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Raw Materials from Geothermal Fluids

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The energy and digital transitions require a large amount of mineral and raw materials which are considered 'critical' worldwide. Interestingly, there is an untapped resource in geothermal fluids, some of which contain significant amounts of CRMs.

The EU-funded CRM-geothermal project therefore proposes to combine the extraction of raw materials and geothermal heat, a renewable energy resource from the ground which is available 24 hours per day. The combined extraction of heat and raw materials from geothermal reservoirs offers a series of advantages like minimising the environmental impact, maximising returns on investment, avoiding additional land use, and enabling domestic supplies of CRMs.

Although CRMs are known to occur in geothermal fluids, there are still many uncertainties concerning their occurrence in different geological settings and the sustainability of their extraction. The actual extraction process is still a challenge requiring technology development. The project therefore aims to:

- Establish an overview of the potential for raw materials in geothermal fluids for a large range of CRMs.
- Determine the source of selected CRMs, their mobility, and potential for sustained extraction from geothermal brines.
- Develop and optimise innovative extraction technologies for selected CRMs from geothermal brines that can form a business case.
- Assess the environmental-social-economic viability, create transparent and traceable value chains, and foster ethical sourcing of CRMs.
- Demonstrate at a pilot site the extraction technology and system's sustainability for at least one CRM at the scale of a mini-plant.

The combined extraction technology will help developing a more resilient and ethical CRM supply chain. The proposed solution could bridge the gap between societal resistance to domestic raw materials extraction and the increasing demand for raw materials. Finally, the combined extraction of minerals and heat will also increase the number of viable geothermal projects, fostering the green transition and diversifying the worldwide energy portfolio.