

REE4EU



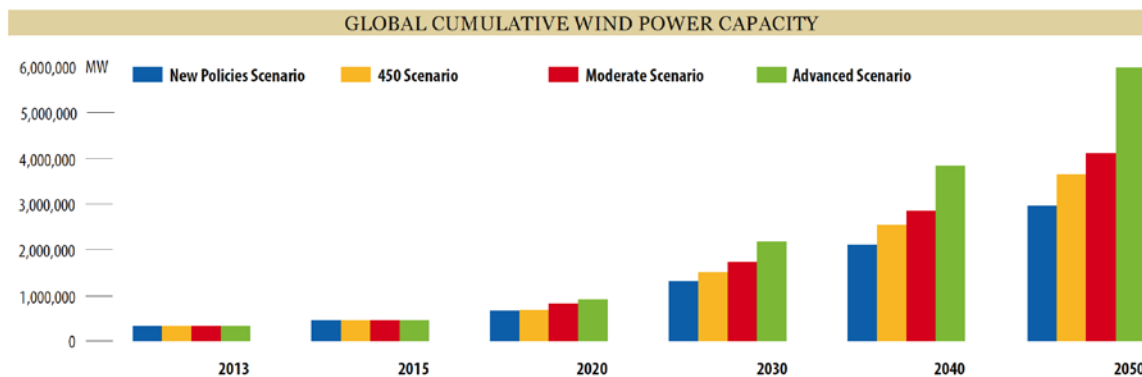
Rare Earth Recycling for Europe

**Integrated High Temperature Electrolysis and Ion Liquid
Extraction for a Strong and Independent European Rare Earth
Elements Supply Chain**

Ana Maria Martinez, SINTEF (Norway)

