

## Industrial Projects

### Minewater project (Heerlen, The Netherlands)



The Heerlen mine is a large complex of four interconnected mines belonging to the Oranje Nassau colliery, extending over more than 50 km<sup>2</sup> and encompassing six main depth levels of stonedrifts. After closure of the last mines in 1974, the mines have been flooded nearly completely. The mine water is in thermic equilibrium with its host rock, thus having a different temperature according to the depth of the colliery. Warm (deep) and cold (shallower) water are used today to heat and cool buildings. In 2005 VITO conducted a first feasibility study for the mine water concept. In 2006 the “Minewater Project” started under the Interreg IIIB NEW Programme. It demonstrates how the geothermal energy stored by mine water can be used as a safe and ecological way to heat buildings. In Heerlen, a pilot was developed that aimed: to supply new, 'green' energy from old mines, to convert the old mining region into a pleasant environment to live in and to create new job opportunities, to find an environmental solution in place of an environmental problem; VITO was responsible to develop the mine water reservoir.

The aim of the follow-up contracts is to monitor the mine water system in Heerlen and to evaluate the long term behavior of the flooded underground working of the Oranje Nassau mines in the municipality of Heerlen (The Netherlands). Based on this information, the capacity of the former colliery as an energy source for the local heating and cooling network is progressively refined and the operation of the system is optimized.

### VENLO – Geothermal greenhouse heating

VITO evaluates and explores of the deep geology of the Venlo region (NL) for the development of a geothermal doublet for the heating of green houses. The study includes a geological workpackage, a seismic exploration campaign, modeling of the water and heat flow, design and implementation of a geothermal doublet.



### BALMATT – phase 1 – Green geothermal power, Mol (Belgium)

Design and development of a geothermal system for the production of electricity and heat in North Belgium. The target is a deep seated, regional aquifer with an expected formation temperature in the range of 130°C. Power production will make use of ORC or equivalent technology.

### Liaocheng – Geothermal district heating (China)



Evaluation and exploration of the deep geology of the Liaocheng region (China) for the development of a geothermal doublet for district heating.

Terra Energy is the leading partner in this project. VITO conducted a feasibility study for deep geothermal applications.