New technologies for the energy and circular transition – the demand of Mineral Resources

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Abstract

In December 2015, at COP21 in Paris, an International Agreement was signed that sets the goal of maintaining, by the end of this century, global warming at 2 °C compared to pre-industrial levels and preferably limit it to 1.5 °C. The main instrument for achieving this objective is the energy transition, the passage from an energy matrix focused on fossil fuels to another, with low or zero carbon emissions, based on renewable sources.

The electricity sector began to rely on renewable energies, complemented by the rapid abandonment of coal and the decarbonization of natural gas, while the supply of energy is wanted to be safe and accessible to consumers and companies.

To overcome these challenges, the European Union presented, in December 2019, the European Ecological Pact "GreenDeal", a roadmap for a growth strategy that transforms it into a modern, resource-efficient, and competitive economy. This "Green Deal", the EU's main strategic instrument for carbon neutrality by 2050, includes an ambitious package of measures aimed at enabling citizens and companies to benefit from a sustainable ecological transition.

For this transition, it will be necessary to utilize extensively, and in growing demand, mineral resources (as raw materials) to produce materials, which are at the base of the value chain of all industries, essential for the electrification of society and countless other applications (e.g. electric vehicles), as well as, given the intermittency of renewable energies, for the storage of the energy produced (e.g. batteries).

Indeed, a multiplicity of materials and technologies is needed to contribute to the energy and circular transitions in sectors such as transport, energy, electronics, and telecommunications (Kleijn et al, 2022) - sectors considered key to achieve climate goals due to their role in reducing greenhouse gases (GHG).

Thus, the widespread use of these technologies will require increasing amounts of raw materials and will originate specific supply chains, with critical raw materials being the ones that will have the most economic relevance, but which, at the same time, suffer comparatively greater risks of disruption in specific economies.

The identification of future critical raw materials in key sectors will be essential for the implementation of strategies that can mitigate future disruptions and will allow improving the resilience of relevant value chains.

Some of the critical raw materials needed for the main key materials/technologies, and which are expected to contribute to a better climatic, social and economic performance, will thus be briefly described.

References

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