

LICENSING DEEP GEOHERMAL PROJECT - HUNGARY

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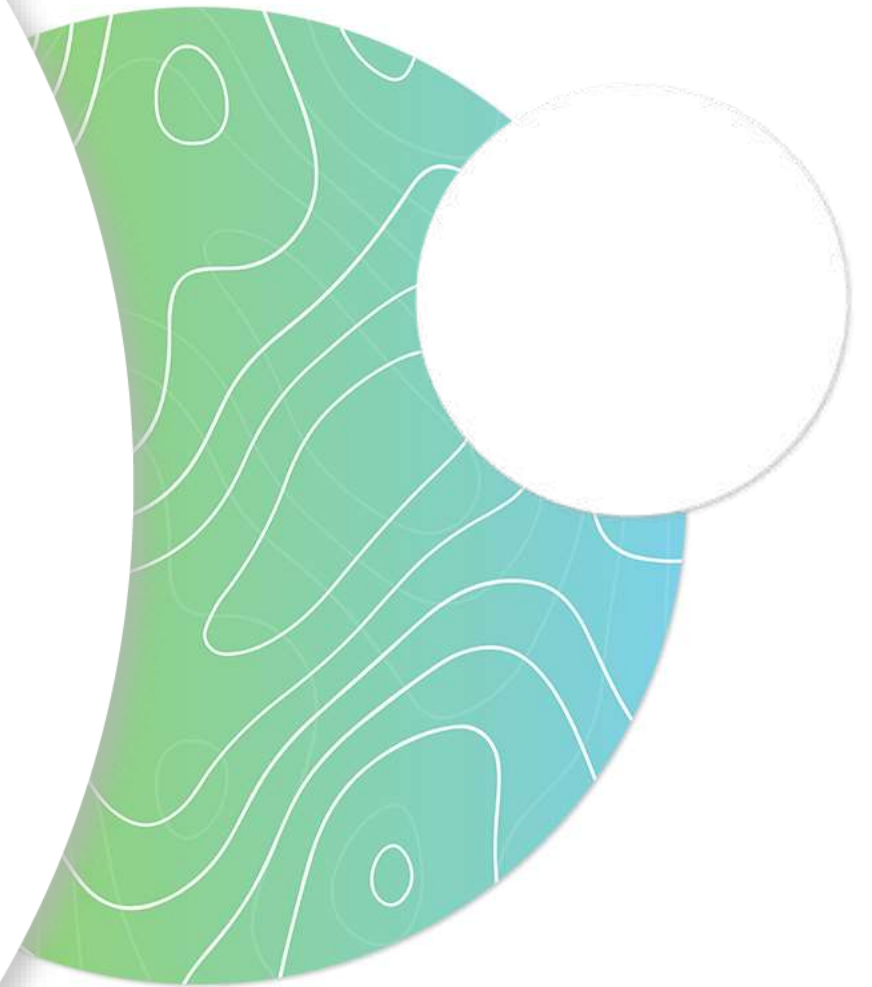
Mining and Geological Survey of Hungary

GEOENVI workshop on „Overcoming the barriers to establishing a European environmental framework for geothermal projects” February 23, 2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [818242 – GEOENVI]



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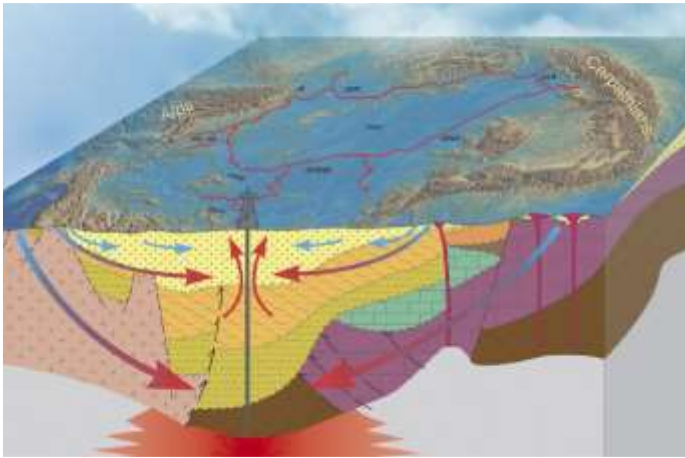


2/ Geothermal conditions → relevant environmental impacts → prominent areas of legislation

Hot sedimentary basin with low-enthalpy resources (thermal waters up to 100 °C) → direct use

