

LUGLIO 2024

LIFE22-ENV-IT-INSPIREE



ITELYUM 

Ecoforum 3 luglio 2024



LIFE22-ENV-IT-INSPIREE

Industrial Production of mixed Rare Earth Elements oxides and carbonates from spent magnets recycling

DURATION: 01/10/23 - 30/03/27

BUDGET: 5.409.049,02 €

EC Co-funding: 60%

Coordinating Beneficiary

Itelyum Regeneration SpA

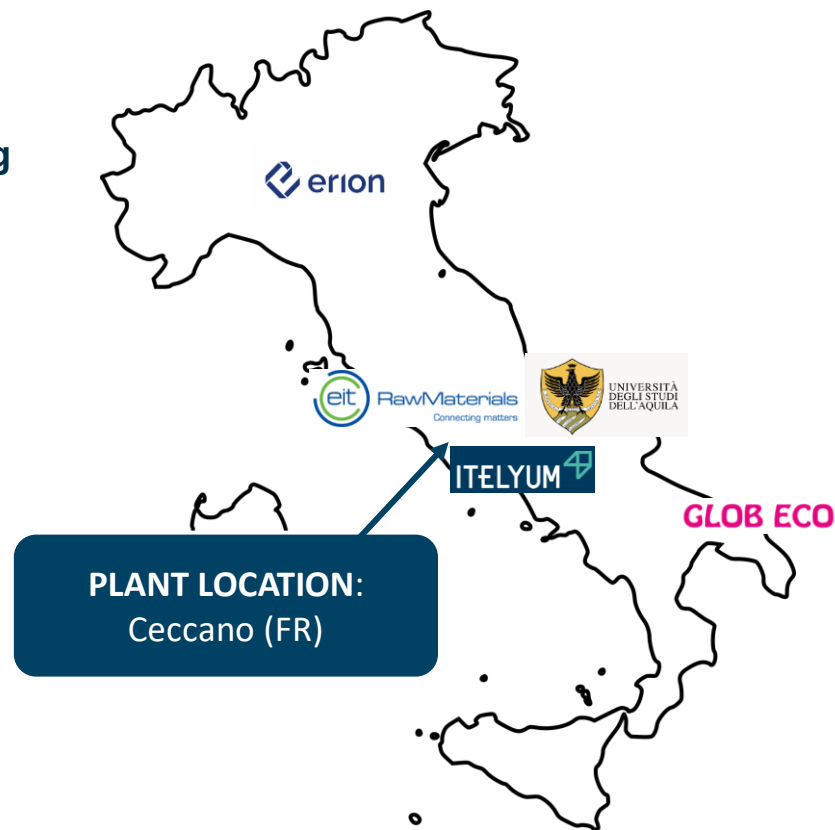
Associated Beneficiaries:

Erion Compliance Organization

Globeco Srl

Università degli Studi dell'Aquila

EIT Raw Materials CLC South S.r.l.



OBJECTIVES & SCOPE

The **first industrial-scale plant in Europe for the recycling of Rare Earth Elements (REEs - Nd, Pd and Dy) from spent permanent magnets (PM) from WEEE**



Hard Disk Drive \approx 7 g of permanent magnets

(25% w/w of Neodymium)

→ 3 kton/y REEs are consumed for HDDs manufacturing

\approx 2-5 kg of permanent magnets for each electric vehicle

→ E-automotive demand will grow more than 10 times by 2030



Starting point: pilot project NEW-RE funded by the EIT Raw Materials.

Target is to recycle REEs by scaling up a hydrometallurgical process producing REEs oxides and iron pigment at industrial pilot scale (TRL7).

