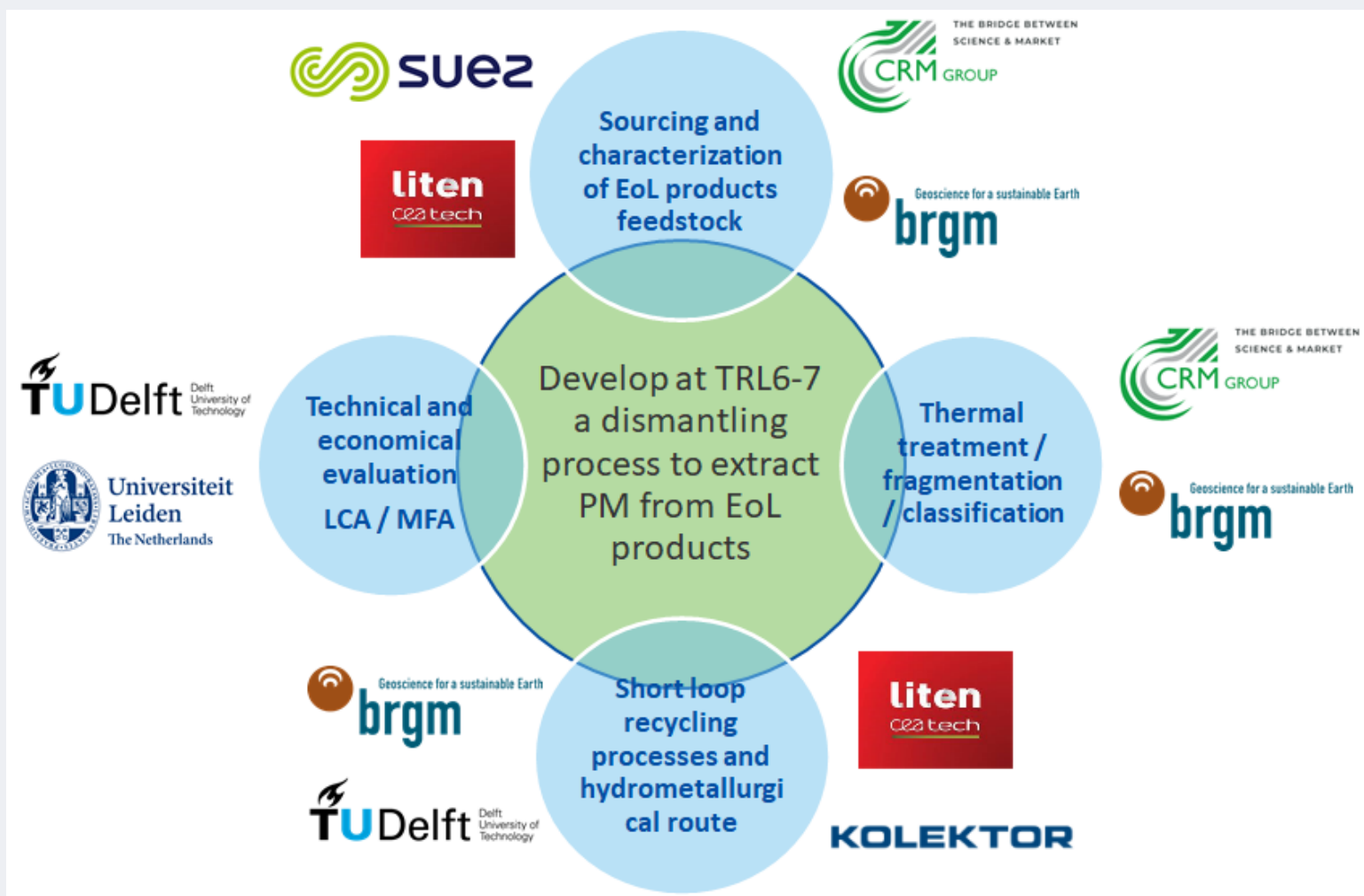


Environmental impacts assessment of permanent magnets recycling with VALOMAG project

Z. Li (Leiden University), F. Coelho, S. Abrahami, B. Sprecher, JH. Welink, Y. Yang (TU Delft), T. Marcon (CRM Group), C. Rado (CEA), B. Saje (KOLEKTOR), and NE. Menad, K. Bru, A. Seron (BRGM), V. Decottignies (SUEZ)

Objective



Challenges of Rare Earth Magnet Recycling

- ✓ Difficult to extract from End-of-Life products
- ✓ Lost in shredded fractions of ferrous metals or low quality recovered as magnets are mixed with other alloys
- ✓ Lack of awareness of RE magnets recycling
- ✓ Potential environmental impacts of recycling ...