Rare Earth Market Drivers

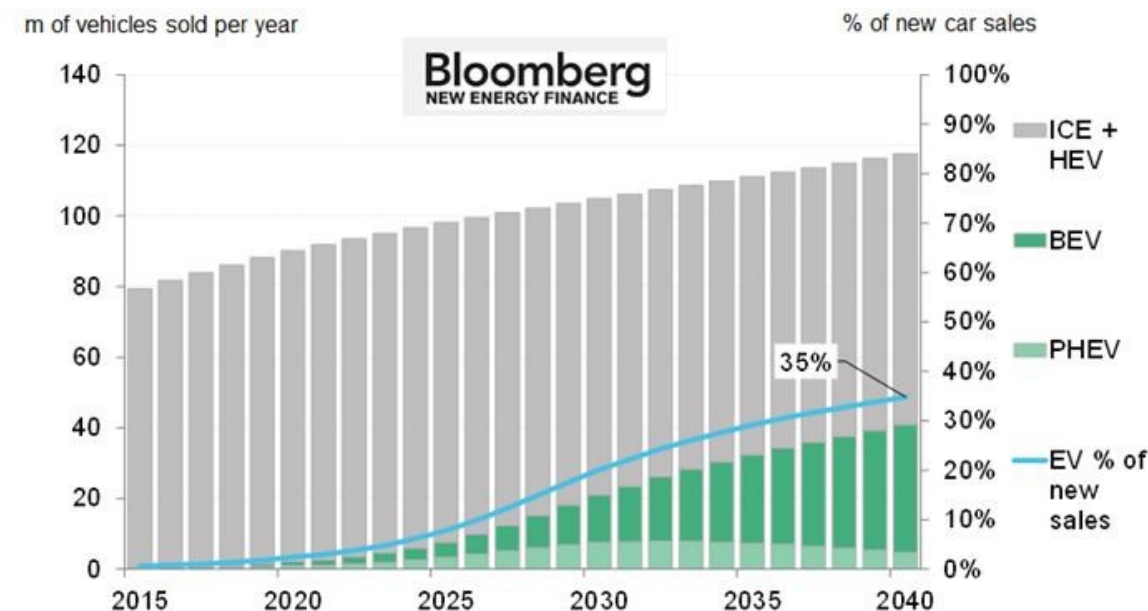
Wind Energy



PM in offshore turbines \Rightarrow 170-230 Kg RE/MW

Re= Nd and Dy

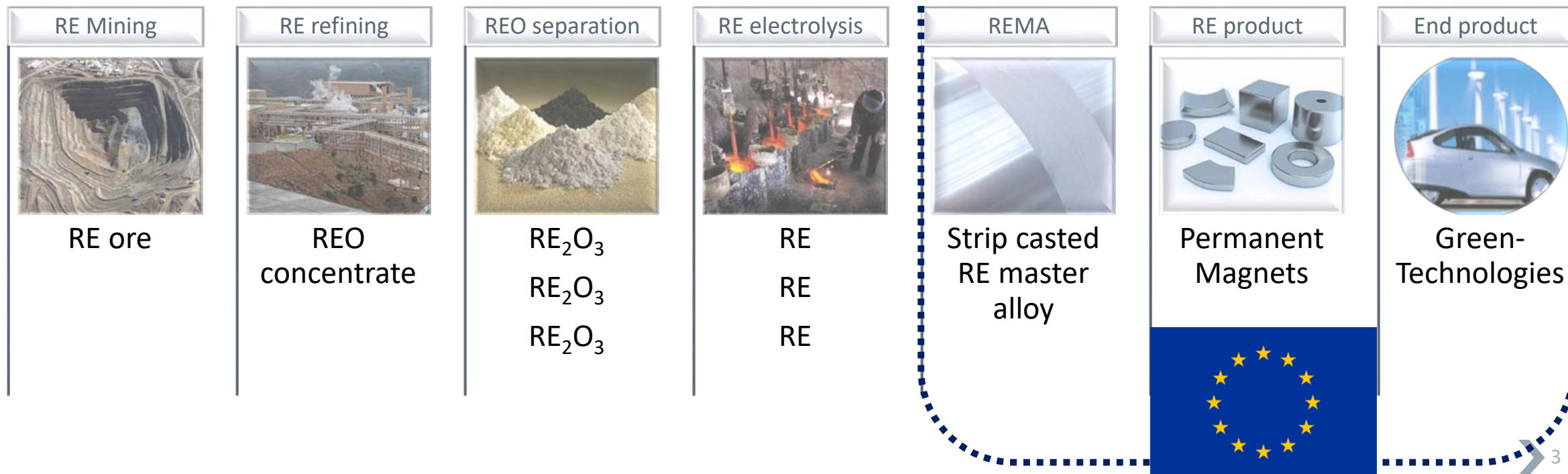
Electric Vehicles



PM in both motor and generator \Rightarrow
1.5-2 Kg and 0.5 Kg, respectively

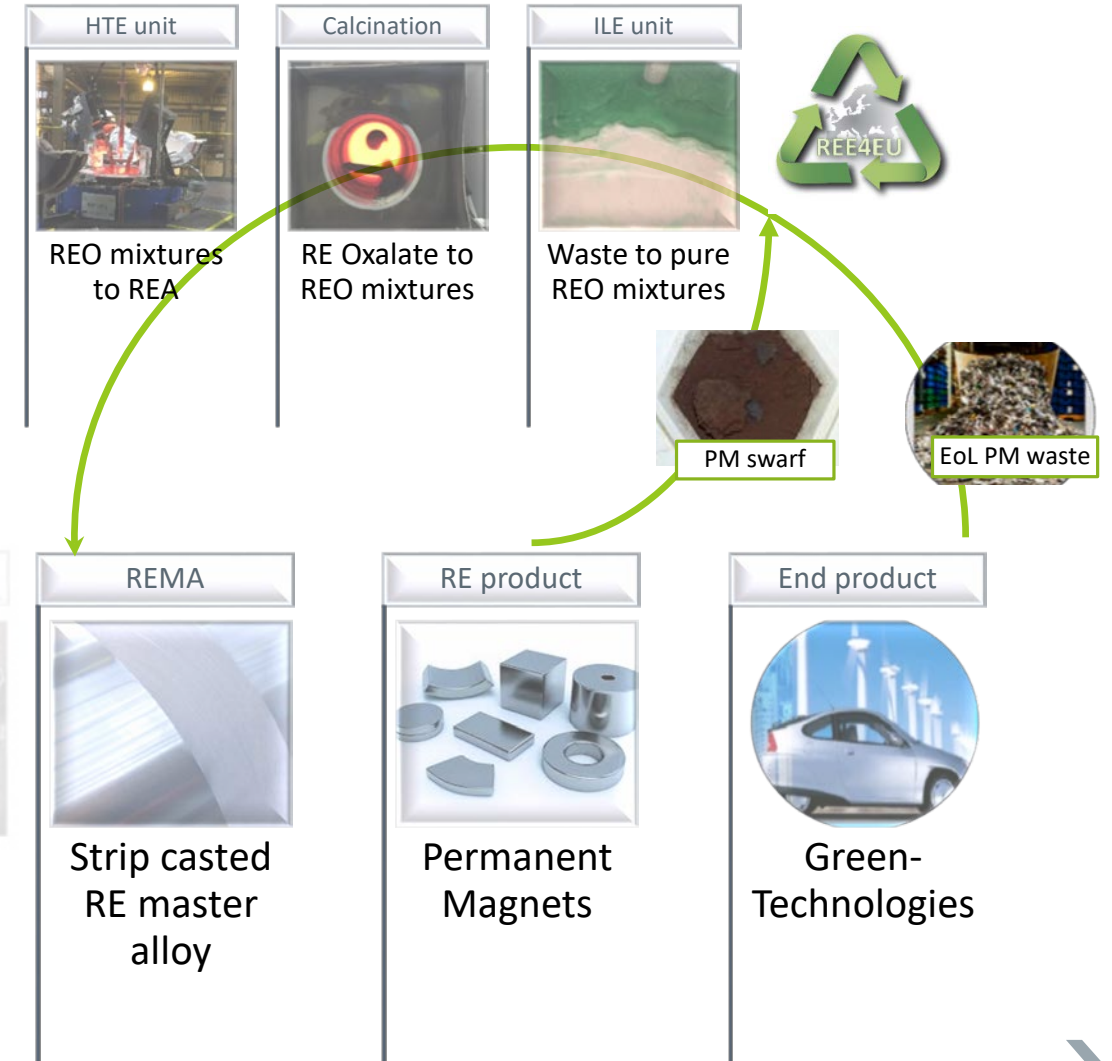


Current Permanent Magnets Value Chain





REE4EU technology - PM value chain in Europe



Sustainable Process Industry through
Resource and Energy Efficiency

