ADDED VALUE AND BENEFITS
REProMag is an application oriented project, providing a whole range of considerable benefits:

- **Sustainability** in the use of RE-metals by using 100% recycled feedstock and a completely waste-free production method
- Creation of new fields of application for RE-magnets by enabling the production of complex and miniaturised geometries and assemblies without costly after-treatments
- Fast prototyping through additive manufacturing with minimised initial costs for a fast proof of concept for new and innovative ideas
- Easy selection of the most appropriate shaping process according to the features and functions of the product/application as well as productivity through the use of a computational modelling tool
- Smooth up-scale of production
- Highly customised products

IMPACTS
Through the new SDS processing route, REProMag will have some major impacts:

- **Material efficiency** (reduced material charge, net-shape production) and use of recycled materials will significantly decrease the dependency on foreign RE-metals and work against the risk of a shortage as a limiting market growth factor
- Diminution of necessary machinery and post-processing steps allowing for reduction of the energy consumption compared to the classical processing route
- Combination of the net-shape processing and the computational modelling approach allowing for an almost zero-defect production process, leading to a more efficient manufacturing route
- REProMag SDS route will drastically reduce the European dependency on Asian magnet manufacturers in key industrial sectors, which not only is important on a strategic level, but also will boost the job creation in this sector in Europe

PARTNERS
REProMag brings together leading scientific and industrial experts in RE-magnets, powder processing, material characterisation, additive manufacturing, powder injection moulding as well as well-known end-users in a highly motivated team on the route to success:

**CONTACT**
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PROJECT VISION AND CONCEPT

Our modern world relies on the use of Rare-Earth (RE) magnets: Energy supply, transportation and communication are strongly dependent on these mostly invisible but indispensable powerful ‘little helpers’.

In a critical raw material market dominated by Asia (only 3% produced in EU) there is a need to develop new processes for efficient use and production of RE-magnets. The project REProMag addresses this issue by developing a new RE-magnet production process, using the RE-material efficiently and being sustainable over the whole processing chain: The SDS process (Shaping, Debinding and Sintering).

Once used, SDS parts can be recycled, leading to a completely waste-free production with high efficiency.

PROJECT OBJECTIVES

By developing and implementing the SDS process, REProMag addresses the following objectives:

- **Economically efficient production route** for RE-magnets by development and up-scaling of the SDS process from the laboratory scale to industrial mass production
- **Reduction of the raw material charge** of RE-materials during the production by 30-40%
- **Completely waste-free** production
- **30% energy saving** during the production process by avoiding energy-intensive post-treatments such as machining
- **Increase of the magnetic energy product** by 10-40% allowing the use of complex and 3D structured parts in miniature application

PROJECT APPROACH

REProMag is an integrated combination of research, development, demonstration and economical assessment activities:

- Development and testing of RE-powders and feedstock based on recycled RE-material
- Development and validation of shaping methods and machinery (MIM and 3D-printing), having integrated magnetic alignment systems
- Development and testing of debinding and sintering regimes as well as innovative coating methods
- Building and validation of magnetic demonstrators from real applications
- Health, environmental and economical assessment (LCA & LCC) of the whole manufacturing route

Rare Earth magnets are everywhere …
… electrical motors, sensors, loudspeakers, headphones, wind turbines, mobile phones, computers, DVD players …

Did you know that …
… in 2010 the world-wide RE material market was more than 62,200 tons; with Europe having a market share of only 3%.

The SDS process is an integrated solution overcoming today’s limitations in the production and use of RE-magnets:

- **Recycling**: Use of recycled RE-metals to provide sustainable RE-powder and feedstock
- **Shaping**: Net-shape production of RE-magnets with complex geometries through metal injection moulding (MIM) and 3D-printing in a magnetic field
- **Debinding and Sintering**: Removal of polymer binder needed for shaping and production of dense net-shape magnets
- **Application**: No post-processing (grinding etc.) needed, combined with an innovative anti-corrosion coating. SDS parts are ready for application

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