Regional geological database for deep geothermal - Hungary

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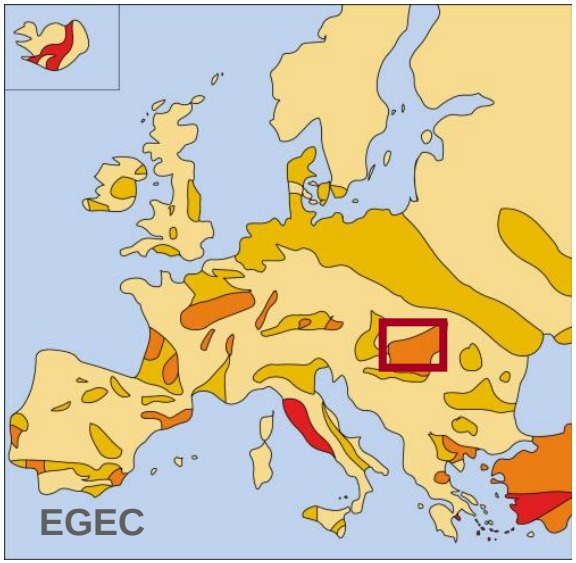
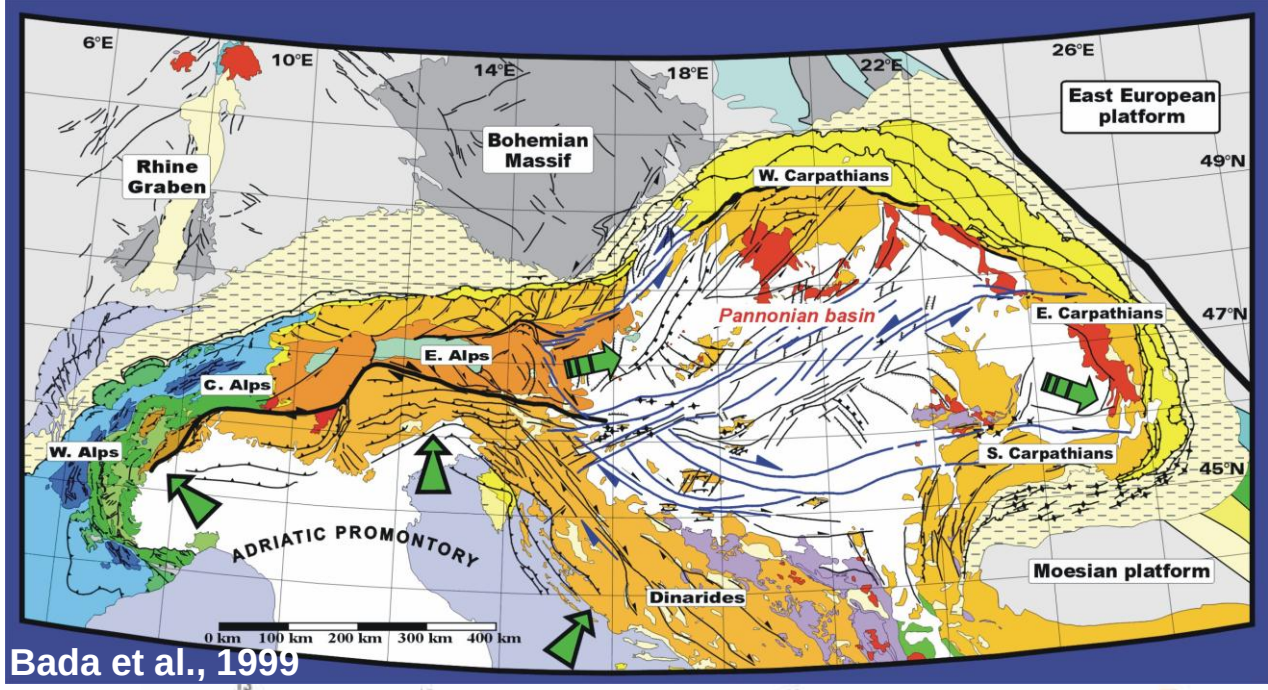
Geological Institute of Hungary (MÁFI)

