




FACT SHEET

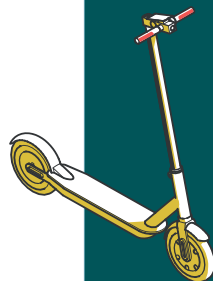
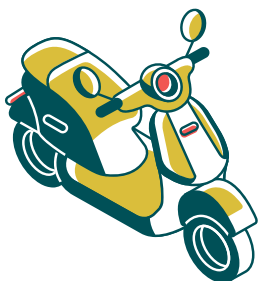
PASSENGER: a solution for future- proof permanent magnets made in Europe

DOI: 10.5281/ZENODO.10781400

Key facts

The PASSENGER project aims to make the European permanent magnets industry more sustainable and self-reliant. It focuses on addressing the issues related to the European Union's heavy dependence on rare-earth elements for magnets.

- ⚡ The project explores **alternative options**, such as **improved strontium ferrite and manganese-aluminium-carbon magnetic materials**, which perform well at high temperatures, resist corrosion, and are easy to recycle. As such, permanent magnets prepared with these materials can be a compelling alternative to Nd-Fe-B magnets, contributing to a more sustainable future.
- ⚡ **Funded by the European Union** and implemented by a **consortium comprising 20 organizations**, the project has achieved a significant milestone with the **successful testing of prototypes integrating rare earth-free permanent magnets**. 
- ⚡ The prototypes, an e-scooter and a water pump system, were assembled using **raw materials extracted and processed in Europe**. This achievement aligns with the European Commission's Critical Raw Materials Act, addressing the continent's reliance on critical raw materials.



The role of Permanent Magnets: a silent force in green tech

Permanent Magnets play a critical role in powering green technologies, particularly electric vehicles, as they can ensure the seamless functioning of motors and generators. According to a [report](#) by the International Energy Agency (IEA), **electric vehicles (EVs) are expected to account for over 10% of the vehicle fleet by 2030**, with approximately 240 million on the road, up from nearly 30 million in 2022. However, the current reliance on Rare Earth Elements (REEs) for manufacturing Permanent Magnets poses strategic challenges for Europe, given that REEs are classified as critical raw materials.



The challenge ahead: breaking free from REEs

The prevalent use of REEs in permanent magnets poses considerable challenges for Europe due to their scarcity and environmental impact. **Rare earth elements are under extremely serious supply risk**: they are extremely costly, subject to great price volatility, and prone to supply crises. The mining process of REEs is also expensive, energy-intensive, and with a significant environmental impact.

PASSENGER steps up to this challenge by introducing **alternative magnets based on strontium ferrite and manganese-aluminium-carbon alloys**. This move also underscores a commitment to sustainability and resilience.

Exploiting Europe's resources

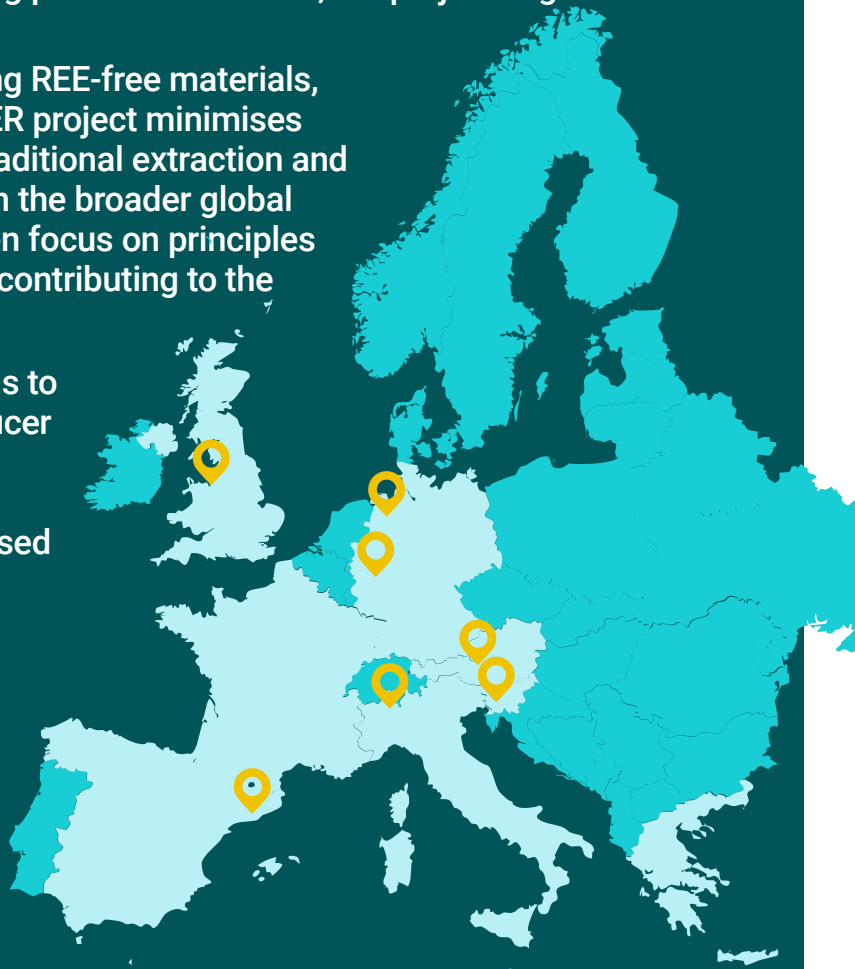
A key aspect of PASSENGER lies in its utilization of Europe's strategic reservoir of raw materials. Countries like Ukraine, Norway, Iceland, and Spain are playing a crucial role, contributing their valuable deposits to foster self-sufficiency and reduce dependence on external sources. This strategic move could potentially reshape the global dynamics of raw material supply.

For example, according to data from the [U.S. Geological Survey](#), Ukraine boasts a manganese reserve of 140,000 tons as of 2022, representing approximately 7% of the world's supply. Norway and Iceland produced 1.46 million tons and 880,000 tons of aluminum, respectively, in the same year. Spain, a major strontium producer, contributed significantly to global production, accounting for around 40% with a total of 200,000 tons in 2022.

What can we expect in the future?



- ▶ **Technological Advancements:** PASSENGER proposes a diversified range of new and improved magnetic materials that don't rely on rare earth elements, optimised for efficient and application-specific use. These materials, like Mn-Al-C and Sr-ferrites derive from European resources,
- ▶ **Reduced REE Dependency:** Europe is working towards reducing its dependence on REEs imports, aiming for resilience and self-sufficiency. PASSENGER focuses on sourcing raw materials within the EU, making extraction processes easier and cheaper, leading to economic benefits. The project partners will carry out pilot actions in eight different Pilot Plants across Europe. With the entire production cycle of permanent magnets - from extraction to product integration - taking place within the EU, the project aligns with Europe's aims.
- ▶ **Environmental Sustainability:** By utilising REE-free materials, available within Europe, the PASSENGER project minimises the carbon footprint associated with traditional extraction and manufacturing processes, aligning with the broader global push towards sustainability. With a keen focus on principles of reuse and recycling, PASSENGER is contributing to the evolution of a circular economy.
- ▶ **Industry Repositioning:** The project aims to establish Europe as a self-reliant producer of PMs, fostering European autonomy. The EU magnet industry is expected to reposition itself in the world market based on new, sustainable technologies.
- ▶ **Cost Reduction:** Users of REE-free permanent magnets are expected to benefit from reduced costs due to the use of less expensive raw materials. This, in turn, is anticipated to increase revenues for magnet producers.



Find out more about the PASSENGER project

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 101003914