GeoTHERM
expo & congress

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Ortenauhalle Kongress 1
Tiefe Geothermie

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Ortenauhalle Congress 1
Deep geothermal energy

Main outcomes of the Prefeasibility Study of the Ageli project aiming to produce lithium carbonate battery grade with low environmental impacts from deep geothermal brine in the French Upper Rhine Graben

Wichtigste Ergebnisse der Vormachbarkeitsstudie für das Ageli-Projekt zur Gewinnung von Lithiumkarbonat in Batteriequalität mit geringen Umweltauswirkungen aus tiefer geothermischer Sole im französischen Oberrheingraben

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Électricité de Strasbourg (ÉS), and Eramet have signed a cooperation agreement on January the 23rd 2023 and joined their knowhow and expertise to develop the Ageli (Alsace Géothermie Lithium) project, aiming to produce lithium carbonate battery grade, with low environmental impacts from deep geothermal brine in the French Upper Rhine Graben. ÉS is a leading regional company in Alsace, active in renewable energy production, distribution, electricity and gas supply. ÉS is currently operating the two geothermal plants in the French Upper Rhine Graben: Soultz-sous-Forêts and Rittershoffen. Eramet is a global mining and metallurgy group developing the critical metals for the energy transition. ERAMET has developed a Direct Lithium Extraction (DLE) process and inaugurated in July 2024 a 24,000 t/year LCE plant at Centenario in Argentina.

The Ageli's Prefeasibility Study (PFS) was completed in 2024. From a subsurface perspective, the PFS allowed the estimation and validation by a Competent Person of the lithium resource and the elaboration of a Field Development Plan. The numerical simulations carried out by reference service companies and reservoir engineers, based on a complete subsurface dataset, including 3D seismic survey, core measurements, single well tests and multiple wells circulation tests, lead to the definition of the best well patterns to allow significant brine production while minimizing the lithium depletion at production wells. The calculations showed that a sustainable lithium production of more than 10 000 t LCE/year can be achieved in a first phase.

The Ageli's PFS surface studies comprised in situ pilot testing, laboratory testing and engineering studies. A three-columns pilot unit was installed at the Rittershoffen geothermal plant and was operating during 8 months under representative industrial conditions (pressure, temperature). This pilot testing allowed the determination of the optimal lithium extraction setting using the sorbent patented by Eramet. Laboratory tests were also performed to confirm the flow sheet after the lithium extraction (conversion of the lithium chloride into lithium carbonate battery grade). And finally, engineering studies developed by a reference service company designed the process and infrastructures of the lithium extraction and purification. Heat and power generation associated with the geothermal energy were also designed. Special attention was paid on a synergy between geothermal energy production and the lithium extraction and conversion process.

The Ageli's PFS also included environmental assessment and permitting activities. Environmental assessment comprised fauna and flora investigation, as well as carbon footprint (Life Cycle Analysis) and water consumption estimation based on the mass and energy flow balances developed in the engineering studies. Drilling Authorizations are under preparation and lands were secured. Finally, a robust business plan was developed in the PFS, based on subsurface and surface engineering results and environmental activities. This business plan includes sensibility analyses, and some optimizations were highlighted for the Detailed Feasibility Study (DFS).

The next phase of the project is starting early 2025 and consists in drilling and testing new wells to validate the resource production pattern as well as building and operating a demonstration plant and training centre to adjust field scale production and validate assumptions of the DLE process and purification steps. End of this phase is expected in 2026. Start of the execution of the complete geothermal-lithium Ageli project is expected from 2027 and a commercial production of Li2CO3 will be achieved by 2030.