GEOELEC Workshop, February 29, 2012, Offenburg, Germany

Pannonian basin

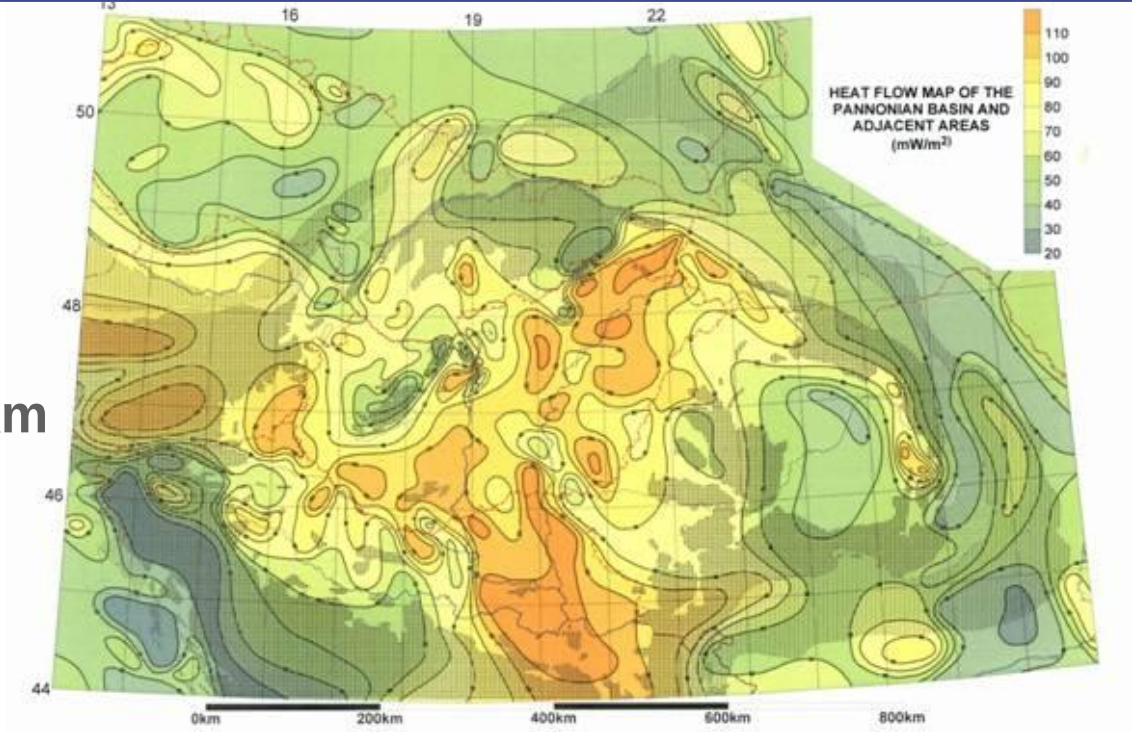


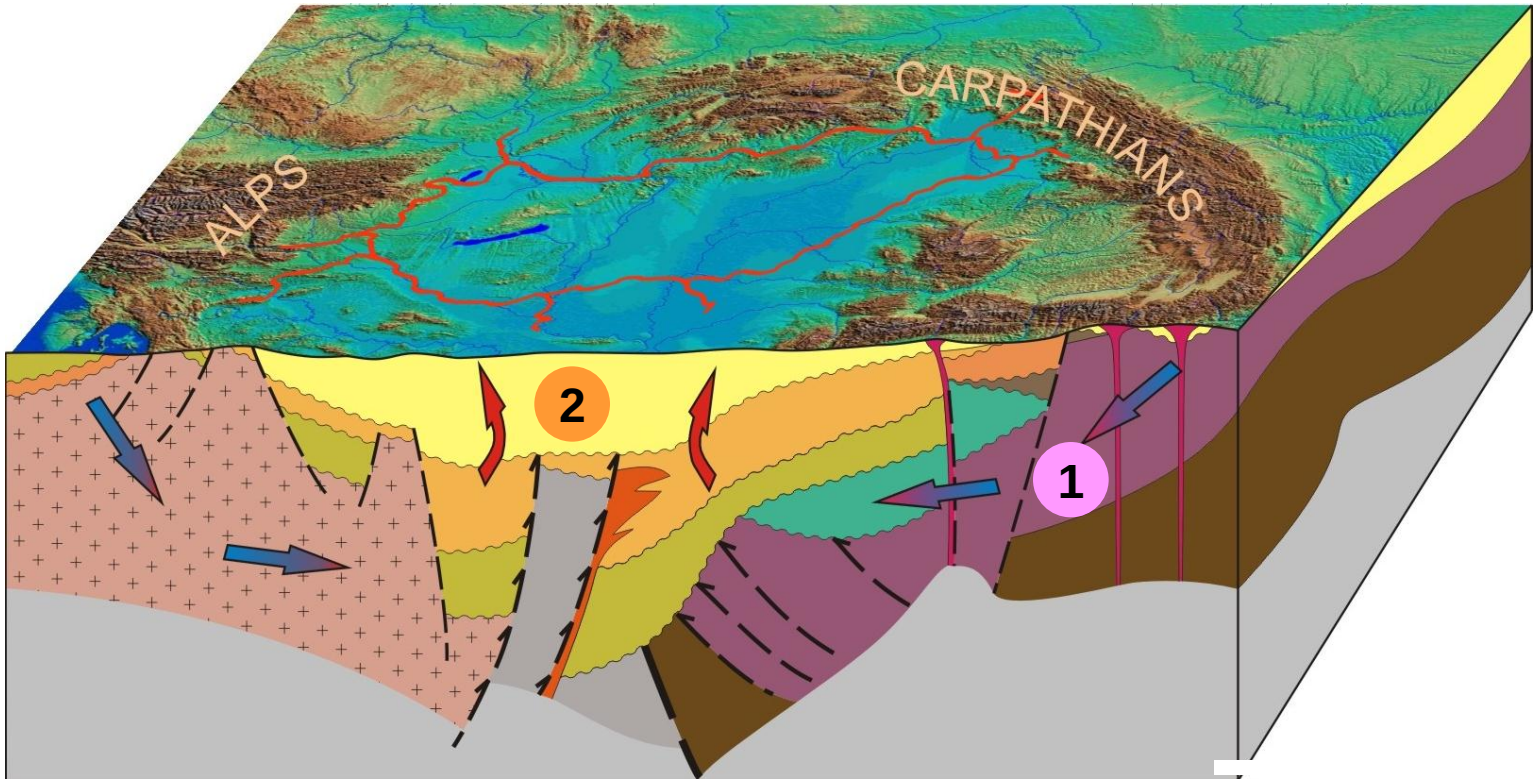


Bada et al., 1999

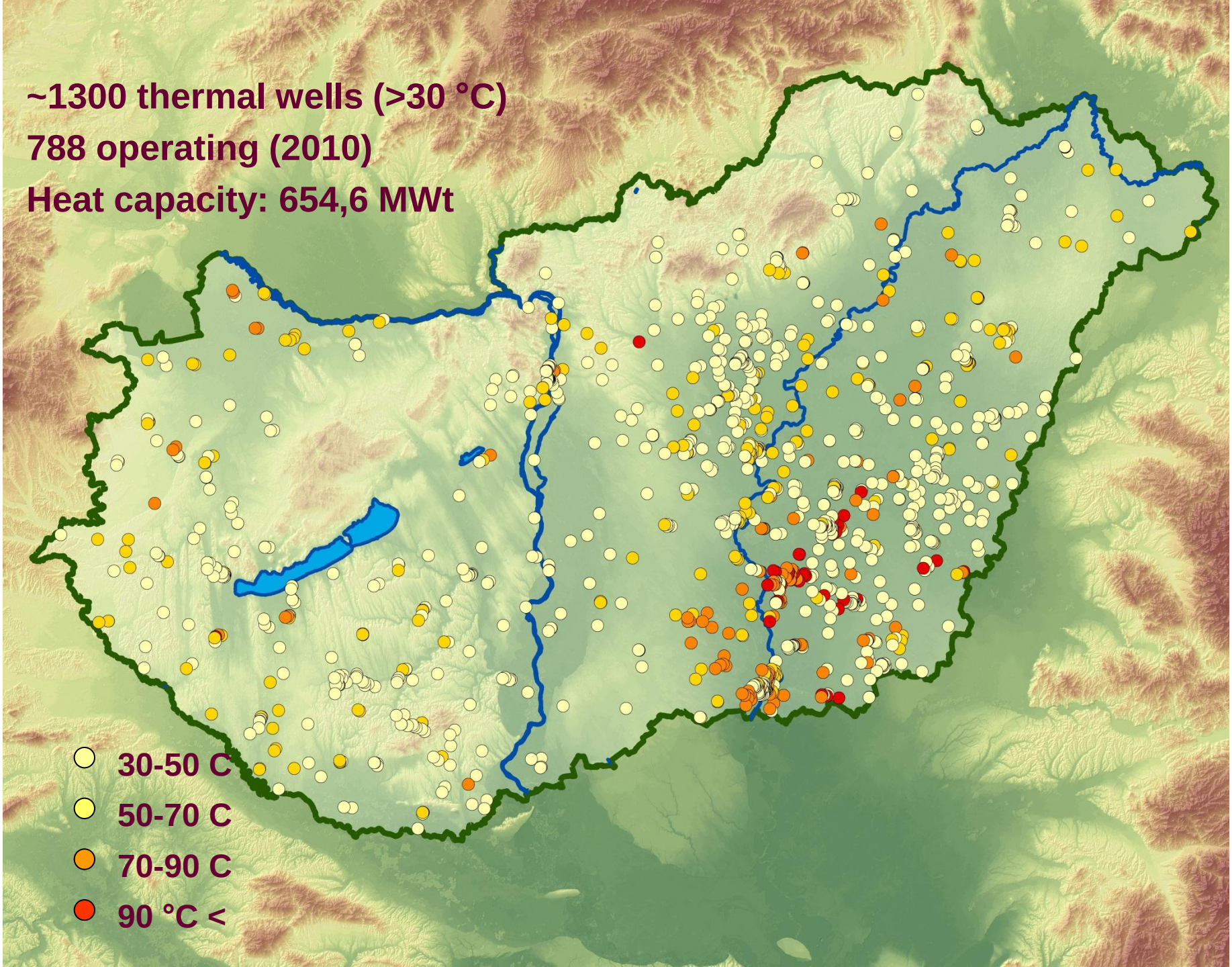
Average terrestrial heat flow: 100 mW/m^2

Geothermal gradient: 45 °C/km





Main geothermal reservoirs	1. fractured, karstified basement rocks (Palaeozoic-Mesozoic)	2. porous multi-layered sandstones, shales (Upper Miocene-Pliocene basin fill)
thickness	80-100 m (upper part)	200-300 m
depth, temperature	>2500 m, >100-120 °C	800-2000 m, ~60-70 °C
porosity	< 5%	20-30%
permeability	500 -1500 mD	500 -1500 mD


~1300 thermal wells (>30 °C)
788 operating (2010)
Heat capacity: 654,6 MWt
30-50 C
50-70 C
70-90 C
90 °C <