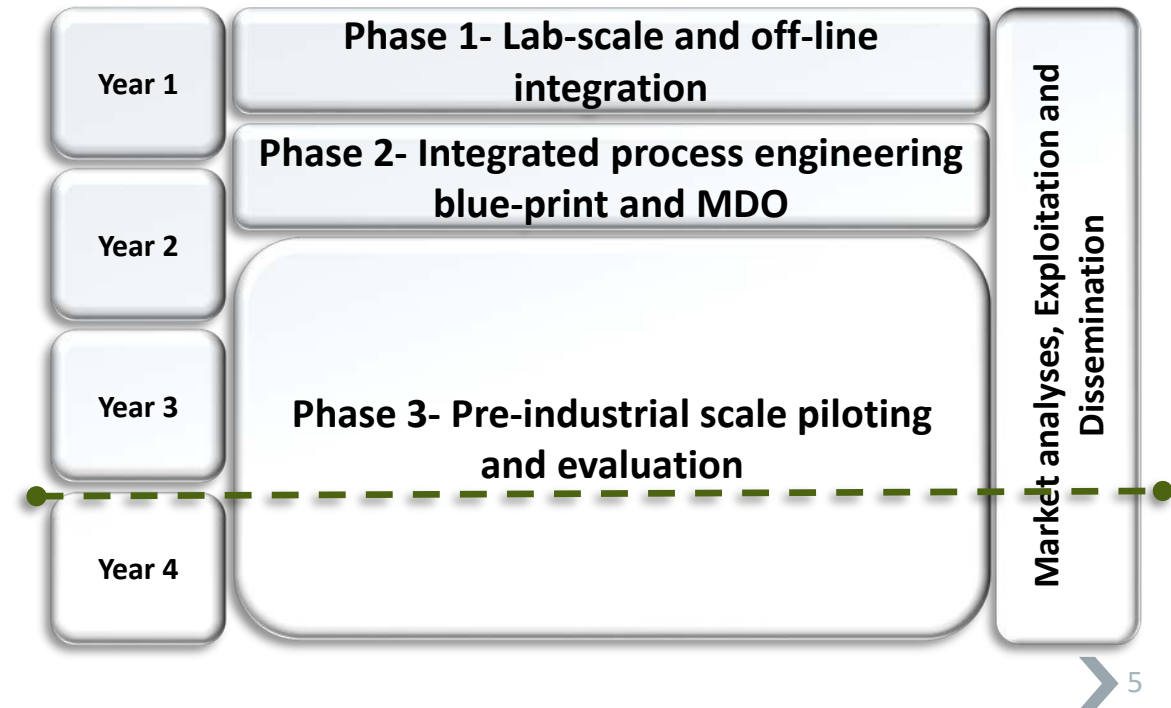




REE4EU Project

Realize a breakthrough in securing REE availability in Europe, providing for the first time a cost effective and efficient REE extraction and **direct RE Alloys production route from abundantly available in-process and end-of-life RE-containing waste streams**

- ❑ Engineer, upscale, pilot and prove the technology.
- ❑ Validate replicability (other RE-containing wastes) and provide tools for integration in existing facilities.