Hard Disk Drives / extracted magnets

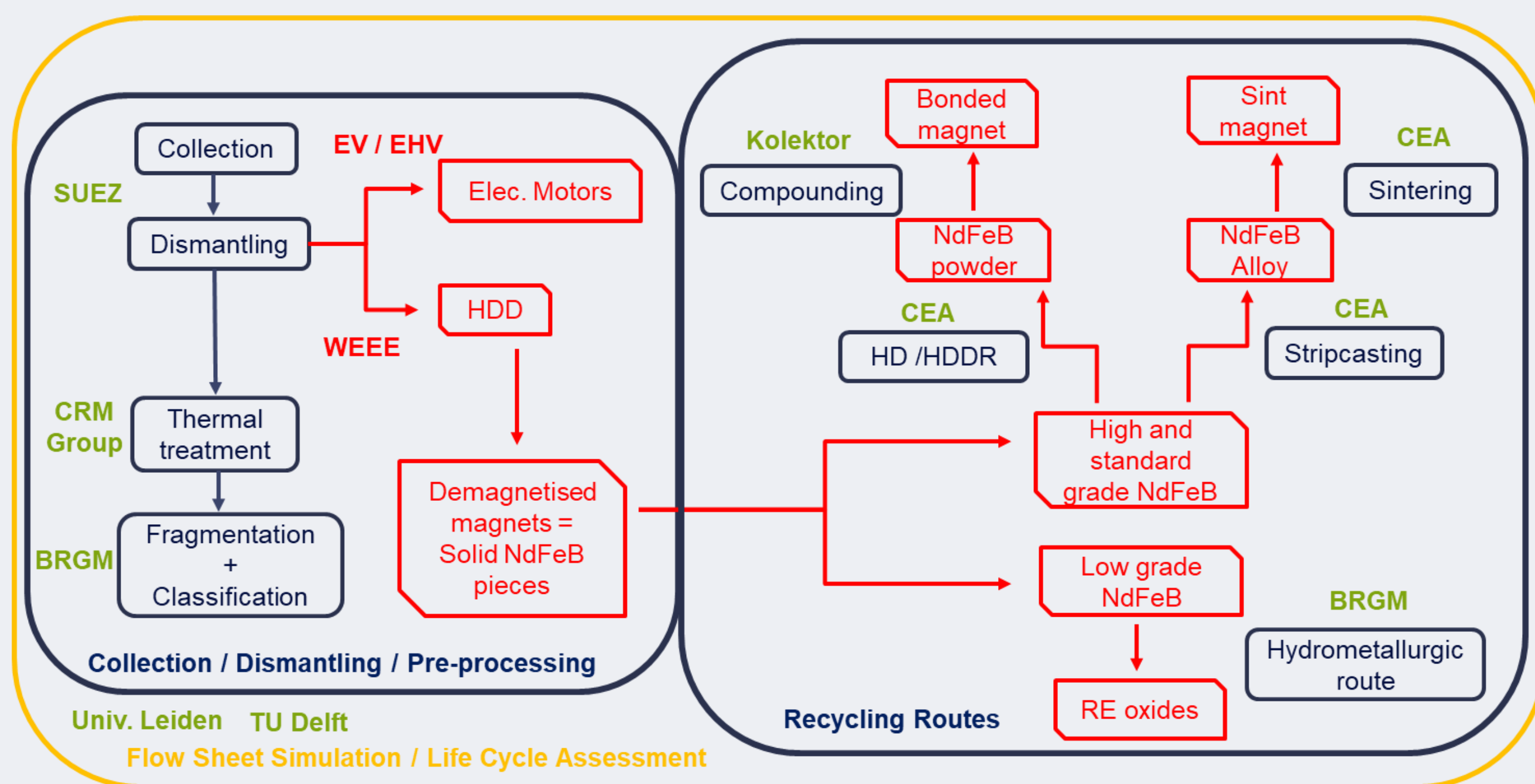


EV and E-scooters rotors with magnets

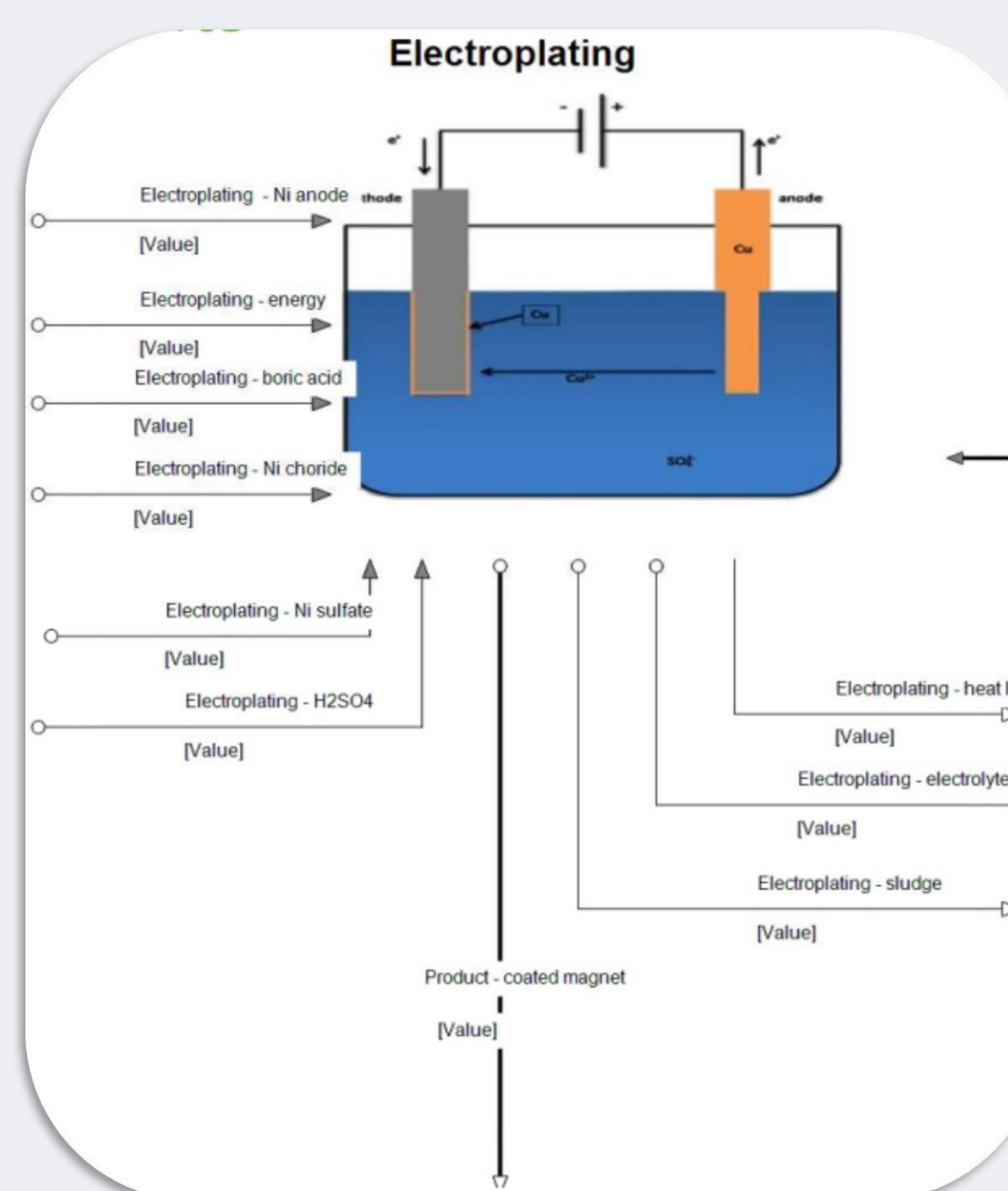


Rotor and stator from air-cooling compressor

Our solution in VALOMAG project



Legend: Partner involved (green), Materials (red), Process step (grey)



AB Welcome to the Activity Browser !

