



## The energy-material nexus: CRM demand, CRM footprints, and their interplay

### IRTC-Business Round Table

March 22, 2022

11.00–14.30 CET

Via [Zoom](#)

Critical raw materials are needed for the energy transition, and at the same time they require energy themselves across their supply chains. In this workshop, we aim to look at a) the different ways critical raw materials are used for energy production and storage, and the energy and material efficiency of different technologies, and b) the energy needs of critical raw materials, the potential of the circular economy to reduce these, and the interplay of raw material demand and energy requirements. One goal of the workshop is to gather expert opinions on how the “energy balance” of critical raw materials could be calculated and put into context.

11:00 CET	Welcome	Alessandra Hool, ESM Foundation
a) Critical raw materials contributing to energy supply		
11:05	Critical minerals for the clean energy transition	Toru Muta, IEA
11:20	Scenario modelling approaches for critical mineral supply	Stephen Northey, UTS
11:35	Supply and demand mismatches in wind power deployment	Peng Wang, Chinese Academy of Sciences
11:50	Energy efficiency of different battery types	Naeem Adibi, WeLOOP
b) Energy needs of critical raw materials		
12:05	Energy requirements of CRM extraction and the role of ore grades	Gavin Mudd, RMIT
12:20	Energy sources used in mining operations	Luisa Moreno, Tahuti Global

12:35	Environmental Footprints of Li extraction from brine and ore	Hyunsoo Kim, POSCO
12:50	The influence of demand shifts on REE processing	Alain Rollat, Carester
13:05	Thermodynamic limits of mining and recycling, and optimization of strategies	Markus Reuter, SMS Group
10 min Break		
c) Discussion, with White Board		
13:30	<ul style="list-style-type: none"> <li>- Could energy use for extraction be a limiting factor in the energy transition?</li> <li>- Are there materials of specific concern?</li> <li>- Where do you see “energy bottlenecks” in the supply chains?</li> <li>- What are energy sources used in mining now and in the future?</li> <li>- What is the potential to electrify mining and processing of ores? Could this offset the increased energy needs from declining ore grades?</li> <li>- Should we consider energy availability and sourcing (and their vulnerability to disruption) when devising criticality methodologies?</li> <li>- What is the relation between energy density and material efficiency? How can this relate to criticality?</li> <li>- Are there trade-offs between energy use and desired properties? How can these be balanced?</li> <li>- How can energy consumption for raw materials be reduced?</li> <li>- What are other potential impacts of the increased use of CRMs in energy technologies? (e.g. water consumption, pollution, loss of biodiversity...)</li> <li>- How can mining strategies be optimized/ what factors limit optimization in mining and processing industries? (e.g. long-term stability of demand, role of by-products..?)</li> <li>- What is the potential of the circular economy to limit trade-offs?</li> <li>- What planning and overview is needed to avoid energy losses?</li> <li>- What information about markets is important to plan ahead?</li> <li>- How do changes in demand affect mining and recycling activities?</li> <li>- How can (energy) waste be avoided when demand changes?</li> <li>- What is the role of life cycle assessments? In what stages can it be implemented?</li> <li>- How can we design for circularity? What are prerequisites for it?</li> <li>- <b>How could the “energy balance” of raw materials be assessed?</b></li> </ul>	
14:20	Wrap-up and final remarks	
14:30	End	