Critical Minerals for the GeoEnergy Transition (G503)

Tutor(s)

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Overview

This course covers all aspects of the crucial role that mineral extraction will play in the energy transition. Building the low-carbon technologies required to combat climate change, such as wind turbines, electric vehicles and batteries, will be hugely mineral intensive. The impact of this increased extraction is often overlooked, yet it's vital that these materials are sourced and extracted in the most responsible manner possible. This course explores where certain critical raw materials are currently produced and the impacts of their global supply chains, as well as examining how new technologies are aiding exploration for and extraction of new deposits. It also discusses challenges faced by responsible sourcing, and the growing importance of ESG within the mining industry.

Duration and Logistics

Classroom version: A 1.5-day course comprising a mix of lectures, case studies and exercises. The manual will be provided in digital format and participants will be required to bring a laptop or tablet computer to follow the lectures and exercises.

Virtual version: Three 3.5-hour interactive online sessions presented over 3 days. A digital manual and exercise materials will be distributed to participants before the course. Some reading and exercises are to be completed by participants off-line.

Level and Audience

Fundamental. The course is intended for industry professionals, though it is suitable for penultimate year undergraduate university students and above.

Objectives

You will learn to:

1. Understand the wider context behind the mineral intensity of the energy transition.
2. Define what is a 'critical' raw material.
3. Describe how new technologies are 'unlocking' mineral deposits which have previously been considered unconventional.
4. Understand the technical challenges associated with production of certain critical raw materials.
5. Describe how environmental, social and geopolitical factors can also influence an element's 'criticality'.
6. Begin to evaluate the environmental and social impacts of current global supply chains.
7. Understand the role mineral extraction has to play in delivering the UN Sustainable Development Goals, alongside various industry operating codes and principles.
8. Assess the importance of Environmental, Social and Governance (ESG) factors in project success.

Course Content

Course Details

This course will focus on the critical raw materials required to deliver the energy transition.

Session 1: Why? The mineral intensity of climate action

- The scale of the challenge
- What is a critical raw material?
- Exploring for these critical raw materials
- Supply and demand of key raw materials
- Recycling and the circular economy

Session 2: How? Looking at where critical raw materials are currently produced and their supply chains

- Focus on lithium as a case study: current global production and production from unconventional deposits, such as geothermal waters and hard rock mica deposits
- New technologies helping to unlock new mineral deposits – exploration and extraction
- Vertically integrated supply chains and the current trend for localization of them
- Public perception of mining: a case study

Session 3: Responsible sourcing

- ESG overview: environment, social and governance
- Mining and the UN Sustainable Development Goals
- Introduction to ESG standards, initiatives and legal conventions
- The use of Life Cycle Assessments (LCAs) in project development
- ESG and investment