

Generating and Storing Geothermal Heat throughout the Year



The DeepStor Research Infrastructure

Goal

DeepStor serves to develop high-temperature aquifer storage in the deep subsurface. The demonstrator plant will be used to validate technical feasibility of this new storage technology. DeepStor allows for deep reservoir loading and unloading experiments as well as for the investigation of the associated coupled thermal, hydraulic, chemical, and mechanical processes in the thermal water cycle. At DeepStor, major scientific issues are studied in detail.

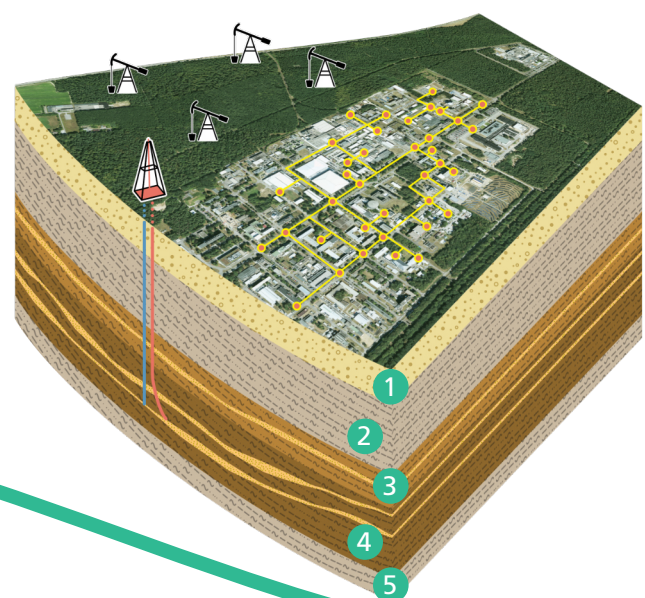
In addition to heat storage, innovative drilling technologies, two-phase flows, water-rock interactions, use of nanotracers, and induced seismicity are investigated within an accompanying comprehensive scientific program. DeepStor is part of an integrated concept for CO₂-neutral heat supply based on geothermal technologies on KIT's Campus North. Once the feasibility has been demonstrated with DeepStor stage one, we plan to integrate the HT-ATES for research purposes into the regular operation of the heat supply with the existing district heating network on the campus.

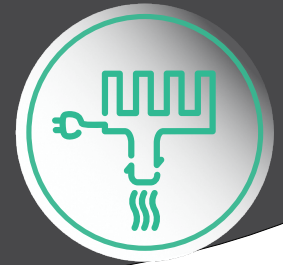
Together with other production, conversion, and storage technologies, coupling of an aquifer storage system with geothermal heat production may well support the regional heat transition.

Data and Facts

- 2 boreholes down to about 1300 m depth
- Tests for loading and unloading the deep reservoir
- Re-injection temperature > 120°C
- Use of former oilfields for the energy transition

- 1 Quarternary- and Pliocene
- 2 Landau-/Bruchsal-Formation
- 3 Niederrödern-Formation
- 4 Froidefontaine-Formation
- 5 Pechelbronn-Formation





