



Challenges and context

Permanent magnets are at the heart of **Europe's green and digital transition** powering electric vehicles, wind turbines, electronics, robotics and many other digital products. However, the EU is currently **dependent on non-European** imports for REEs, making the continent **vulnerable to supply risks and market volatility**.



Partners



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Driving Europe's independence in rare earth permanent magnets

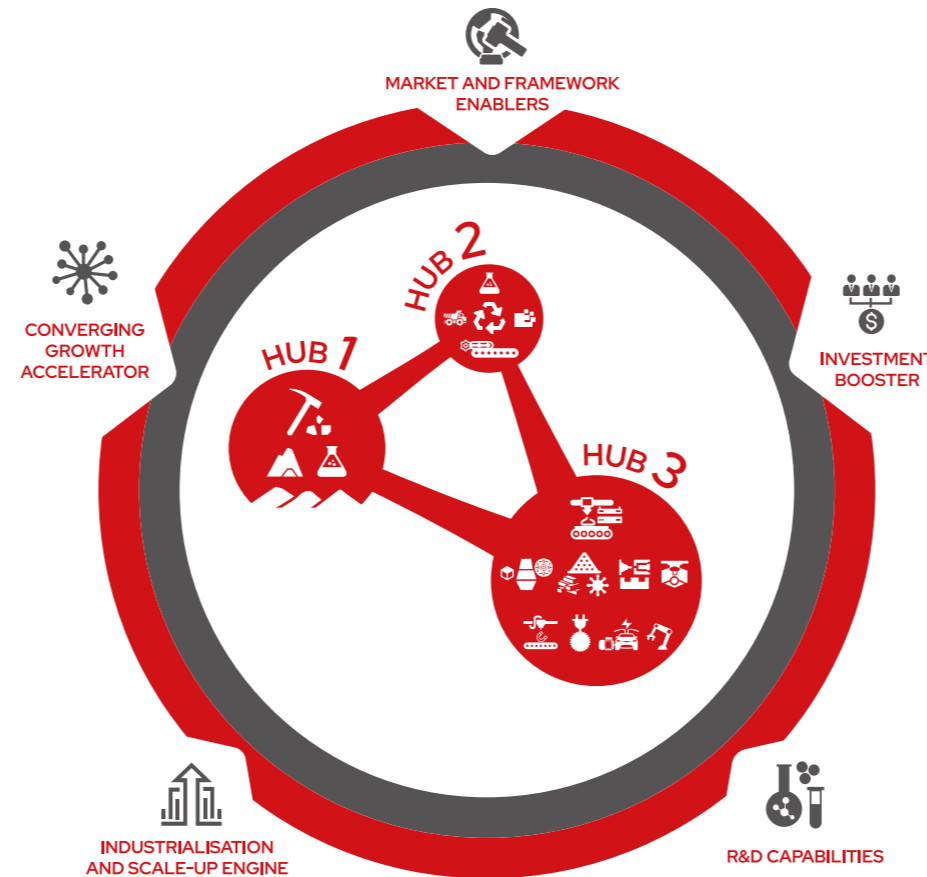
Project overview

Funded under the EU Horizon Program, PERMANET is a research project that aims to establish an **innovative network of EU actors** to build the first fully integrated, circular and resilient European value chain of **Rare Earth Permanent Magnets** (REE PM) in Europe. It is composed of relevant stakeholders able to provide equipment, R&D services, policy and business model expertise to **accelerate the development of cutting-edge technologies** in the REE PM industry to match EU industrial demand.

Activities carried out by the project

The project will test and scale up **13 technological innovations** addressing the **whole value chain of REE PM**. The implementation of **3 technological hubs** will facilitate this scale up by organizing thematic collaborative R&D and supply ecosystems. The hubs will address the themes of **Sustainable REE Supply, Circular REE Innovation** and **Innovative Magnet Production & User-Driven Testing**.

The three technological hubs

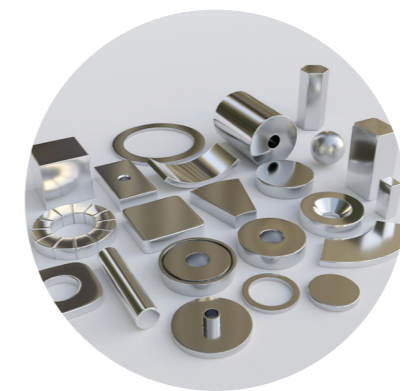
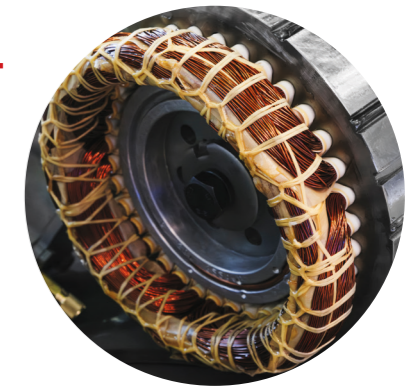


→ HUB 1 - Sustainable REE Supply Hub

The Sustainable REE Supply Hub develops green technologies to extract and refine REEs from mining tailings, including monazite and iron ore. The Hub will be complemented by the demonstration of hydrometallurgical processes to produce REE's carbonate and REE's oxides from miscellaneous mining sources.

HUB 2 - Circular REE Innovation Hub ←

Circular REE & Manufacturing focuses on circular technologies for recovering REEs from WEEE (waste from electric and electronic devices) and electric vehicles. Specifically, it includes a marketplace development and innovative processes for collection, dismantling, sorting, and refining WEEE.



→ HUB 3 - Innovative Magnet Production & User-Driven Testing Hub

The Innovative Magnet Production & User-driven Testing Hub demonstrates novel magnet production methods and user testing, including oxide reduction, powder production, advanced sintering, bonding, and printing with final validation by industrial end-users.