

The CENTRAL EUROPE project TRANSENERGY – Transboundary Geothermal Energy Resources of Slovenia, Austria, Hungary and Slovakia

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Introduction

Worldwide there is a growing need for sustainable energy – not only because of the negative climatic affects of the man-made emission of carbon-dioxide but also due to the restricted reserves of fossil combustible materials. A significant component of the energy mix of the future could be geothermal energy, a renewable energy which is stored as heat beneath the earth's surface (fig 1).

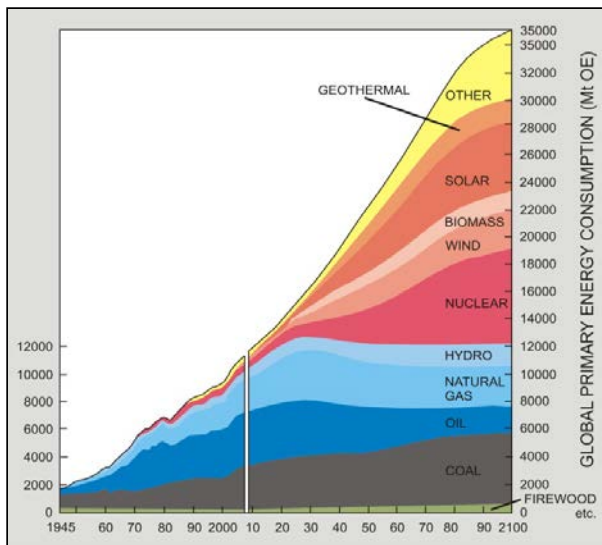


Figure 1 – Energy spectrum 1945 to 2100 after W. E. Schollnberger (2006)

In the Pannonian basin and its surrounding there are met good conditions for the production of geothermal energy due to the occurrence of deep aquifers and the elevated heat flow rate (Lenkey et al., 2002). But these natural resources are limited and a sophisticated water management is necessary to avoid overexploitation and conflicts among users. This is especially true to the national borders because the hydrothermal systems are strongly linked with favourable geological settings which don't end at the state boundaries. In this

region the international water management is a challenge.

The project TRANSENERGY – Transboundary Geothermal Energy Resources of Slovenia, Austria, Hungary and Slovakia (it is implemented through the CENTRAL EUROPE programme and co-financed by the ERDF) deals with transboundary thermal water management from the geosciences' point of few. Four national geological surveys are partners in TRANSENERGY project: MÁFI (Geological Institute of Hungary), GeoZS (Geological Survey of Slovenia), GBA (Geological Survey of Austria) and ŠGÚDŠ (State Geological Institute of Dionyz Stur, Slovakia). The project started in April 2010 and it will deliver its services in March 2013.

Project area and the challenge of thermal water management

The project area comprises the north-western part of the Pannonian basin and the adjacent Vienna and Styrian basin (red line in fig. 2). In this region Hungary, Slovakia, Austria and Slovenia border on each other. In this region famous ancient thermal springs and spas exist, for instance in Hévíz in Hungary and Baden in Lower Austria. Due to the favourable geological conditions the number of thermal water utilisations (district heating, bathing resorts etc.) is constantly expanding.

The thermal water aquifers consist of Tertiary sediments or thick Palaeozoic or Mesozoic carbonates. In the project area the thermal water occurrences can be roughly divided into two types (transitions are possible): Stagnant thermal aquifers with high mineralized water can be distinguished from thermal convection systems with relatively young and low mineralized water. In the Vienna basin, for instance, such waters are described by G. Wessely (1983). For both types of thermal waters specific problems related to the application and water management can be observed: The low mineralized circulating thermal waters normally don't reach temperatures much higher than 50°C. Furthermore, in most instances their natural discharge is already in use which implicates the risk of overexploitation in the case of an additional thermal water catchment. The stagnant thermal waters are more interesting for

energy production as they reach significant higher temperatures, but overexploitation is also here a problem, even if this risk is better manageable than in the mentioned convection systems. Moreover, due to the high dissolved content of the stagnant thermal waters there is the risk of environmental pollution. Therefore the reinjection of such waters is necessary – only small amounts used for balneological treatments are excluded from reinjection.



Figure 1 – Scheme of functionality operation.

The project's supporting tools

The project TRANSENERGY will deliver multilingual tools supporting a sustainable transboundary thermal water management. These tools comprise a profound geoscientific evaluation of the thermal water resources of the project area, in which particular attention is paid to the pilot areas (fig. 2). These tools are based on geological, hydrogeological and geothermal models. Moreover, the project will deliver an overview on the actual legal framework on the use of thermal waters in the participating countries and the EU level and it will deliver a strategy paper with recommendations for an improved sustainable thermal water management in the project area. In these activities representatives of the national water management and mining authorities, land use planners, consultants and investors are involved by the project partners. After their completion in March 2013 all TRANSENERGY services (multilingual maps, databases, reports etc.) will be provided to the public by the project website (<http://transenergy-eu.geologie.ac.at>).

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TRANSENERGY website:

<http://transenergy-eu.geologie.ac.at>

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REFERENCES

- LENKEY L., DÖVÉNYI P., HORVÁTH F. & CLOETINGH, S.A.P.L. (2002) - *Geothermics of the Pannonian basin and its bearing on the Neotectonics*. EGU Stephan Mueller Special Publication Series, 3, 29-40.
- SCHOLLNBERGER W.E. (2006) - *From scarcity to plenty. Who shapes the future mix of primary energy? What might it be?*. Oil Gas Eur. Mag., 32, 8-20.
- WESSELY G., (1983) - *Zur Geologie und Hydrodynamik im südlichen Wiener Becken und seiner Randzone*. Mitt. Geol. Ges., 76, 27-86.