The **Activity Browser** is an open source graphical user interface designed to increase the productivity when working with the **Brightway2** advanced life cycle assessment framework.

Key features:

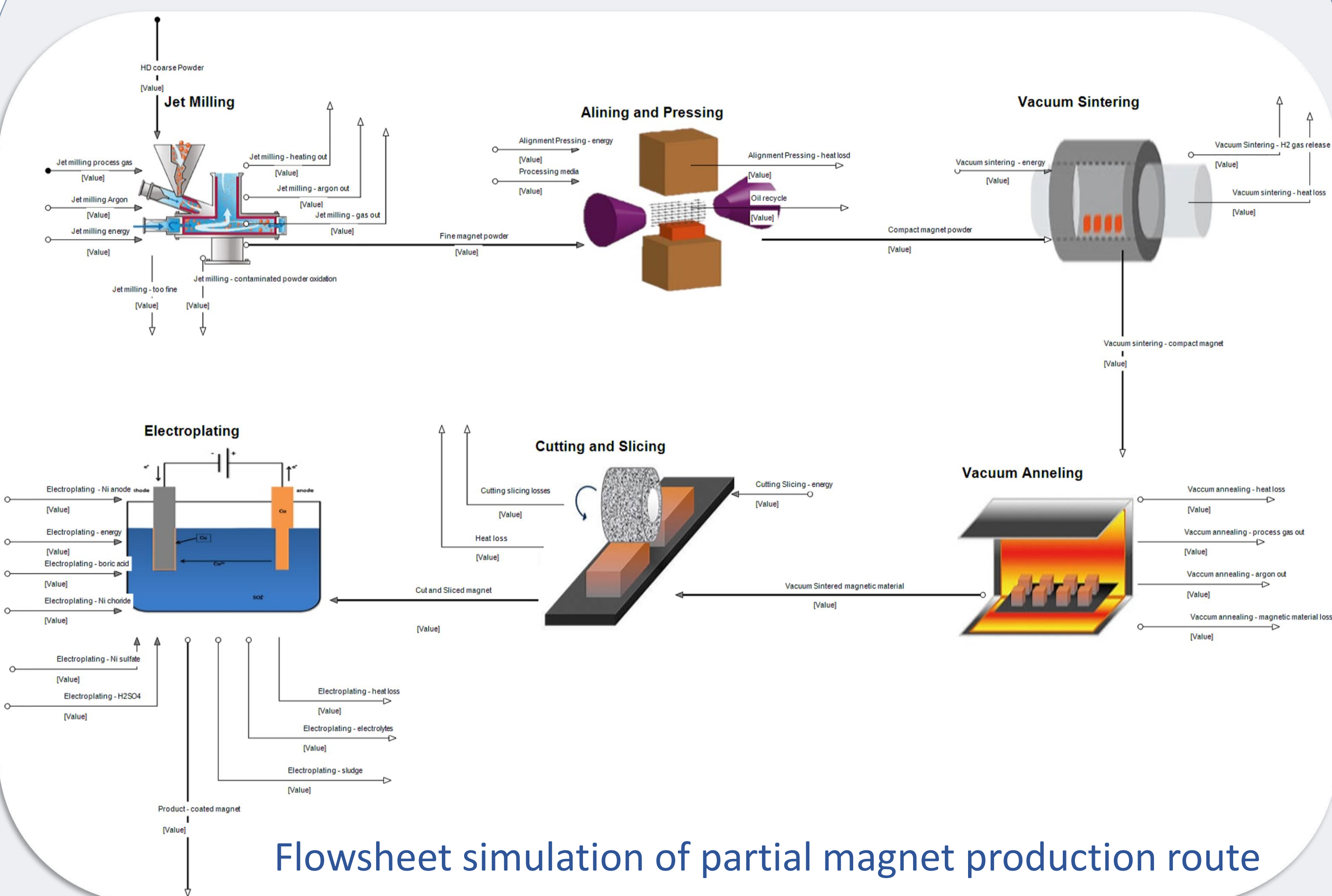
- Manage brightway2 projects, databases and activities (increasing your productivity with brightway)
- Calculate fast LCA results (use "calculation setups" to calculate LCA results for several reference flow and impact categories at once)
- Easily plot and export your LCA results (contribution analyses, Monte Carlo simulations)
- Visualize your results in Sankey diagrams or explore your database with the Graph Explorer