National databases

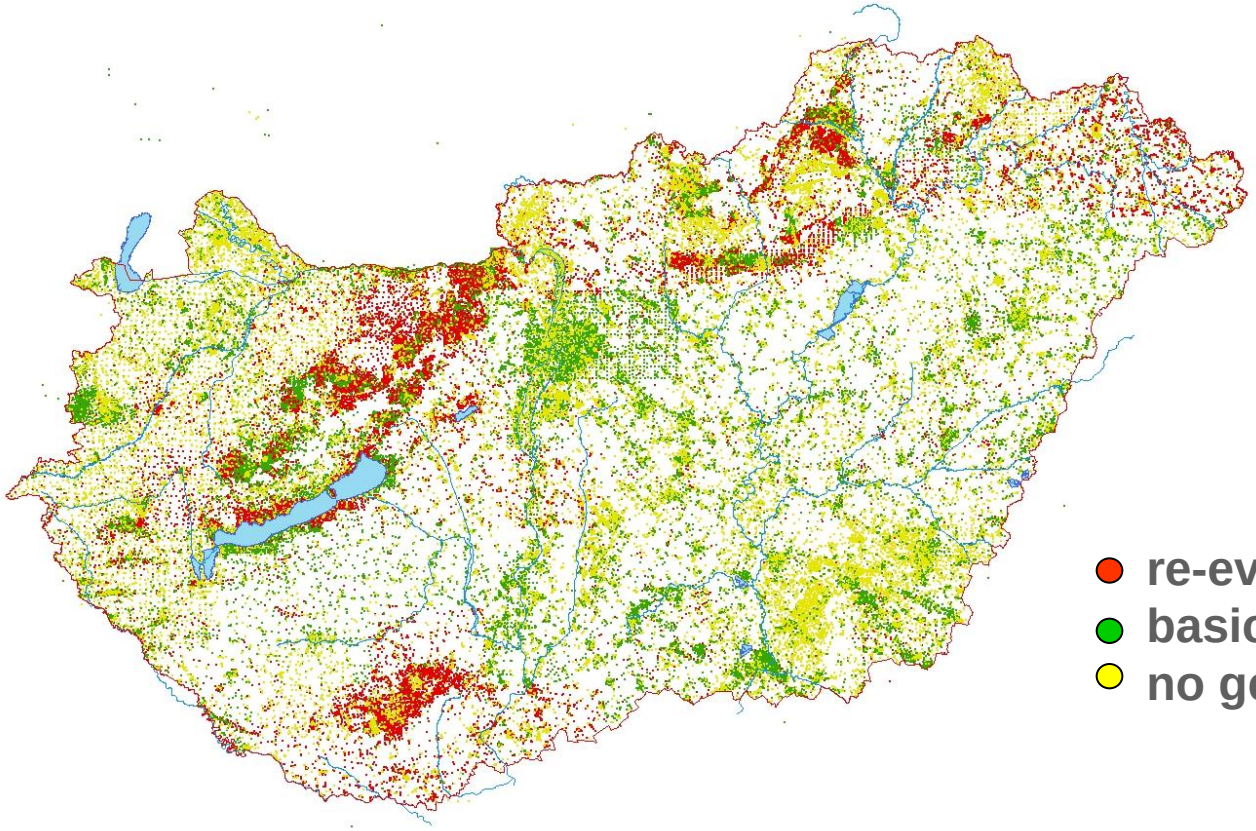
Mining Law 1993. XLVIII: geological and geophysical data produced before 1992 are state owned and they are accessible free *(except for areas of production / exploration)*

- **Hungarian Office for Mining and Geology (MBFH):** authorised manager for state geological data (www.mbf.hu)
- All data are stored in the **National Geological and Geophysical Archive** handled by MBFH: mostly hard copy of reports (e.g. well-documentations), no uniform digital databases
- Although state data are free, but service fee for data handling, (compilation of various datasets, copies) is requested by MBFH
- MBFH: databases for state of exploration (boreholes + seismics) and mining related registers **including register of geothermal energy**
- Digital geological databases (boreholes, maps) available at the Geological Institute of Hungary (www.mafi.hu), digital geophysical databases at the Eötvös Loránd Geophysical Institute (www.elgi.hu
- „Data policy”: no raw data, but value-added interpretations

Digital borehole database at MÁFI

borehole database (~200 000 boreholes: basic data + geology)

