

GeoSmart: Towards Flexible and Efficient Geothermal Systems

by GeoSmart Consortium



The European Strategic Energy Technology Plan¹, commonly referred to as the SET plan, focusses on fostering the development and implementation of low-carbon technologies. Geothermal, energy harvested from the earth's core, is a renewable technology with capacity to offer a low-carbon, clean and non-intermittent energy resource. Despite the opportunities, exploitation of geothermal power has traditionally lagged behind as opposed to wind and solar technologies. Geothermal is currently engineered as an "always on" baseload supply, due to the limited flexibility to throttle the well without scaling and liner fatigue problems, and is engineered for maximal efficiency at this output level. Project GeoSmart (<https://www.geosmartproject.eu/>), funded by European Commission's H2020 program, aims to address the strategic flexibility required from European geothermal installations, as they become significant energy sources over the next 20-30 years, replacing decommissioned fossil fuel plants.

GeoSmart Excellence and Impacts

GeoSmart aims to optimise and demonstrate innovations to improve the flexibility and efficiency of geothermal heat and power systems, by developing a suite of equipment and tools including:

- Energy storage and power block management innovations to provide daily flexibility
- Integration of more flexible Organic Rankine Cycle (ORC) systems that can cope with

- variations in needs in the electricity markets
- Combined Heat and Power (CHP) supplier to extract more heat from the post-generator ("waste" heat) brine outflows when required for increased heating supply during colder weather

The technology will be demonstrated in working geothermal plants of two variants, thus meeting the different flexibility needs of low and high enthalpy CHP provision. As such, GeoSmart technology concept will allow the geothermal plant to be operated in flexible mode to produce power and heat in cost competitive way. The project kicked-off in June 2019 and will run over a period of 48 months.

GeoSmart Consortium

The consortium consists of 19 members including the research institutes, SMEs and plant operators including TWI (UK), VITO (Belgium), Zorlu Energy (Turkey), CEA (France), Atlas Copco (Belgium), EGEN (Belgium), Fraunhofer (Germany), Spike Renewables (Italy), ON power (Iceland), University of Iceland (Iceland), Middle East Technical University (Turkey), BERTIN (France), Gerosion (Iceland), Kadir Has University (Turkey), Technovative solutions (UK), Flowphys (UK), PVALD (Iceland), COSVIG (Italy) and Innovation Centre Iceland (Iceland).

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¹ <https://ec.europa.eu/energy/en/topics/technology-and-innovation/strategic-energy-technology-plan>