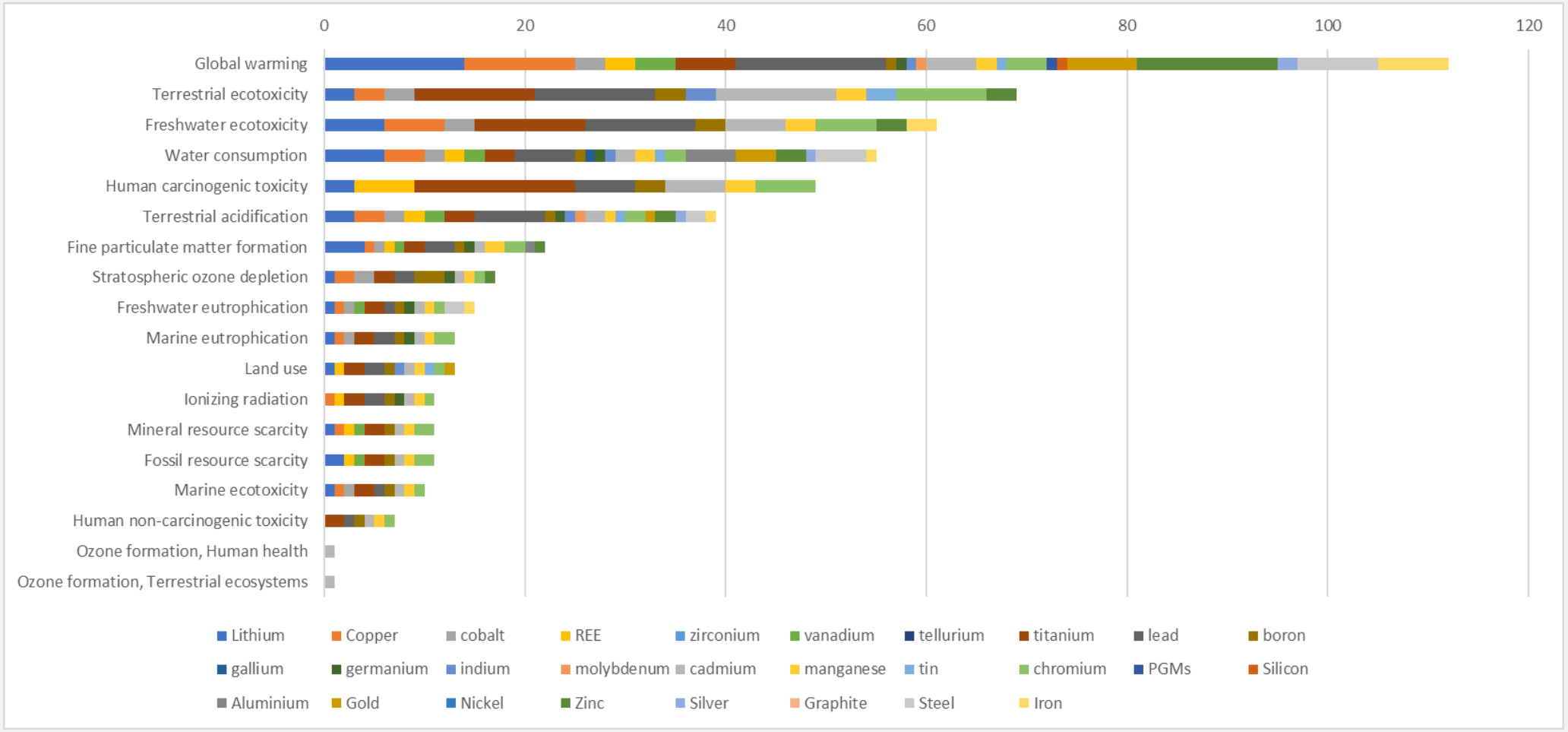
Hotspots in CETM Value Chains

Research across 28 critical minerals (250+ sources) reveals major environmental hotspots: climate change, water depletion, ecotoxicity, and human toxicity.