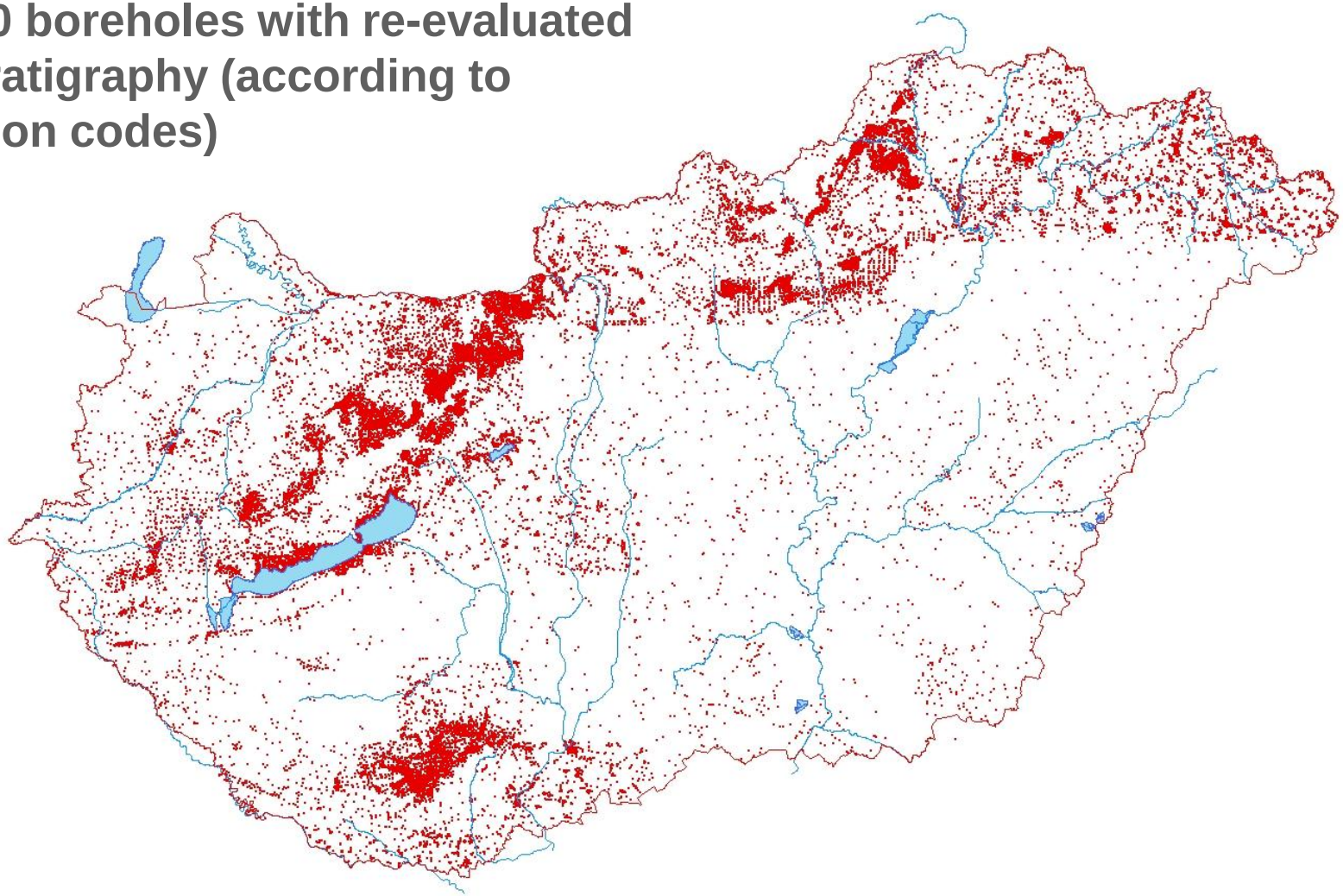
~8 000 hydrocarbon wells
~n x 10 000 water prospecting wells including ~1000 thermal water wells
~n x 1 000 structural-geological exploration („basic boreholes”)
~n x 10 000 mineral resource exploration boreholes



