CRM-geothermal Newsletter #2

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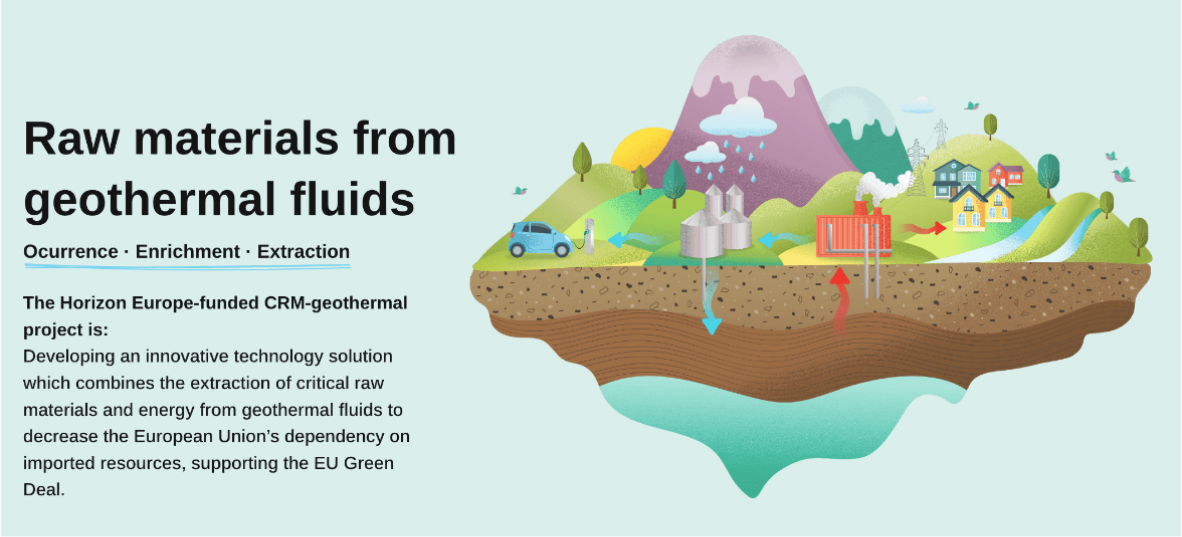

Where are we now?

We invite you to discover our latest newsletter which features the following news:

- Status summary by the project coordinators
- Latest milestones achieved
- New scientific publications
- Student stories
- Webinar recordings
- Open call for stakeholders
- Winners of our video contest
- Where to meet us next

As our project coordinators Simona Regenspurg and Katrin Kieling from the German Research Centre for Geosciences (GFZ) write:

"The CRM-geothermal project is heading into a busy autumn, and many activities illustrate the progress of the project and the interesting times that lie ahead.

The project team had an informative and engaging General Assembly in Munich, where we gathered for updates on project activities and results. Major discussion points were: Which Critical Raw Materials (CRM) other than lithium do we actually encounter in economically interesting quantities? Which extraction technologies are suitable for upscaling? Can we combine certain technologies for optimal results? How does extraction of CRMs from geothermal fluids compare in economic, social, and environmental assessments to conventional mining? In the next phase, project partners are going to be busy answering these questions.

Project partner INLECOM has undertaken a pioneering effort to uncover the intricate relationships between elemental features and lithium concentrations through the application of advanced Machine Learning methodologies. At the heart of this endeavour lies the development of the CRM AI Tool—a sophisticated platform designed to provide accurate estimations of lithium concentrations while ensuring interpretability in geothermal data analysis. Transparency in the decision-making process of lithium concentration estimation is provided by incorporating Explainable AI techniques, including Shapley values. The Beta version of the AI-tool is currently undergoing testing.

Lithium extraction technologies are adapted in the project, like adsorption or ion exchange. However, project partners are also paving the way towards new extraction approaches using biotechnology. Researchers from Dr. Brill+Partner GmbH have investigated biosorption technologies, while the University of Neuchâtel investigates bioprecipitation by combining two microbial metabolisms: fungal oxalic acid production and bacterial degradation of oxalic acid/oxalate. If that triggers your curiosity, please find out more information in their joint Milestone report.

To ensure that social aspects are satisfyingly considered when setting up combined extraction projects for CRMs and geothermal energy from geothermal fluids, mining consultants from Levin Sources have teamed up with local developers Geothermal Engineering Ltd (GEL) and Cornish Lithium and conducted a consultation workshop in Redruth, western Cornwall. The aim was to collect input for developing guidelines for successful two-way communication between a developer and the local community. Workshop participants were asked how they want to be consulted, the best way for them to be informed, and how to voice their concerns and opinions.

Project partners from the University of Iceland, Izmir Institute of Technology, Constructor University and GFZ have conducted three field trips to Iceland, Turkey, and Rwanda with different aims: In Iceland, the focus was on sampling fluids for REE + Y analysis. Additionally, scale samples from a power plant in Reykjanes were provided by HS Orka, a local geothermal operator, to perform leaching experiments on these scales and investigate whether this waste product can be turned into a source for CRM. The field trip to Rwanda was a follow up to fieldtrips in Kenya, Tanzania, and Malawi to explore the CRM content in wells and fluids along the East African Rift. Here, brine, rock, scale, and gas samples are collected.

We are now entering into the hot phase of the project: in the next year, we expect deliverables on all extraction technologies and concerning the basic geological understanding. Please join us further on our interesting journey!"