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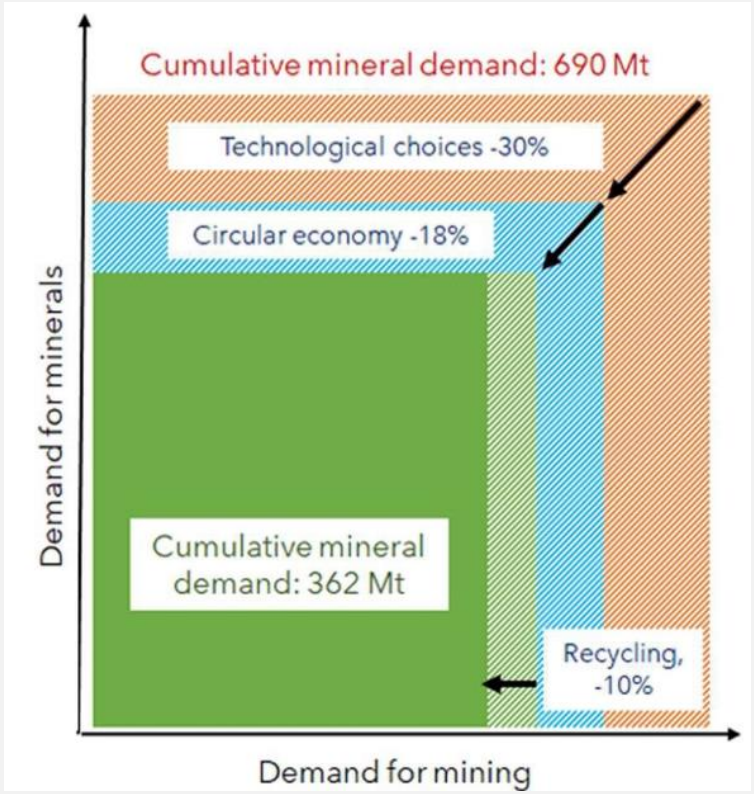
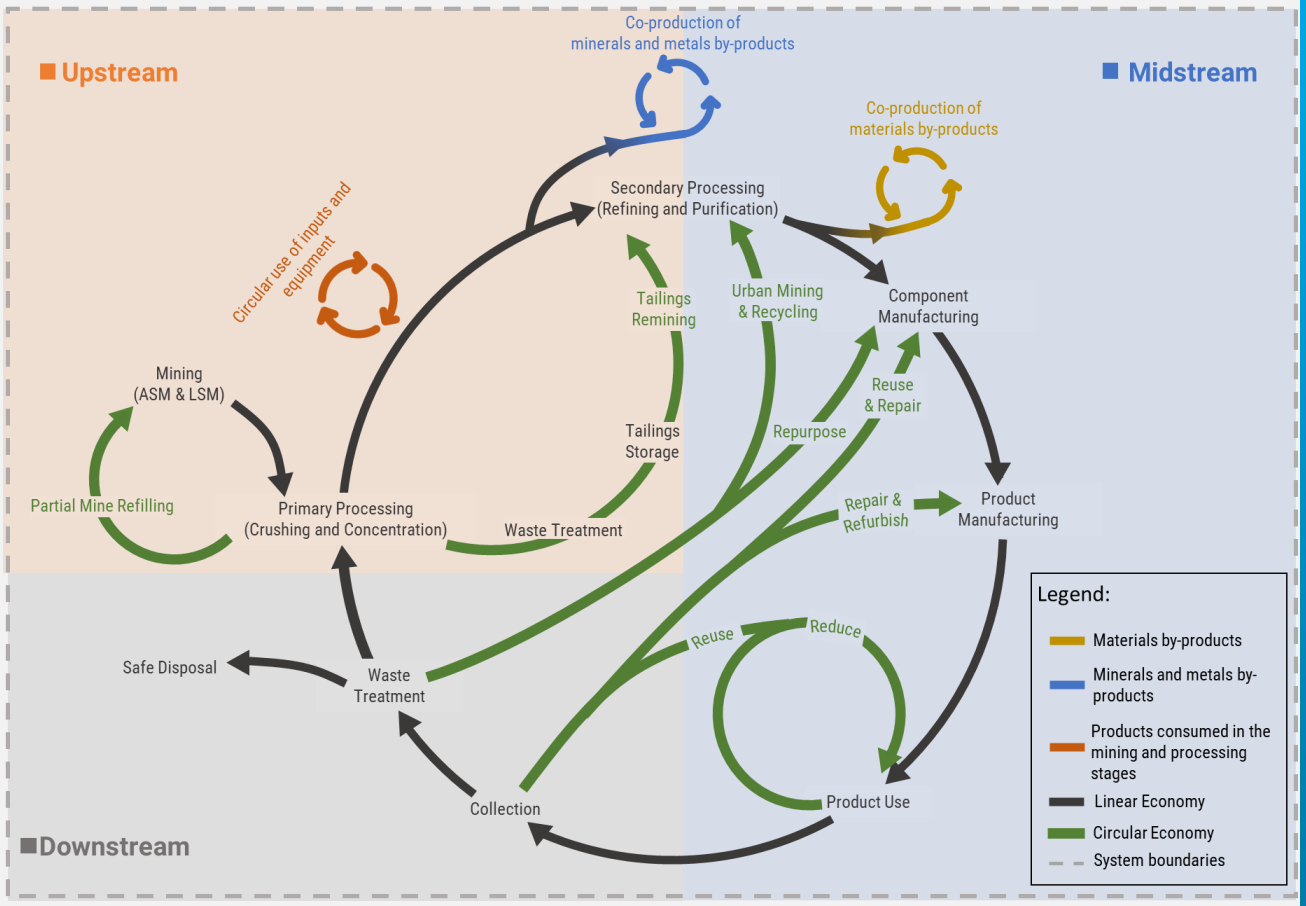
Systematic Rethinking of Minerals and Metals Value Chains