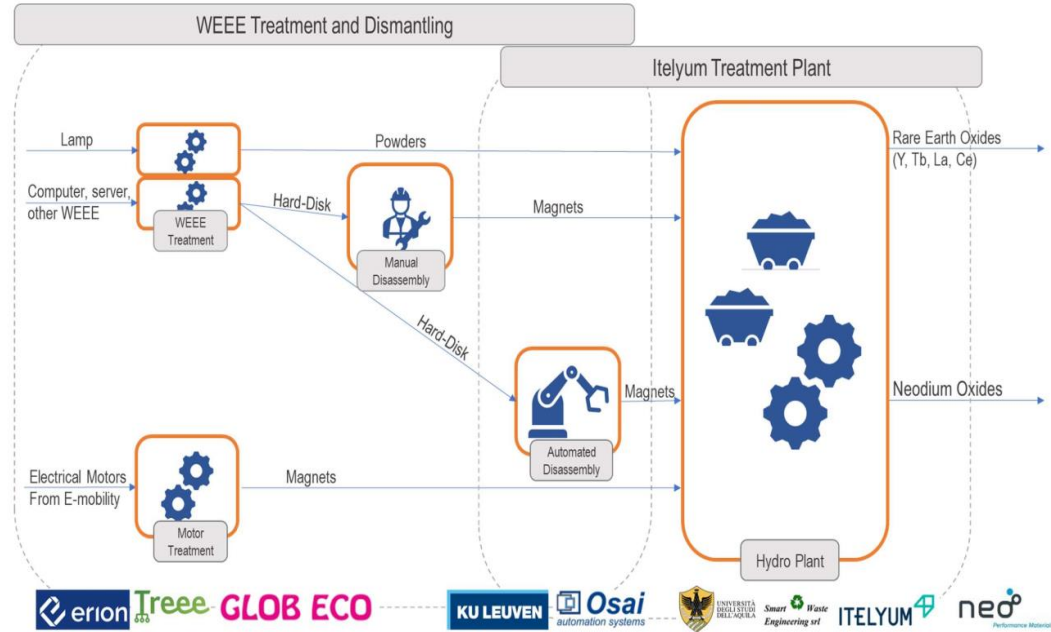




The project gathers the **key actors to cover the entire value chain.**

The final scope is to achieve with the plant:

- a recycling capacity of 500 t/y of spent PM;
- A production capacity of 170 t/y REE oxides from recovered WEEE to produce new PMs for EVs.



EXPECTED RESULTS

KPI	Specific	Units	Baseline value	End of project (2026)	5 years after the end (2030)
Resource efficiency	Permanent Magnets recycling	Ton/year	0	500	2000
	Recovery of Rare Earth Elements (Nd, Pr, Dy)	Ton/year	0	170	680
	Nickel concentrate	Ton/year	0	35	140
	Iron oxides	Ton/year	0	275	1100
Water saving	Water for industrial process	m3/year	1.020.000	767.856	11.424
Energy saving	Energy for industrial process	GWh/year	5,95	5,33	2,47
GHG emissions	CO2	tCO2e/year	44.000	36.800	28.800



POLICY IMPLICATIONS

- **CREATE** a new circular economy model supply chain, thus contributing to the implementation of the Circular Economy Action Plan (COM(2020)98 final);
- **CONTRIBUTE** to increase EU strategic autonomy in the field of Critical Raw Materials (CRM) and increase CRM quantity recycled from waste as expected by Critical Raw Materials Act (to >15% of the EU's annual consumption);
- **DEFINE** a standard WEEE management system for collection, disposal to treatment plants recycling to REEs to be replicated in other EU countries (like Italian Used Oil re-refining model – CONOU consortium and related legislation – Circularity index > 90%)
- **SUPPORT** the implementation of End-of-Waste Directive in Italy



CONTINUATION (REPLICATION, TRANSFER, MARKET UPTAKE)



LIFE INSPIREE will:

- **ESTABLISH** commercial agreements with final users in EU able to further treat the REEs oxides and sell them to EVs manufacturers;
- **BUILD** a new industrial facility able to recycle over 20,000 t/y of Spent PM;
- **DEVELOP** a “multipurpose plant” able to recover:
 - ✓ Y, Eu, Tb oxides from fluorescent powders of cathode ray lamps and tubes;
 - ✓ La, Ce, Nd, Y and Pr oxides from NiMH rechargeable batteries;
 - ✓ Li and other metals (Ni, Co when present) from Li-Ion batteries for commercial and automotive use;
 - ✓ In and Sn from LCD panels
- **INVEST** some additional 9.5 mln EUR and create 20 FTE by the end of 2030.



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