

FIC Fighters

Circular Solutions for Phosphogypsum Stack Regeneration



Funded by
the European Union



Circular
Cities & Regions
Initiative

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Environmental and economic benefits



- **Waste reduction and resource recovery:** Treatment of 700 t/PG year and up to 1,800 t/year of wastes from aluminium industry; production of Na_2SO_4 and $\text{Al}(\text{OH})_3$, recovery of P and REE
- **CO₂ capture:** Katoite carbonation → absorption of 90-179 t/year of CO₂ – rich industry gases
- **Sustainable raw material production:** Belitic cements, reduced Clinker factor, CRMs, PCC, $(\text{NH}_4)_2\text{SO}_4$

Societal and industry impacts



- **Creation of new circular business models**
 - + Four industrial users will validate the Na_2SO_4 produced: two detergent manufacturing companies using ~20,000 tonnes/year; a paper mill using ~400 tonnes/year in the “kraft” process; a cement producer interested in novel hybrid cements
 - + Use of acid mining brines in the process, replacing common acids
 - + Recovery of REE and P (CRMs)
- **Enhancing local engagement and citizen participation:** Fostering trust and support
- **Supporting multiple industries:** Paper, cement, batteries, fertilisers, detergents

European-wide replicability



- **Addressing phosphogypsum stacks across Europe:** 5-8,000 tonnes of PG from 6 different European stacks will be regenerated per year
- **PG Exploitation Portal:** online free portal including >20 PG deposits for which the project results could be replicated, offering a geolocation of the stacks, informing about PG quantity, characterisation, environmental problems, radioactivity levels, CRM content, owners, linked companies
- **Development of Community of Practice:** LinkedIn group for knowledge transfer between PG professionals

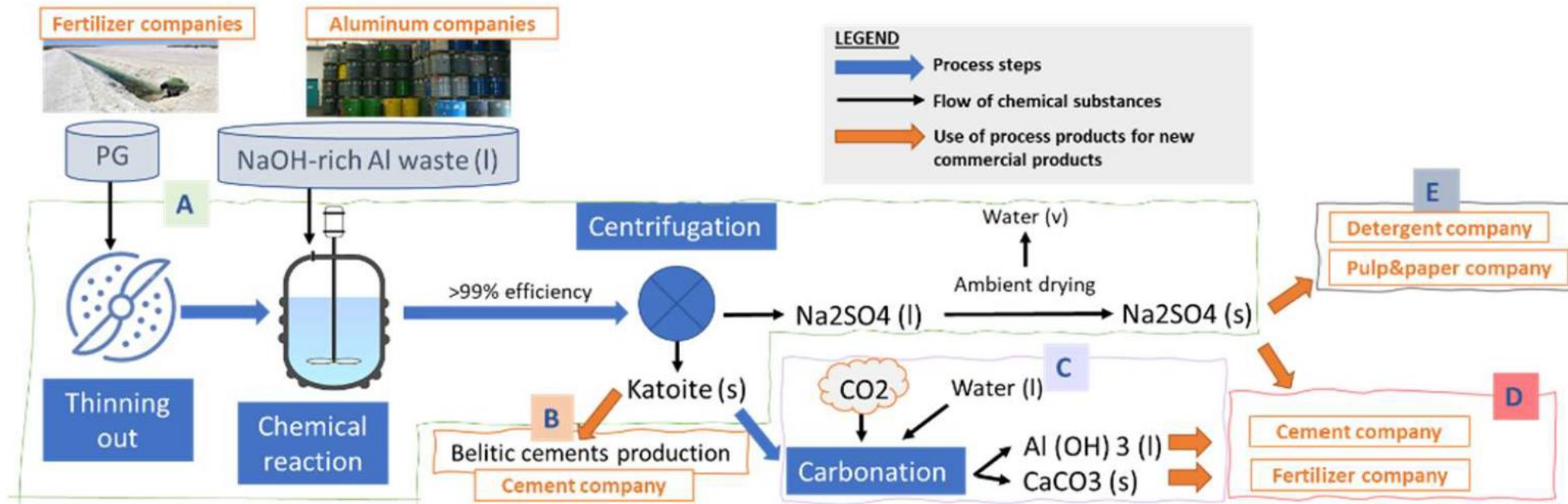
Project overview

- 48-month duration (Jun 24-May 28)
- 26 partners
- ~12 M€, EU contribution ~10 M€
- 6 case studies across Europe