- ❑ Assess the quality of the recovered material producing real REE-containing products and finished goods.
- ❑ Develop reliable estimates of available EoL REE-containing materials in Europe.
- ❑ European stakeholder analyses, business plans and market introduction routes.



Sustainable Process Industry through
Resource and Energy Efficiency



REE4EU Consortium

- 4 years project: 1 October 2015 – 30 September 2019
- 14 Partners:

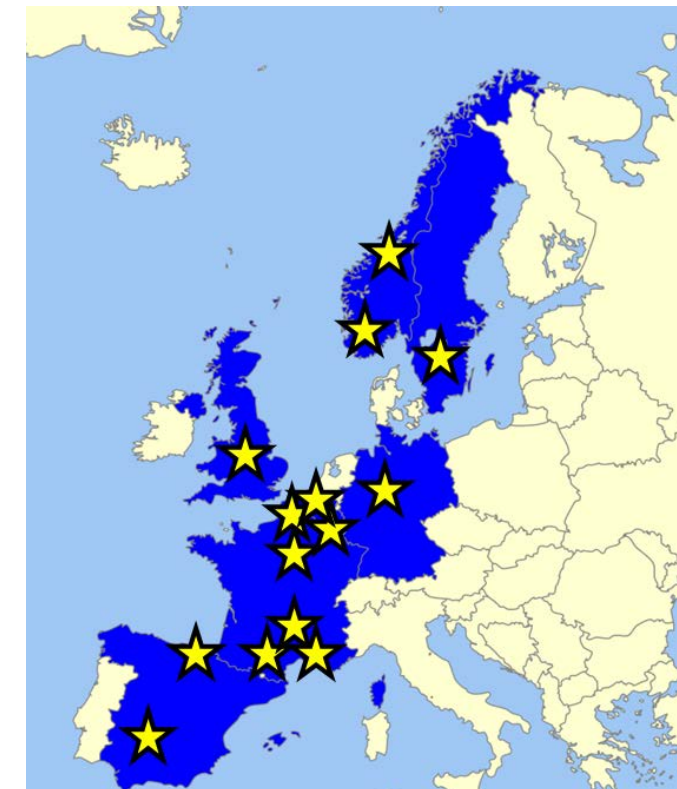
RTOs:



SMEs:



