



Dear Readers,

Let us introduce our project, the Geothermal Power, which is a research project to assess the applicability of the geothermal steam wells in Hungary to be produced electricity by mini power plant. The Altener, Energy Framework Programme 1998-2002 of the European Commission, supports our project.

Our recent issue is about the selected study area, environmental aspects, legal constraints of the project.

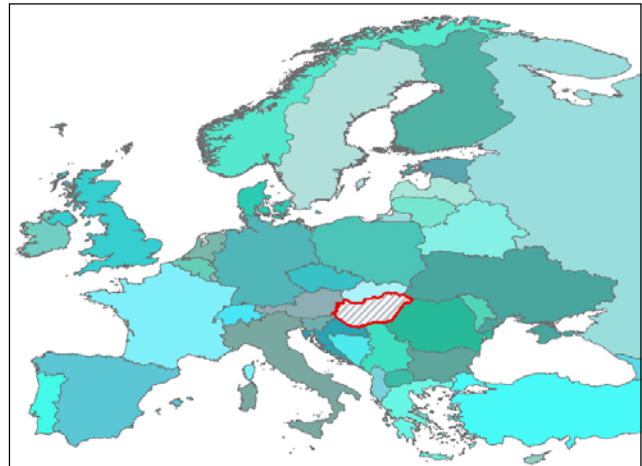
Thank you for your attention!

Editors

Hungary

In the **Pannonian basin** the earth's crust is thinner than the average thus the hot magma is nearer the surface. Moreover the basin is filled with deposits of good heat insulation (clays and sands). That is the reason why **Hungary** was chosen for the study area of the project.

The geothermal gradient of the target country is **5 °C/100 m** as an average (about one and a half times higher than the worldwide average). The measured value of heat-flux is also rather high, **90,4 mW/m²** at an average (the mean value for the European continent is 60 mW/m²).



Hungary is located in Central-Eastern Europe

However the water moving upwards in the thermal wells cools down, therefore we can find only a few cases where the temperature of the water on the surface exceeds 100 °C. It means that geothermal systems in Hungary with a few exceptions belong to the water-dominated systems where some vapour maybe present, generally as discrete bubbles. Depending on temperature and pressure conditions, they can produce hot water, water and steam mixture, wet steam and, in some cases, dry steam.

Environmental aspects, legal issues

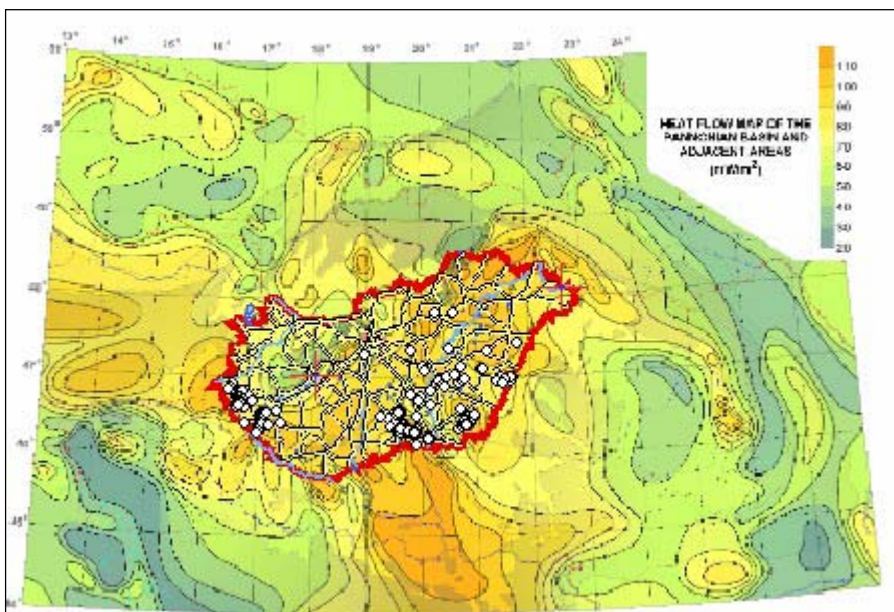
In Hungary according to the regulations the Water Authority is the proceeding authority and the Environmental Inspectorate is the special authority. The exploration and production of thermal waters fall under the scope of the Law on Water Management and may be implemented only according to a water licence (Act LVII of 1995 and the Government Decree No. 72/1996. (V.22.) Korm.). If thermal water is utilised with the purpose of energy production, the production of energy is covered by the Act XLVIII of 1993 on Mining Industry and by the Government Decree No. 203/1998. (XII.19.) Korm.

The users of abstractions have to pay a water resource charge, except for water reinjected into the aquifer in accordance with the water permit, without endangering the subsurface waters.

The Water Authority may only grant licenses for thermal water abstractions if forecasts based on modelling do not indicate adverse environmental impacts. The authorities may not license the production and/or utilisation of thermal waters without any restraint, especially if abstraction is carried out without reinjection.

