DPRESS-RELEASE

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FROM DETECTION TO RECOVERY

THE REEPRODUCE PROJECT A STEP TOWARDS A RESILIENT RARE EARTH ELEMENTS VALUE CHAIN

During the first half of the project, significant progress has been made in advancing recycling technologies for devices containing Neodymium (Nd) magnets. The REEPRODUCE consortium initiated demonstration phases, focusing on validating innovative recycling processes across multiple facilities in Europe.

A critical phase of this development has involved testing systems capable of detecting Nd-magnets within various end-of-life products (e.g., hard drives, hoverboards, vacuum robots, etc.). This has ensured precise and efficient identification, thereby streamlining the recycling process.

Additionally, a newly designed dismantling robot that automates the extraction of components containing Nd-based permanent magnets has been developed. This robotic system enhances both the safety and efficiency of recycling operations.

Parallel to this activity, specialised machinery has been developed to separate Nd-magnets from extracted components. These machines will enable the recovery of Nd-magnets, which can then be processed to reclaim high-value materials. By automating this extraction process, recycling operations will become more efficient and safer.

At this stage the consortium has successfully completed **five demonstrators (TRL7)**, marking a significant step forward in achieving the project's objectives.

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Intelligent sorting and dismantling of devices containing Nd-based magnets

Sense2Sort has successfully developed a **semi-mobile pilot machine** that sorts end-of-life (EOL) products containing Nd-based permanent magnets (PM).

The technology is based on vision in combination with artificial intelligence (AI) and X Ray Transmission (XRT) technologies.

Currently, Indumetal Recycling and REVAC, both recyclers' sites are demonstrating and validating tests.

Intelligent sorting machine

Automatic Robotic system for dismantling

CEIT has developed a **robot machine** that performs dismantling tasks (such as unscrewing, drilling or housing removal) to obtain the targeted components containing Nd magnets from EOL products.

Deep learning is applied to help the robot to understand and settle the trajectory planning of the action to perform.

The pilot is being adapted to the current WEEE dismantling practices of Indumetal Recycling.

Automatic Robot system

Pilots to extract Nd-based magnets blocks from components

FAU-FAPS and Bronneberg have developed **several pilot units** where the magnet blocks are extracted from different components of selected EOL products such as automotive traction drives, AC/heat pump compressors, traction wheels from personal mobility devices and hard disk drives.

The pilots will be validated at the beginning of 2025.

Pilots to extract Nd-based magnets blocks from components

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As a next step, the project is developing a hydrometallurgical pilot plan to recover the valuable and strategic rare earth elements that constitute the permanent magnet. This pilot plant will enable to refine and optimise the recovery process, ensuring that it is possible to extract the maximum value from recycled materials while minimising environmental impact. In a subsequent step, the valuable materials recovered in the hydrometallurgical pilot plant will be converted into rare earth metal alloys through an innovative high-temperature electrolysis technology, which will be validated in a dedicated pilot line consisting of an automated electrolysis cell running at high efficiencies and with the highest environmental standards.

Dr. Ana María Martínez, coordinator of the REEPRODUCE project, states: «the project is currently entering a new phase, validating new technologies that will certainlyimprove the recycling and recovery of Nd-magnets from discarded electric and electronic devices, contributing to establish the foundations for a more sustainable and efficient use of strategic resources».

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Follow the project on social media:

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