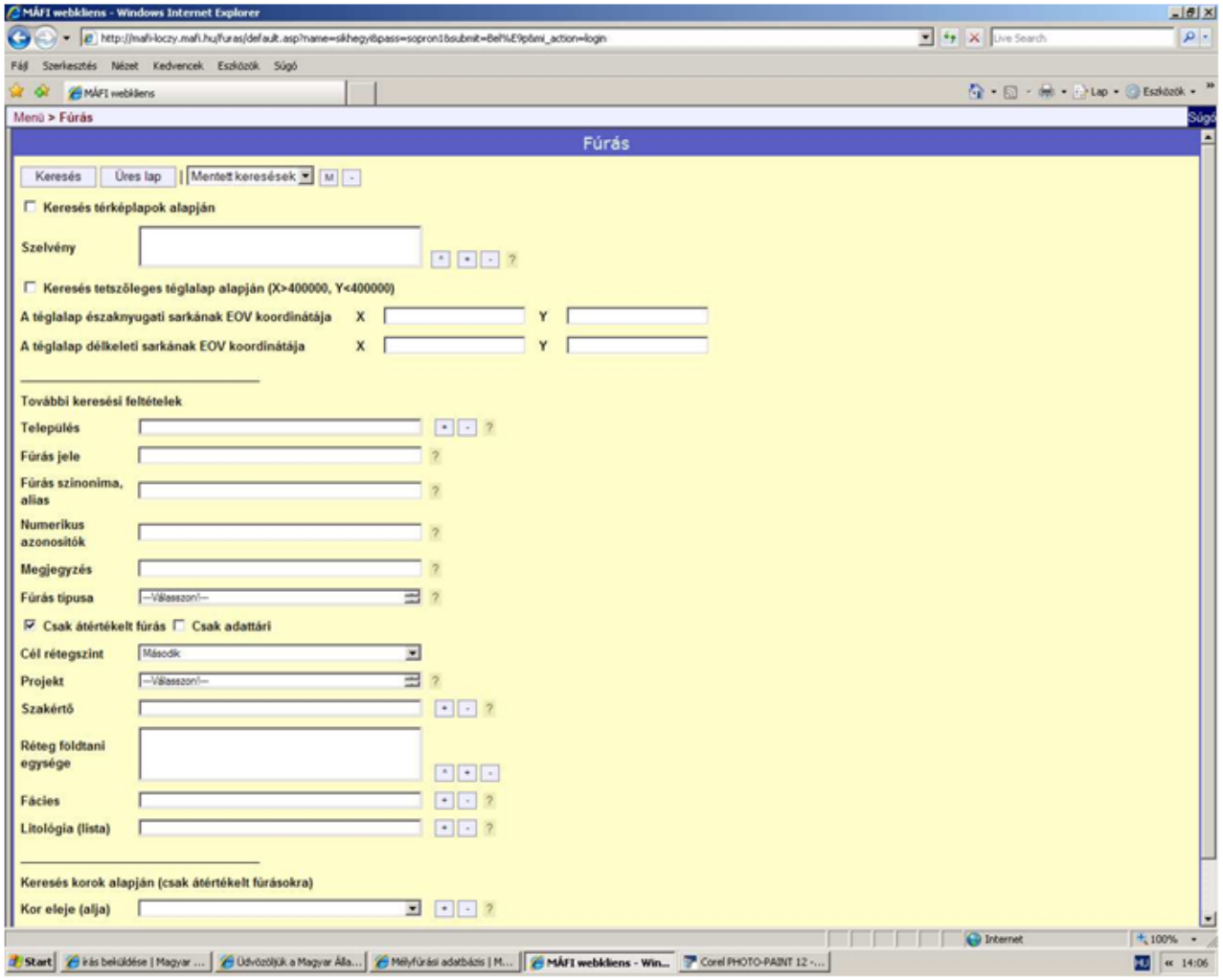
- **re-evaluated stratigraphy**
- **basic litostraigraphy**
- **no geological data**

Digital borehole database at MÁFI

~65 000 boreholes with re-evaluated lithostratigraphy (according to formation codes)



