The Role of Critical Raw Materials in Achieving the Goals of the Paris Agreement in the UNECE Region

Why critical minerals are different and why they are not

Why minerals matter for the energy transition

Why everything starts with a rock
What is criticality?

- Combines consideration of economic importance with vulnerability to supply disruption
- Can also take into account environmental and/or ethical issues
- Assessed on a bloc-/ country-/ sector-/ company-specific basis

**Diagram:**

- **Supply risk** (vertical axis)
- **Economic importance** (horizontal axis)

- **Most critical** area in the upper right quadrant.
Metals and minerals in the energy transition

WHAT DO WE MINE?

All metals and ores

- Fe ore: 3108 MT
- Mn ore: 56 MT
- Cr ore: 35 MT
- Zn ore: 1.4 MT
- Cu: 21 MT
- Pb: 4.6 MT
- Ni: 2.8 MT

All other metals and ores including technology and precious metals: 210 MT

‘Industrial’ metals and ores

- Technology and precious metals: 2.4 MT

- Li: 115 KT
- W: 101 KT
- Ag: 26.2 KT
- Au: 3.3 KT
- Co: 132 KT
- V: 118 KT
- Sn: 257 KT
- REE: 267 KT
- Mo: 209 KT
- Mg metal: 988 KT

MT = Million tonnes

KT = Thousand tonnes

Source: British Geological Survey

Footnote: unless otherwise stated all figures are metal content.
Can we manage without minerals for (clean) energy?

• 940 million (13% of the world) do not have access to electricity.
• 3 billion (40% of the world) do not have access to clean fuels for cooking.
• Per capita electricity consumption varies more than 100-fold across the world.
• Per capita energy consumption varies more than 10-fold across the world.
• Energy access is strongly related to income: poorer households are more likely to lack access.

Source: Hannah Ritchie and Max Roser (2020) - "Energy". Published online at OurWorldInData.org. 'https://ourworldindata.org/energy'
What are we going to do and where do we get them?

- Manage them better/more sustainable consumption and more equality
- Recycling/circular economy
- Mining
- Understand resources – from geology to supply chains
UNFC and UNRMS

**Exploration**
- Mineral location
- Mineral composition/grade
- Mineral quantity

**Extraction/Mining**
- Production volumes
- Energy requirements

**Processing**
- Processing technology
- Environmental reporting and relevant ESG metrics
- International/domestic trade, processing volumes
- Chemical compositions of processed commodities
- Different sources of materials
- Energy requirements

**Manufacturing**
- Manufacturing techniques
- Relevant ESG metrics
- International/domestic trade
- Manufacturing volumes
- Chemical compositions of products
- Different product categories
- Different sources of materials
- Energy requirements

**In-Use**
- International trade stocks in use

**Recycle/Reuse**
- Recycling process, relevant ESG metrics
- Energy requirements

**Anthropogenic resources**
- Waste composition
- Waste location
- Waste quantity

**Extractive waste**
- Processing waste

**Scrap material**
- Municipal/Industrial waste
SUSTAINABLE RESOURCING

UNRMS Principles

State rights and responsibility in the management of resources
Responsibility to the Planet
Integrated and indivisible management of resources
Social contract on natural resources
Service orientation
Comprehensive resource recovery

Value addition
Circularity
Transparency
Innovation
Health and Safety
Continous strengthening of core competencies and capabilities
A unified, comparable, interoperable and harmonized approach to resource assessment and management.
Thank you