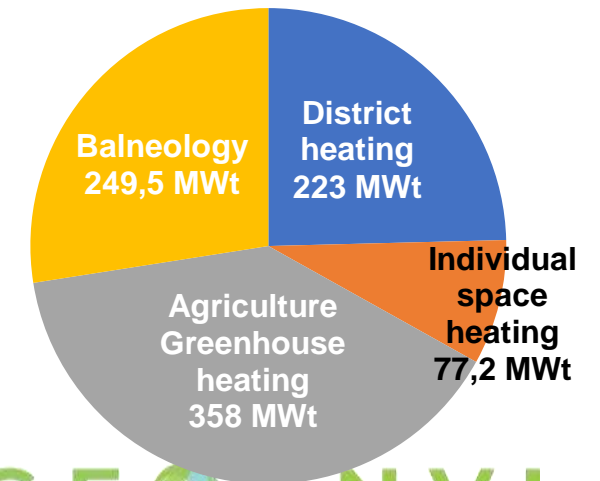
Annual thermal water production: cca 15 million m³/year from karstic and cca 40 million m³/year from porous aquifers – rate of reinjection < 10% (surface discharge of used fluids)

Most impacts are related with reservoir and surface recipient physical and chemical modifications → strong interaction with water management



~ 950 active wells
($T_{\text{outflow}} > 30\text{ °C}$)

Installed capacity (908,06MWt)



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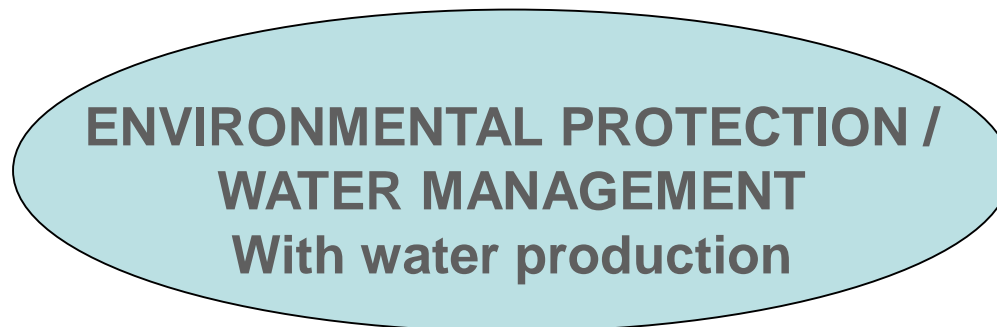
3/ Geothermal energy - dual regulation



Mining Act XLVIII of 1993

Geothermal energy: „ the internal heat energy of the earth crust”

STATE OWNED



Act LVII of 1995 on water management

Thermal water: „ all groundwater (derived from an aquifer) with an outlet temperature **of 30 °C** or higher”.

Act LIII of 1995 on the general rules of environmental protection

STATE OWNED

Below -2500 m: entire country is closed for the exploration and exploitation of geothermal energy: **CONCESSION**

4/ Environmental licensing, Environmental Impact Assessment

Environmental licensing is the first step of project development, exploration and construction licensing could be started only in possessing (if necessary) an environmental license.

During environmental licensing process, the environmental authority (=Governmental Offices) involves special authorities (water management, mining, land- and soil protection, public health, etc) to make decisions on their relevant fields.

Governmental decree of 314/2005 (XII.25) on EIA – general, but some specifics to geothermal

- Capacity of a geothermal power plant is above 20 MW,
- Project is within the protection zone of mineral-, medicinal- or drinking water resource,
- Project is within a Natura 2000 area,
- Thermal water abstraction exceeds 500 m³/day from thermal karstwater, or 2000 m³/day from thermal groundwater (porous) resource.
- Reinjection into thermal groundwater bodies

5/ Authorities, licensing

Open areas (0-2500 m) – thermal water abstraction

Water license (preliminary, construction, operation): Regional Directorates for Disaster Management
(*water management authority*)

Closed areas (below -2500 m) CONCESSION

35 years, open tenders, contract

(1) Exploration: Mining Departments of Divisions of Authority Affairs of the competent Government Offices
(*mining authority*)

(2) Designation of a geothermal protection zone („3D mining plot”) - in case of successful exploration: –
Mining and Geological Survey of Hungary

(3) Production: Licensing by the *mining authority*, (in case with water production the water management authority involved as a co-authority)



6/ Complex vulnerability and impact assessment – prior to concession only

Governmental Decree 103/2011 (VI.29.)

to determine those areas, where **mining activity cannot be performed** due to environmental- and nature protection, water management and protection of water resources, protection of cultural heritage, agriculture, public health, national defense, land-use, transportation issues, as well as mineral resource management.

