

The development of renewable energies and their increasingly integration into power supply of Germany is currently a primary task of the country's energy policy. However the problem of storage itself has not been fully solved yet. Besides new energy storage technologies and conventional pump storage facilities, the underground pump storage is another possibility for energy storage.

A 3D cutaway diagram illustrating a geothermal power plant system. The diagram shows the following components and layers:

- Surface Level:**
 - Windenergie:** Four wind turbines on a hill.
 - Halde:** A large pile of material, likely waste or ash.
 - Solarenergie:** A field of solar panels.
 - Biogasanlage:** A large cylindrical biogas plant.
 - Speicherbecken:** A large blue reservoir for water or steam.
 - Umspannwerk:** A substation with power lines.
 - Luft-/Wärmeverwertung:** A unit for air/heat recovery.
- Subsurface Layers:**
 - Steigrohr:** Vertical pipes (risers) for fluid circulation.
 - Förderpumpe:** A pump at the bottom of the riser to draw fluid up.
 - Transformator:** A transformer unit for power conversion.
 - Turbine:** A turbine driven by the fluid to generate electricity.
 - Zulaufleitungen:** Inlet pipes for fluid supply.
 - Wärmetauscher:** A heat exchanger unit.
- Depth Scale:**
 - 50 Meter Halde:** A vertical scale marker indicating the height of the waste pile.
 - 1000 Meter Tiefe:** A vertical scale marker indicating the depth of the subsurface layers.

Figure 1: Scheme of an underground pump storage

The project is promoted by the state of North Rhine-Westphalia und the European Union in context of the “ZIEL2”-Program. The supervising agency is the District Council of Arnsberg und the project executing organization is the “Projekträger ETN” in Jülich. The Project is aimed to be split into two phases. The first phase of 18 months will end in April 2018 and is meant to be a feasibility study of such facilities inside the coal mines of the Ruhr area.

Contact:

Project coordination

Prof. Dr.-Ing. André Niemann

Institute of Hydraulic Engineering and Water Resources Management

University of Duisburg-Essen

Universitätsstrasse 15

45 141 Essen

Tel. (+49)201/183-2225

Fax (+49)201/183-4734

e-mail: andre.niemann@uni-due.de

<http://www.uni-due.de/wasserbau>

Partners:

 <i>Offen im Denken</i>	
	
	

University of Duisburg-Essen

- Institute of Hydraulic Engineering and Water Resources Management
- Department of Geotechnics
- Department of Geology
- Institute of Electrical Power Systems
- Department of Aquatic Ecology

University of Bochum

- LEE (Chair of Energy Systems and Energy Economics)
- IBE (Institute of mining and energy law)
- Department of Hydrogeology

RISP (Rhein-Ruhr-Institut für Sozialforschung und Politikberatung e.V.)

RAG AG

DMT GmbH & Co. KG