Improving Product Design and Replacing Product Alternatives (Material Efficiency)



Retaining Materials in the Value Chain (Material Flow)



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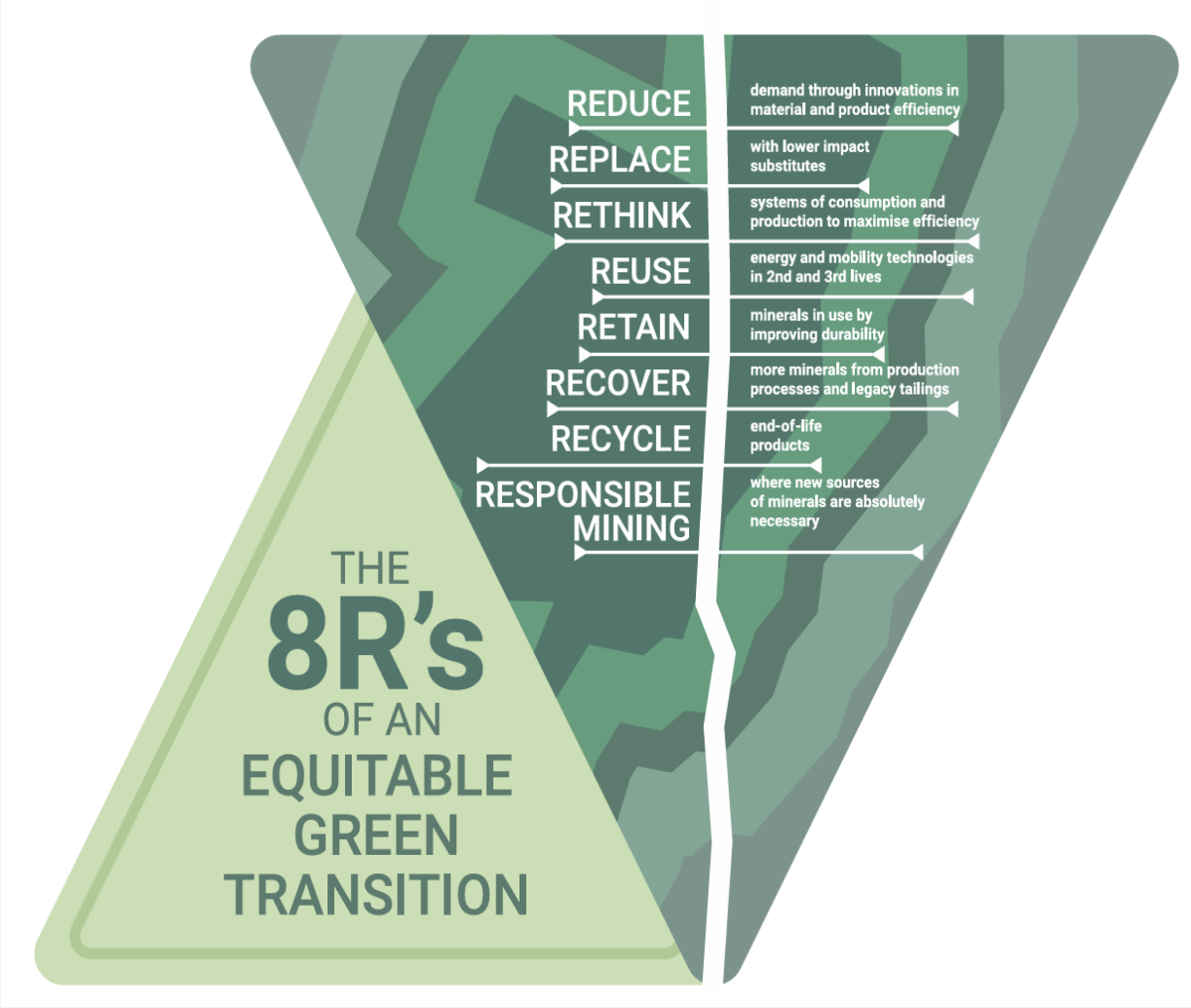
Circularity

