

Abstract - Oral Presentation

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Session: Emerging raw materials policies and their impacts

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Title:

Evaluation of the potential for supply risk mitigation achievable through the EU CRM Act

Abstract: (3000 characters max)

Methods to assess raw material criticality are key tools to support the transition of technologies towards a sustainable development. Specifically, the European Union (EU) has been regularly providing lists of critical raw materials to pilot strategic sectors in the EU economy. The most recent milestone is the Critical Raw Materials Act (CRM Act) that provides benchmarks for strategies to mitigate the criticality of raw materials in 2030: increasing recycling, reindustrialization with focus on mining and refining operations and, redistribution of supply mixes. This contribution aims to provide a prospective assessment of the impact of these public policy objectives in the supply risk of critical raw materials.

The GeoPolRisk method is applied in comparative criticality assessments and used within life cycle assessments to estimate the supply risk of a resource from the perspective of an economic agent; it considers global production and trade information to calculate characterization factors tailored to different sourcing scenarios and measures potential supply risk in monetary units. Based on the objectives in the CRM Act, we employ the GeoPolRisk method to estimate the potential supply risk mitigation attainable within the capacity limits of the EU. We use a linear programming model and “geopolrisk-py”, an open-source python library that operationalizes the GeoPolRisk method, to calculate the potential for supply risk mitigation of critical raw materials in the EU.

Results show that supply risk mitigation strategies for a first group of resources are limited to new or improved recycling technologies due to a restricted international market and limited reserves in the EU (REE, Graphite, B, Mn, Ti); among this group, some CRMs are well recycled (Mn) while others are not (B, Graphite). Current practices in primary sourcing and/or recycling in the EU for a second group (Cu, Pt, Ni, Pd) require only moderate improvements to attain the CRM Act objectives. A further assessment of the cases of Li and Co shows the need for mixed strategies: increased primary production and recycling, and redistribution of current supply mixes. Examples of these initiatives are currently visible in the EU; however, might not be sufficient to attain the goals for 2030.

The analysis of the list of critical raw materials for the EU is limited by the amount of public information required for the assessment; specifically for the case of rare earth elements, the application could improve if more detailed production and trade data becomes available. Moreover, application of the method at intermediate points in the supply chain could further reveal bottlenecks associated to the transformative industry. Results obtained with the GeoPolRisk method should be used in parallel to other indicators focused on socioeconomic and environmental aspects of resource management to inform government bodies on the feasibility of the proposed strategies and better steer current efforts.

Keywords:

Raw material criticality, geopolitical supply risk, recycling, circular economy, risk mitigation