Examples:

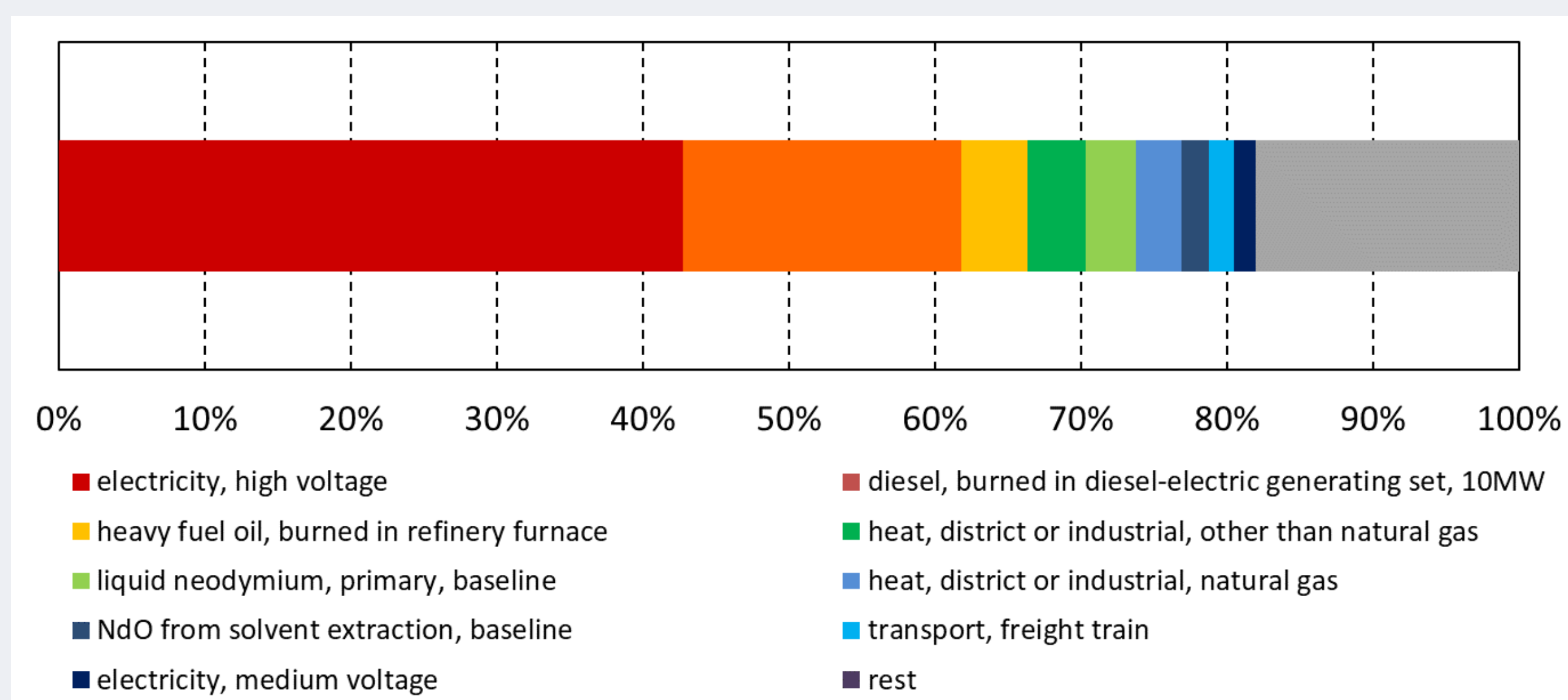
- LCA results overview
- Monte Carlo simulation
- Sankey diagrams