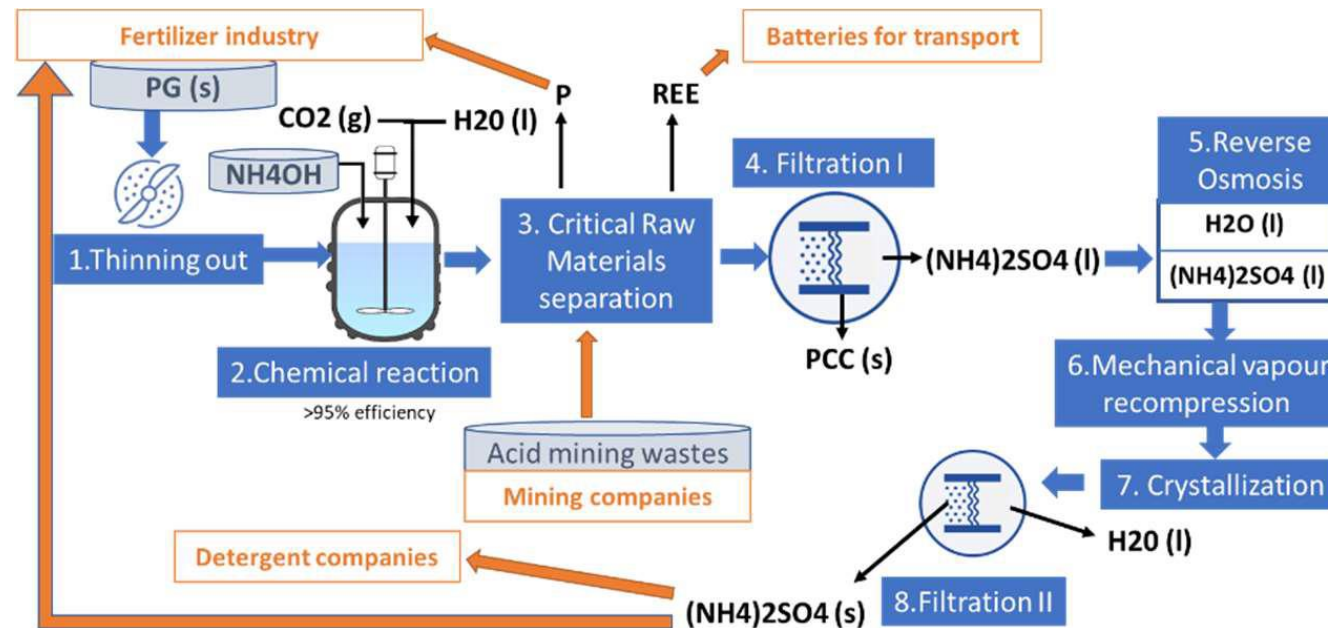
Technology development

- Two chemical routes: "NAOH route" and "AMONI route"
- "Sustainable-by-Design" principles
- Scaling up to TRL6-7



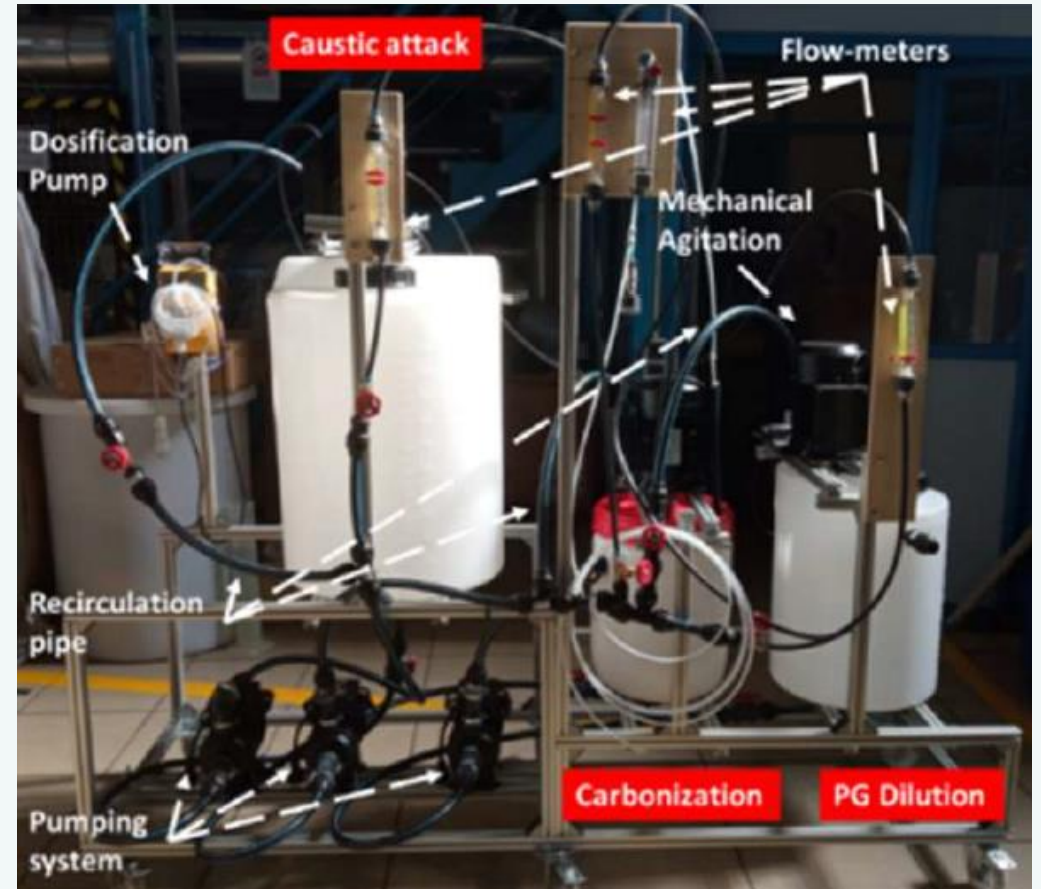
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Mobile pilot plant