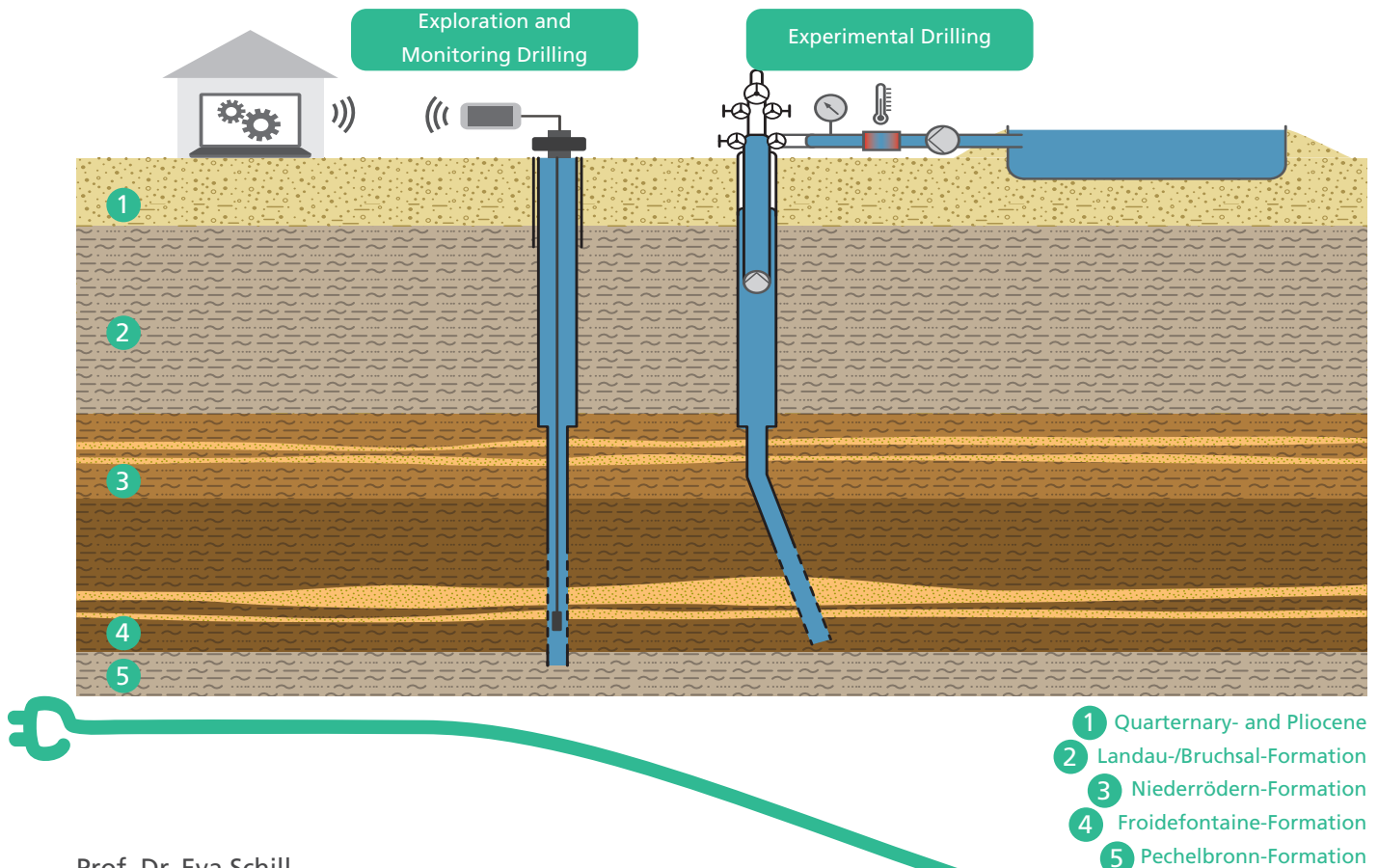
The DeepStor Research Infrastructure

DeepStor: Exploration and Long-term Observation

DeepStor consists of two boreholes and a basin. The exploration borehole (DeepStor-1) allows for investigations in three calcareous fine sandstone horizons between 800 and 1300 m depth, which are eligible as storage horizons. The planned test borehole (DeepStor-2) will be used for long-term observation as well as for extraction and re-injection. Experiments with specifically heated water will be carried out to using a heat exchanger and a mobile heating station.

Participation of Citizens

GECKO is an inter- and transdisciplinary project of KIT and Öko-Institut e.V. A co-design process with citizens and other stakeholders produced a concept for the use of geothermal energy for climate-neutral heat supply on KIT's Campus North. The project results will now be incorporated in the DeepStor project. Citizens will be invited to collect data and, in this way, will be given direct insight in research.



Prof. Dr. Eva Schill
Institute for Nuclear Waste Disposal

Hermann-von-Helmholtz-Platz 1
76344 Eggenstein-Leopoldshafen

eva.schill@kit.edu