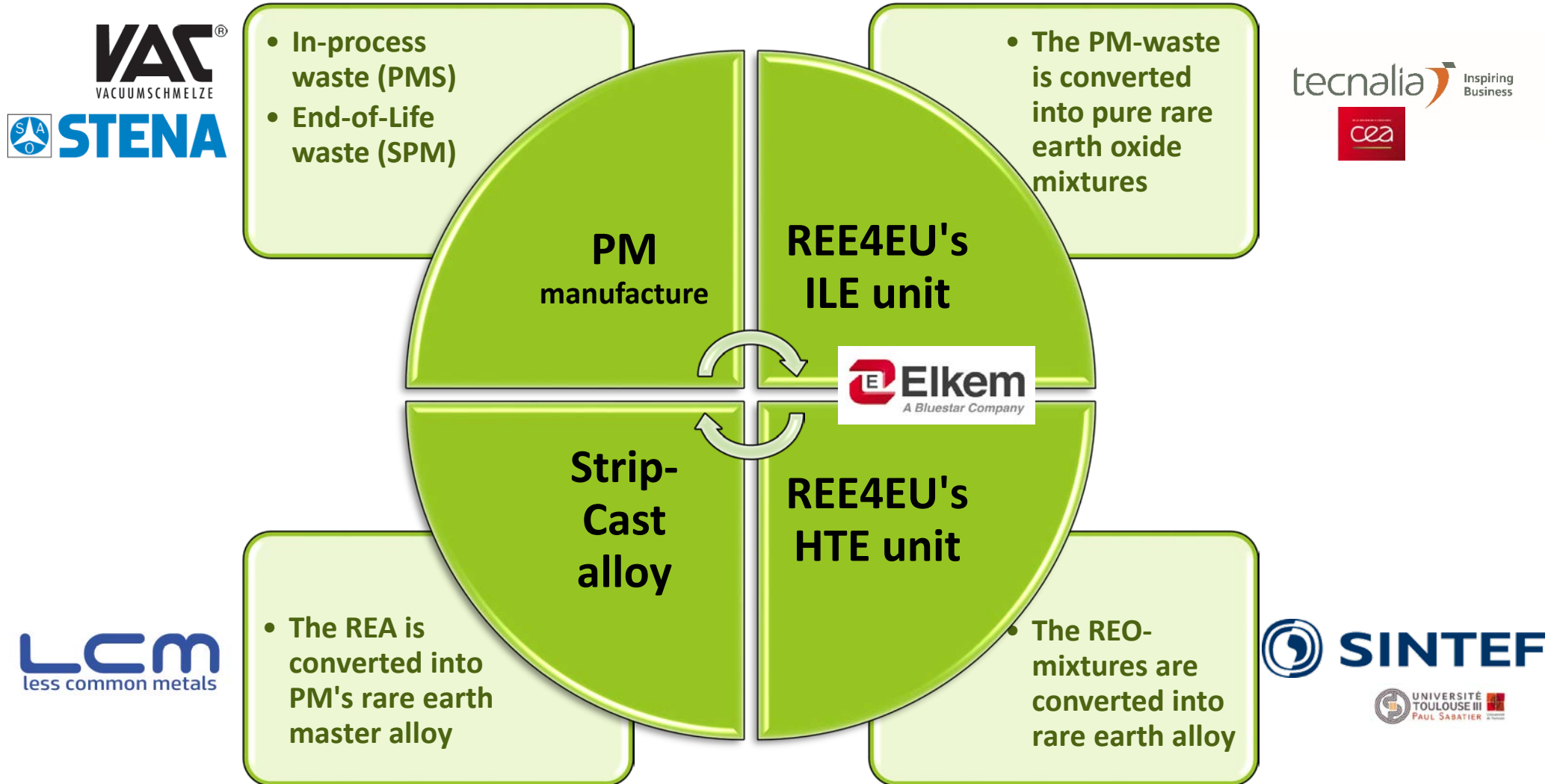
Industry:



www.ree4eu.eu

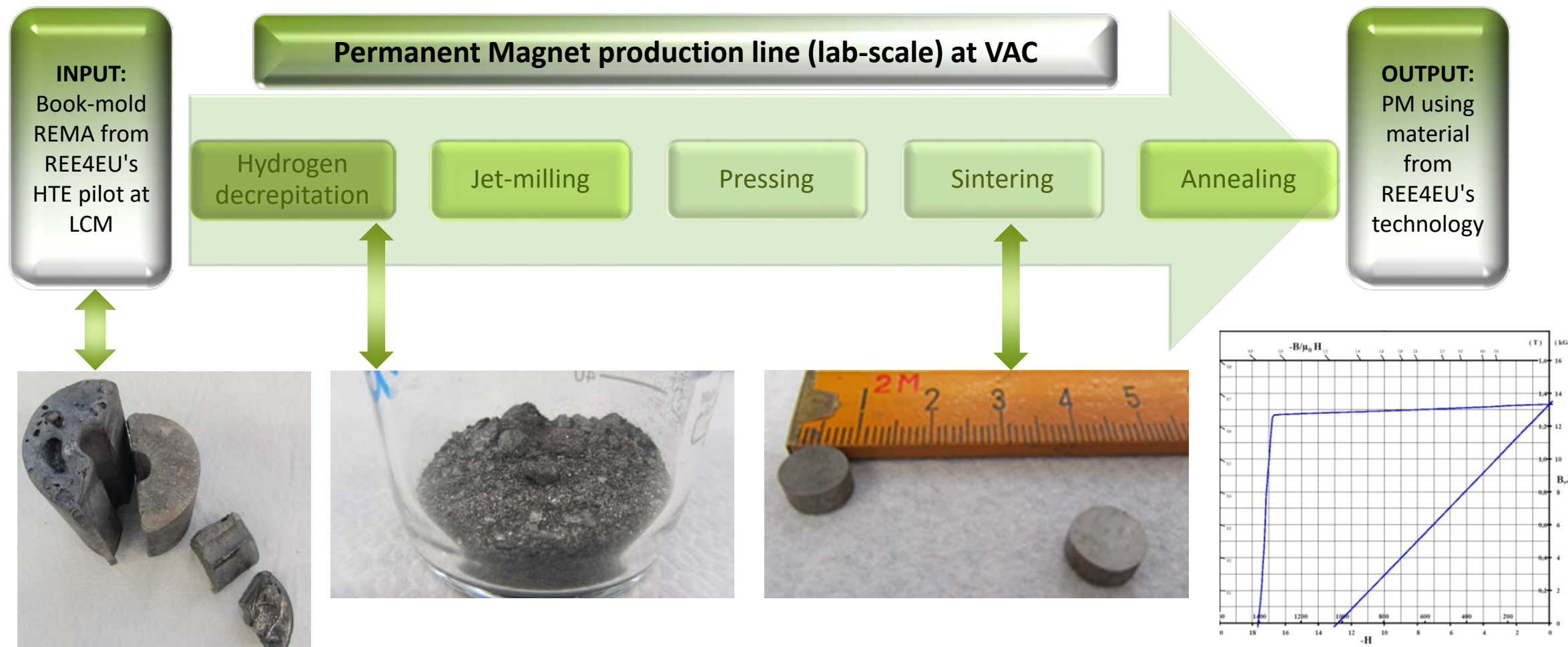


REE4EU's Closed Loop Permanent Magnet Recycling





First PM Produced using REE4EU's Technology





REE4EU for Business



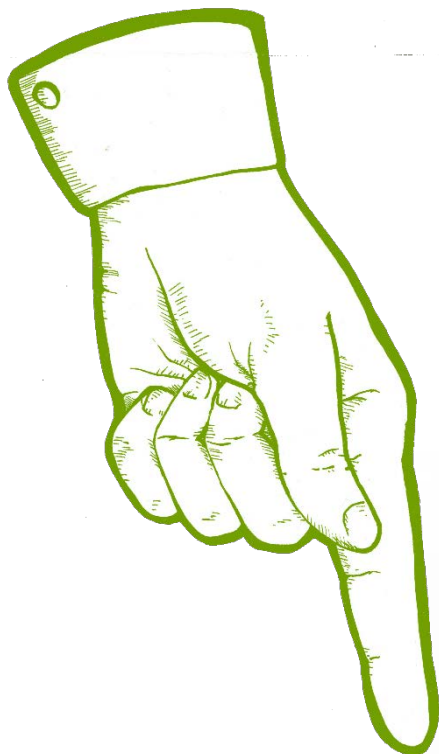
PNO will produce a three-fold value chain business plan that will:

- ♻️ Assess profitability of the **actual** and **scaled-up** REE4EU pilot
- ♻️ Present a **risk assessment** for financial and economic robustness
- ♻️ Provide **recommendations, e.g. policy** in line with REE4EU's objectives





REE4EU for Business



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Stakeholders workshop, Brussels, 24th April 2019



Sustainable Process Industry through
Resource and Energy Efficiency



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Rare Earth Recycling for Europe