- Scaling up to **TRL 6-7**
- Based on optimised results and digital twin
- Demonstrating sustainable production of various raw materials



Stakeholder engagement

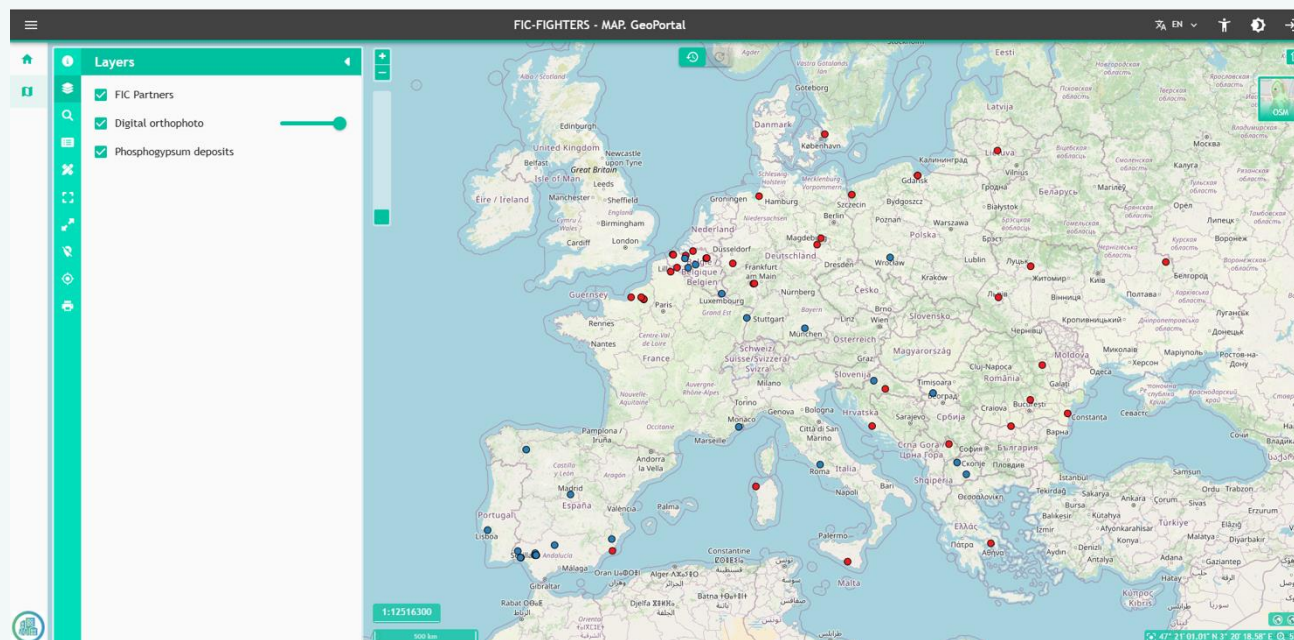
- **PG Forum** for local discussions
- **Local workshops** at 6 case studies sites
- Addressing socio-economic, environmental, and regulatory aspects



Barreiro
Kutina
Turnu Măgurele
Prahovo
Veles
Cartagena

PG Exploitation Portal for Europe - *PEPE*

- Mapping of the PG stacks in Europe for EU-wide replication
- It will collect **data** for whole **Europe** on macro level using existing **bibliography, national registers, contacts, available satellite imagery and other cartographic resources.**



Our contribution to circular economy

1. Develop innovative, sustainable technologies (TRL6-7) for waste valorisation
2. Engage diverse stakeholders in 6 European case studies
3. Create a mobile pilot plant for raw material production
4. Establish a PG forum for inclusive local discussions
5. Launch the first PG Exploitation Portal for EU-wide replication
6. Build a Community of Practice for knowledge sharing

Join us, transforming our economic and environmental future!



Thank you for your attention!



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