UNEP's approach to the mineral sector advocates for a circular approach applied to the whole life cycle of minerals:

- **Product design**: minimize resource use and enables recovery and recycling;
- **Secondary raw materials**: increase the share of recycled minerals, incl. from urban mining;
- **Remining of tailings**: improve extraction efficiency and manage environmental risks from toxic chemicals and other contaminants;
- Sharing and service economies: leveraging well established sharing and service models in other sectors;
- **Recycling**: The use phase presents the highest opportunities for a circular economy by keeping minerals and metals in circulation longer.



UNEP's mandate

2019

UNEA Resolution 4/19: Mineral resource governance

- Knowledge and experience sharing;
- Identify knowledge gaps and options for implementation strategies.

2021

UNEA Resolution 5/12: Environmental aspects of minerals and metals management

- Intergovernmental consultations;
- Strengthening scientific, technical and policy knowledge on the environmentally sound extraction and use of sand;
- Knowledge gaps on the environmental aspects of tailings management.

2024

UNEA Resolution 6/5: Environmental aspects of minerals and metals

- Digital Knowledge Hub;
- Capacity-building;
- Partnerships and cooperation.

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UNEP's Programme on Minerals and Metals

Enhancing the sustainability of minerals and metals value chains to meet climate and biodiversity objectives and reduce pollution

Catalyzing global policy conversations and actions on mineral sustainability

- Intergovernmental processes (UNEA, G7, G20, GACERE, IGF)
- Multistakeholder fora (OECD Forum, WEF, Mining Indaba, PDAC)
- Policies and Standards
- Environmental aspects of trade
- Digital Knowledge Hub

Support to implementation of the SG Panel

- Traceability
- Circularity and Resource Efficiency
- Mining Legacy Issues

Market Transformations

- Environmental Derisking: ESG, EIA, hotspot analysis
- Mine Tailings
- Mine Closure
- Circularity
- Finance and Investment
- Legal and Regulatory Aspects
- Sand
- Technology Transfer

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Just Transitions – UNEP approach

- Currently, nearly **754 million people live without access to electricity**; the transition must expand **energy access** while decarbonizing;

- Possible bottlenecks:
  - Mineral intensity: Renewable technologies are mineral hungry — a net zero pathway requires a 6x increase in production of critical minerals by 2050;
  - Risks of extraction: Mining carries high environmental and social costs — biodiversity loss, water stress, community displacement, and gender inequalities;
  - Supply chain vulnerabilities: Mineral supply is highly concentrated in a few countries, creating risks of price volatility, shortages, and geopolitical tensions

- The energy transition must **not replicate or worsen existing environmental and social harms** — human rights, ecosystems, and communities must be safeguarded.

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Just Transitions – UNEP approach

- Justice and equity should **underpin mineral value chains**, ensuring no one is left behind and that benefits are fairly shared**.**

- Past mistakes in mining — dispossession, degradation, inequities — must not become the **hallmarks of the future.**

- Energy transition requires **global cooperation, transparency, and strong governance** to prevent minerals from becoming a source of conflict;

- UNEP will **champion demand-side strategies**:
  - Prioritize material efficiency, innovation, and circularity targets;
  - Address **overconsumption in high-income countries**, reducing pressures on biodiversity and communities.

- Need for **traceability and accountability frameworks** to ensure responsible practices from mine to recycling;

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Climate finance

Mainstream minerals critical for climate action in climate finance

Vertical funds:
- GEF (e.g. in GEF-9 programming)
- GCF

- Bilateral funding

- Leveraging private finance

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COP 30 Side Event

Powering a Just Energy Transition from Mine to Market

Co-organizers: UNU · UNIDO · ECLAC · UNECA · UNECE · ESCWA · UNEP · UNDP

About the event:

- Showcases implementation of the UN Guiding Principles on Critical Energy Transition Minerals.
- Highlights how to build fair, equitable, and responsible mineral value chains.
- Explores how the UN system can support developing mineral-producing countries to:
    - Minimize negative environmental and social externalities.
    - Maximize positive contributions of CETM value chains to sustainable development.

(Date to be confirmed)

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Thank you for your time and attention!

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