When exploiting geothermal energy the Governmental Decree No. 20/2001(II. 14) on the environmental impact assessments (EIA) should also be respected which lists the followings among the activities requiring EIA:

- the thermal water abstraction larger than 2000 m³/d from porous aquifers
- the thermal water abstraction larger than 1000 m³/d from karstic aquifers
- the injection of water into subsurface waters
- the construction of geothermal power plant



Selected wells in Hungary on the heat flow map of the area

The exploration of thermal waters falls under the scope of the **water management act** irrespectively of the way of utilisation. The act manages thermal water solely as a substance and does not deal with its energy content. The water management regulation does not specify the concession with respect to the exploration and utilisation of geothermal energy, hence if the geothermal energy production is based on a thermal water producing technology, then it is to be regularised by a water license issued within the framework of a permission process by the water management authority.

The basic principle of the **mining act** is that the ownership of the mineral raw material and the land are distinct. The mineral raw material is in the property of the state therefore the right of mining is in the hand of the state. The mining act regards mining as such a state monopole activity, which can be provisionally given to a third party by concession contract. The exploited raw material goes into the property of the natural person or legal entity who has the mining right.

The **environmental protection regulations** are straightforward; they do not hinder the utilisation of geothermal energy but strictly controls the exploitation and utilisation of subsurface waters in such a way that the activity will not affect the good state of the water, will not increase the contamination and the utilisation of the resources, and that it will be maintained on a long term basis with the use of the best available technologies.

The **electricity act** is also straightforward and assists the utilisation of green energy. There are obligatory feed-in-tariffs for renewable energy determined for which the electricity suppliers must buy the electricity from the producers. Unfortunately important points (feed-in tariffs, guaranteed takeover period) are only regulated by Minister Decrees, which can be modified easily leaving possible investors insecure.

In spite of these legal instructions the utilisation of geothermal energy is not adequately regulated. With respect to geothermal energy utilisation there are three basic topics that should be considered:

1. *thermal water*: Natural resources of the earth, including thermal water, are in the property of the Hungarian State. The alienation of these objects is void unless the law does not regulate otherwise.
2. *well*: According to law the owner of the underground water producing well may be a state organisation, legal entity or natural person depending on at whose expense it has been established and registered with the authorities.

Those wells that were established in the formal political era (before 1989) and which proved to be unsuitable for CH production are in the property of the State because they were drilled from state funds. However those wells, which were drilled later, are unequivocally in the property of the establishing organisation, so most of these belong to MOL (Hungarian Oil Company).

3. *land*: The owner of the land, i.e. the person enrolled in the real estate registry, does not own the mineral wealth present on the area of its property; furthermore he can only use it with the permit of public administration.

THE PROJECT PARTNERS

1. Coordinator: GEONARDO Ltd, Hungary - www.geonardo.hu

GEONARDO

GEONARDO Ltd is a fast growing and well-reputed Hungarian environmental consulting enterprise working at the forefront of technology in mapping of geothermal potential, natural resources management, applied remote sensing and GIS development. The company is interested in the assessment of the utilization of different renewable energy sources in Hungary.



2. Eötvös University, Dept. Of Geophysics, Hungary - <http://pangea.elte.hu>

The Department of Geophysics was founded in 1951 and recently is the member of University's Institute of Environmental Physics. Our research and education activity includes both, the physics of the Earth and the applied geophysics. In applied geophysics we have laid special emphasis on environmental issues a decade since.



3. Innoterm Ltd, Hungary - www.innoterm.hu

Innoterm is a steadily growing Hungarian engineering office and consultancy founded in 1989 in Budapest. Its main fields of actions include the development and the implementation of environmental- and user-friendly energy supply systems, herewith trying to contribute to the sustainable development by optimal utilisation of the available energy resources.



BLUEWATERS

4. Bluewaters Ltd, Austria – www.bluewaters.at

Bluewaters is a young company working in the field of project development, project management and environmental engineering. Our experts have academic and post-graduate qualifications in various technical areas (e.g. Environmental Engineering, Landscape Planning, Chemistry, Agricultural Engineering, Civil Engineering, Mechanical Engineering, Hydrogeology, Hydrobiology and Water Management).



enex

5. Enex hf, Iceland – www.enex.is

Enex Ltd is a young but fast growing Icelandic enterprise through which is channelled the export drive of Iceland's four largest power utilities, the Iceland Drilling Company, the Orkustofnun, GeoScience Division (ROS) and the major Engineering Consulting Companies of Iceland. The affiliated company of ENEX in Hungary is: [ENEX GEOTERMIA](http://www.enex.is).



6. Aquaplus Ltd, Hungary - www.aquaplus.hu

AQUAPLUS Well-boring, Well-repairing and Hydraulic Engineering Ltd., was established on 15th September 1989. Its members are natural persons, who have been previously working in the field of water drilling and maintenance demanding high professional requirements. The main activities of the company are related-to the planning, construction and operation of water supply, and the planning, execution and repairing of deep drilling water and thermal water wells.



7. ISQ, Portugal – www.isq.pt

ISQ, Instituto de Soldadura e Qualidade, is a private, non-profit making independent research centre and the largest inspection company in Portugal with a staff of about 500. ISQ was founded in 1965 and has been involved in all major engineering projects in Portugal and other European countries and also in Africa, Latin America and Asia. ISQ developed expertise in several fields of engineering and also environmental sciences through these years. ISQ has also a considerable experience in participation and management of European R&D projects.



Further information are available on the project website:

www.geothermalpower.net