

PRIMARY RARE EARTH RESOURCES IN EUROPE: AN OVERVIEW

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The rare earth elements (REE) have been identified by the European Commission as among the most critical raw materials, due a combination of their economic importance and supply risks. The supply risk is not the result of a shortage of REE resources in the Earth's crust, but is related to a concentration of production in China. A number of supply chain issues can be recognized, including: economic challenges that currently make it very difficult to open a REE mine outside China; complex ore mineralogy and textures, which mean that a specific beneficiation flowsheet must be developed for each REE deposit; the limited number of facilities for REE extraction and separation outside China; and potential environmental problems such as the common association of the REE with U and Th.

The EURARE project (www.eurare.eu), funded by the EC's Seventh Framework Programme, has critically reviewed the potential for primary REE resources across the EU and partner countries. Some key REE projects have already released JORC- or NI-43-101 compliant resource estimates; these include the Kvanefjeld project in South Greenland, Norra Kärr in Sweden, and the Fen Complex in Norway. However, our recent review demonstrates that many more potential REE deposits are present across Europe. These include both hard-rock primary deposits, associated with alkaline igneous rocks and carbonatites, and with hydrothermal mineralization; and secondary deposits, including mineral sands and bauxites. Primary deposits are typically higher-grade, but present greater challenges for beneficiation and processing. Secondary deposits are lower-grade, but beneficiation is generally simpler, and the REE may represent by-products from production of other minerals. This talk will describe the main types of primary REE resources across Europe, and will discuss the key features of each deposit type.

A key conclusion of this work is that Europe has a significant number of REE deposits, and undoubtedly has the potential to be self-sufficient in the REE, including the most critical heavy REE. However, it is essential that researchers, industry and policy-makers work together – as in the EURARE project - to develop a vertically integrated supply chain for Europe.

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