- *geographical location of the area, description of land-use,*
- *geological, hydrogeological, tectonic characterization*
- *status of previous exploration,*
- *protected areas related to the water management plans, status of the surface- and subsurface (ground)water bodies, their monitoring, rate of subsurface groundwater abstraction,*
- *other valid licenses for exploration and exploitation*
- *data related to the geological environment of geothermal energy,*
- *expected amount to be exploited, foreseen exploration and exploitation methods,*
- *introduction of the energy concept,*
- *forecast of environmental impacts with a special regard to surface and subsurface (ground)water bodies, drinking water resources, areas of natural protection (Natura 2000), and possible transboundary effects.*

7/ Impacts on groundwater – WFD/RBMP-s, groundwater bodies

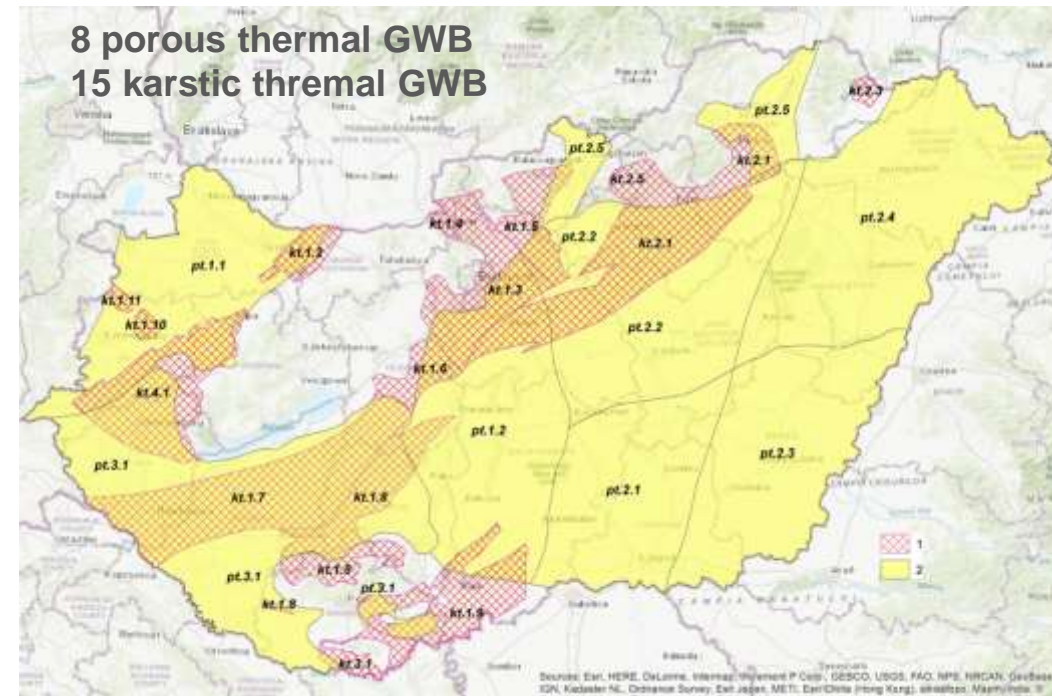
Governmental Decree 219/2004 (VII.21.) on the protection of groundwaters

Good quantity status (all thermal GWB-s, are in good quantity status, except for 1 porous and 1 karstic)

- if the long-term (6 years) annual abstraction rate does not exceed the available groundwater resource,
- water abstraction cannot exceed the “**abstraction limit value (Mi)**” (no permanent decrease in groundwater level or hydraulic head)
- no alterations in the subsurface flow directions take place
- no groundwater-dependant terrestrial ecosystems are damaged

Good quality status (all thermal GWB-s, porous and karstic are in good quality status)

- monitoring proves no contamination,
- measured values do not exceed the threshold values, or the natural background values, or individual contamination limit values
- no groundwater-dependant terrestrial ecosystems are damaged
- its temperature does not decrease to such extent which may cause changes in its qualitative status, or flow paths, and does not disturb utilization



8/ Reinjection vs. surface discharge – environmental impacts

Governmental Decree 147/2010 (IV.29.)

The thermal groundwater abstracted for energetic purposes **may** be reinjected to the same aquifer after utilization, but surface disposal/discharge is also allowed considering the amount and quality of the used thermal water, its impacts on the environment, the capacity of the surface recipient.

Throughout the selection of a potential surface reservoir, environmental aspects and natural recharge processes have to be considered. If any of the components of the used thermal water are above the threshold values, than the thermal water has to be discharged into an artificial lake → *Governmental Decree 220/2004 (VII. 21.) on the protection of surface waters, KvVM /Ministerial Decree 28/2004. (XII. 25.) on the threshold values of water contaminating materials*

Thermal water for household warm water supply can be delivered to the pipeline system only if the water meets the quality requirements of drinking water.





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