Combination of flowsheet simulation and life cycle assessment

LCA results of simulated recycling technology

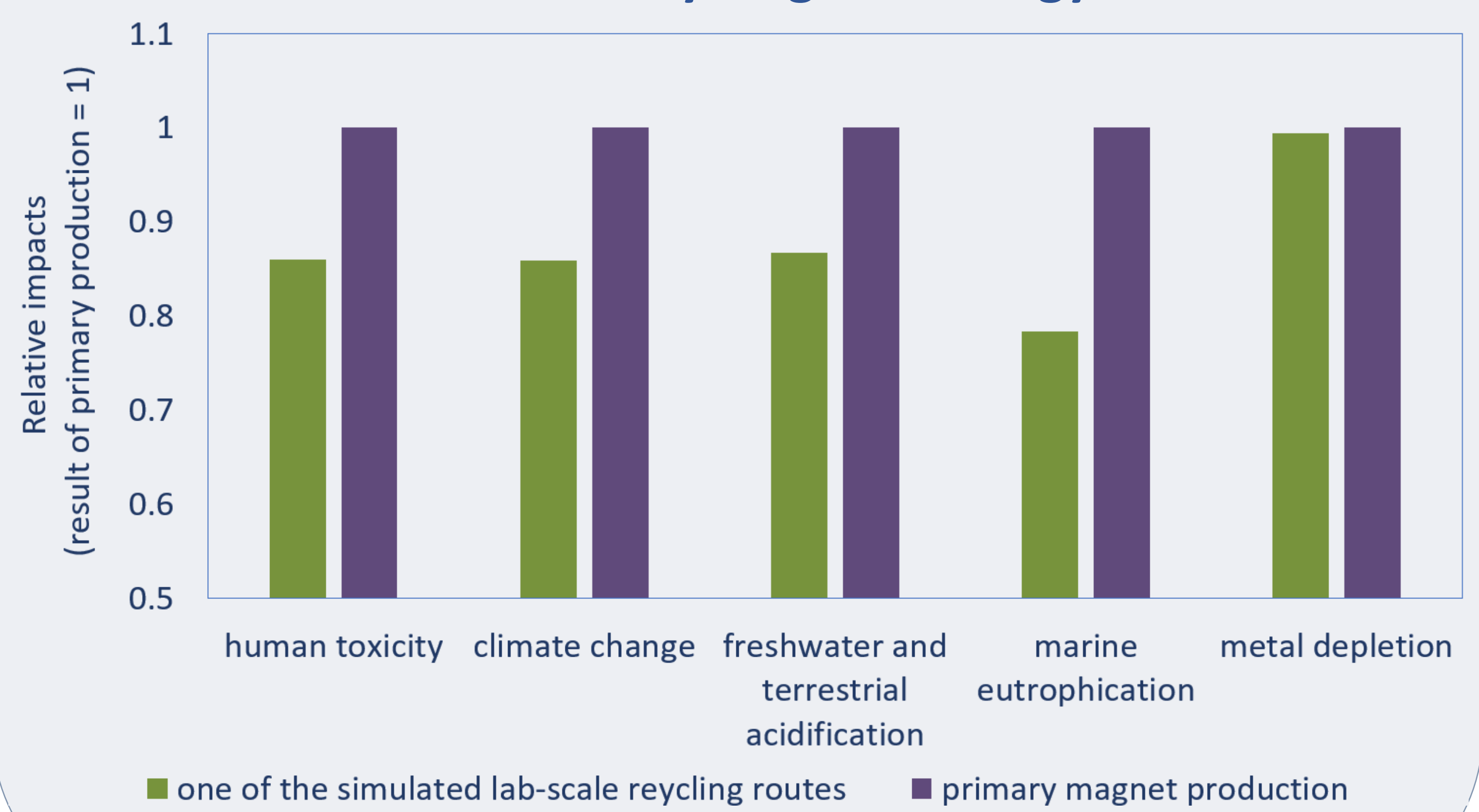


Flowsheet simulation of partial magnet production route



Climate change contribution analysis (one of the recycling routes in VALOMAG)

Relative environmental impacts of simulated recycling technology



■ one of the simulated lab-scale recycling routes ■ primary magnet production

Recommendations

RE products call for more attention to "design for recycling".

Recycling helps strengthen the RE supply chain resilience.

Combining LCA with other methods offers more potential to impact technology development.

