

## 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:



[www.repromag-project.eu](http://www.repromag-project.eu)

## CONTACT

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# REProMag

Resource Efficient Production of Magnets



goetzinger-komplizen.de | 06/2015 | 1. Auflage



## NEW PERSPECTIVES FOR HIGH PERFORMANCE MAGNETS

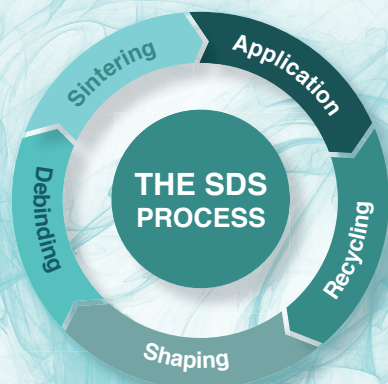
Horizon 2020 European Union funding for Research & Innovation - GA N°636881



## 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).



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

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



**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%.



## 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