

ENGINE- *Geothermal lighthouse projects in Europe*

Information gathered during the ENGINE co-ordination action (ENhanced Geothermal Innovative Network for Europe)

<http://engine.brgm.fr/>

Last update April 2008

Project Name: GeneSys

Project Leader [Companies]: **Federal Institute for Geosciences and Natural Resources (BGR) Hannover; Leibniz Institute for Applied Geosciences (GGA-Institut) Hannover**

Contact Person: Rüdiger Schellschmidt, Ralf Junker

Web-site:

http://www.bgr.bund.de/cIn_029/nn_468082/DE/Themen/Energie/Projekte/Geothermie/GeneSys__Vorstudie.html__nnn=true

Country: Germany

Location: Horstberg / Hannover

Types of resource: EGS

Main on-site operators: Jens Orzol (GGA Institute), Ralf Junker (GGA Institute), Reiner Jatho BGR), Torsten Tischner (BGR)

Number of wells: one

Type of wells: injection and production in one well

Well configuration: single well

Distance between well at Depth: distance between production and injection-horizon ~120 m

Temperature at Total Depth [Single well]: ~ 150 °C

Combination with other energy sources [Biomass, Biogas plants etc.]: no

Geothermal co-operation [Heat, Electricity etc.]: Heat only

Geothermal potential [MW]: 2 MW

Expected Installed capacity [MW/time at Date]: 16 GWh/a at 2009

Expected Running capacity [MW/time at Date]: 10 GWh/a at 2009

Short description of *Exploration History* (Limit this section; no more than 200 words):

Horstberg test site:

Borehole Horstberg Z1 was drilled as gas exploration well and was transferred from the owner (gas company) to BGR in 2003. 3D seismic surveys were performed before drilling the well. Standard well logging data from the well are existing.

Hannover test site:

Three reflection seismic profiles were performed between 2001 and 2006. In addition a seismic profile of the oil industry was available. The formation temperature was estimated from temperature data of oil wells in the vicinity of Hannover. A geologic pre-profile was determined by using geological data of these wells and of the seismic profiles.

Funds for the projects at both sites were raised from the BMU (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) and the BMWi (Federal Ministry of Economics and Technology).

***Reservoir Characteristics* (Limit this section; no more than 200 words):**

The reservoir is the Bunter (Middle Triassic) consisting mainly of clay and thin sandstone layers of moderate to low permeability. The depth is around 3800 m at both sites (Hannover and Horstberg). The sandstone layers have porosities below 10 % and permeabilities between 0.1 and 10 mD. Their thickness varies between a few meters and 20 m. The stress field is inhomogeneous in regional scale due to halotectonic conditions. The temperature is about 150 °C at both sites (Hannover and Horstberg).

Exploitation *(Limit this section; no more than 200 words):*

The objective of the GeneSys project is to show that an extraction of deep geothermal energy from tight sediments of the Northern German Basin in a geologically "normal" situation is possible. Large artificial fractures will be created by water-frac tests in order to connect sandstone layers imbedded in massive clay formations. Water will be circulated between the sandstone layers via the fracture. In this way the fracture will act as a heat exchanger for the extraction of geothermal energy. The geothermal energy will be used for heating of the GEOZENTRUM building complex.

This and other new concepts have been tested in the geothermal research borehole Horstberg Z1 at 3800 m depth and will be applied in the borehole at the Hannover test site to be drilled in winter 2007/2008.

On-going or future works planes *(Limit this section; no more than 200 words):*

Horstberg test site:

2007 – 2008: Long term circulation tests and additional experiments in the research well

Hannover test site:

2007/2008: drilling operations

2008: Massive water-frac tests and circulation experiments

2009: Installation of the heating system

ENGINE partners involved in the Project:

- Use list of partners (No.1–31) from ENGINE Web-site <http://engine.brgm.fr/partners.asp>
- GFZ, Germany

Main References (no more than 5 references):

ORZOL, J., JUNG, R., JATHO, R., TISCHNER, T. & KEHRER, P. (2004): The GeneSys Project – Development of concepts for the extraction of heat from tight sedimentary rocks. - Z. für Angew. Geol., 2/2004 (50. Jg.), 17-23.



Figure 1 : Horstberg test site. The picture shows the setup of a hydraulic injection test using high pressure pumps.



Figure 2 : Hannover test site (red area) next to the GEOZENTRUM Hannover.