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Geothermal Emission Gas Control (GECO) at the German Site, Bochum

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The goal of this GECO project is to advance greatly our ability to provide cleaner, and cost-effective non-carbon emitting geothermal energy across Europe and the World. The core of this project is the application of an innovative technology, recently developed and proved successful at the pilot plant scale in Iceland that can limit the production of emissions from geothermal plants by condensing and re-injecting gases or turning the emissions into commercial products. To both increase public acceptance and to generalize this approach it will be applied by GECO in four distinct geothermal systems in four different European countries: 1) a high temperature basaltic reservoir in Iceland, 2) a high temperature gneiss reservoir in Italy, 3) a high temperature volcano-clastic reservoir in Turkey, and 4) a low temperature reservoir in Germany. Our approach is to capture and inject the soluble gases in the exhaust stream as dissolved aqueous phase. This low pH provokes the dissolution of subsurface rocks, both increasing reservoir permeability and the fixation of the dissolved gases as stable mineral phases. Not only does this approach lead to the long-term environmentally friendly storage of waste gases, an economic analysis shows that it lowers considerably the cost of cleaning geothermal gas compared to standard industry solutions. A detailed and consistent monitoring program, geochemical analysis, and comprehensive modelling will allow us to characterize the reactivity and consequences of fluid flow in our geologically diverse field sites letting us create new and more accurate modelling tools to predict the reactions that occur in the subsurface in response to induced fluid flow. This tool should prove invaluable to identify and develop enhanced geothermal systems in any number of rock formations, fluid compositions and temperature conditions.
Preliminary results will be presented for the Bochum site within GECO with respect to the development of novel monitoring systems to be deployed as well as on capturing the logistics involved on-site, understanding access restrictions, power and services access, health and safety issues, points of deployment, environmental requirements, methods of sampling, and fluid characteristics.