

Post-Mining-Exploitation

Analysis of existing mining infrastructures and their potentials for the utilization of heating and cooling purposes

Our team determines heating and cooling potentials and evaluates underground storage concepts for the use and integration of mine water as well as potentials for the coupling of heating and cooling networks. In addition to digitizing mine maps, we create three-dimensional mine models, implement well path and casing designs and conceptualize the connection of mine layouts to above-ground technologies, such as solar thermal and heat pump systems.

**>500
TWh/a**

possible storage potential in
former hard coal mines
in Germany

The fundamental transformation of Germany's energy supply systems by 2045 represents an immense technological and social challenge. The German government is focusing on the increased use of renewable energies and the efficient use of energy. The transition to a sustainable energy supply requires the provision of large electrical as well as thermal storage capacities. The potential of volatile renewable energy sources can only be fully exploited through flexible management of the electricity and heat supply networks and a differentiated range of different storage technologies. The development of innovative storage technologies is a central task for the further expansion of renewable energies in Germany.

Our Team is concerned with the analysis of existing mining infrastructures and their potential utilization for heating and cooling purposes. For this purpose, mine layouts are digitized and evaluated, and three-dimensional mine models are created. On this basis, heat and cold storage potentials can be determined, well paths engineered and the connection to aboveground consumers and generation systems designed. We carry out potential assessments of mining infrastructures and develop concepts for their systemic integration as underground storage facilities in heating and cooling networks and the integration of mine water utilization schemes.

One focus of our work was the expansion and operation of a mine thermal energy storage pilot plant on the Fraunhofer IEG site in Bochum. This innovative underground heat storage system was successfully implemented for the first time in a former small colliery during the "HEATSTORE" project and tested in conjunction with a solar thermal system. In the future, the mine thermal energy storage is to be linked with a high-temperature heat pump to enable the integration into existing district heating infrastructures.

Our Competences

- **Analysis of existing mining infrastructures**
- **Utilization of mine water for heating and cooling purposes (incl. storage)**
- **Creation of underground storage concepts**
- **Digitization of mine layouts and creation of 3D mine models**



**Post-Mining-Exploitation –
Turning industrial burdens
into eternal benefits."**



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