Layout of borehole database – not public



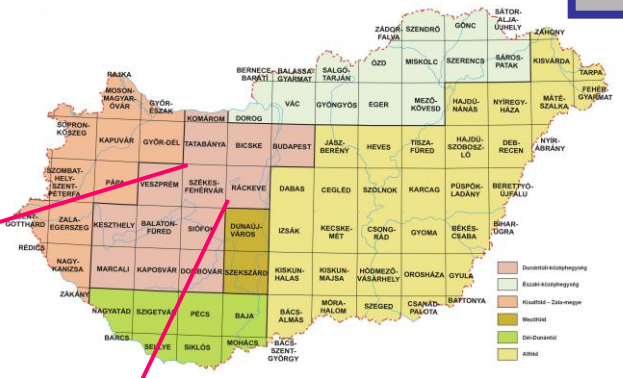
Query options

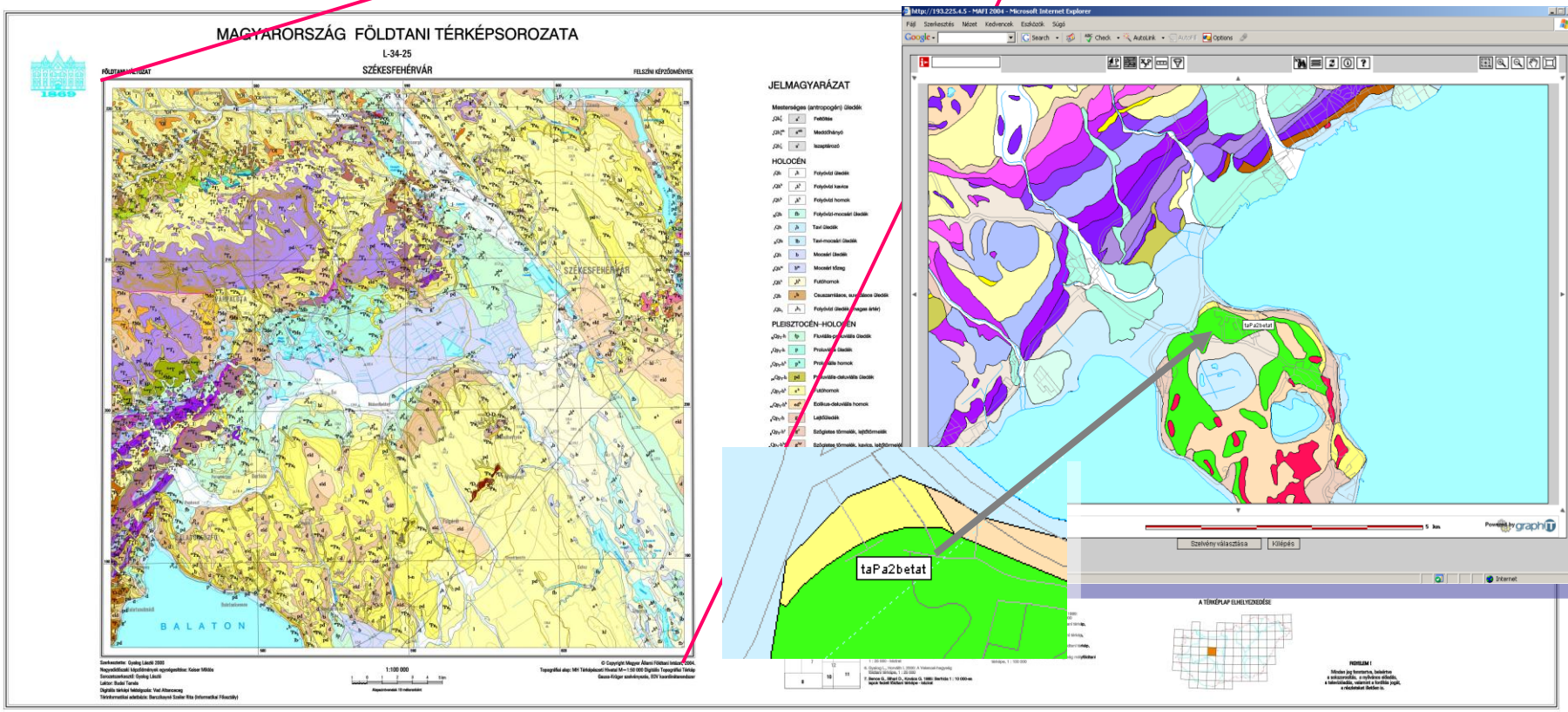
- ✓coordinates
- ✓settlement
- ✓well
- ✓formation
- ✓facies
- ✓lithology
- ✓geological age
- ✓Over / underlying strata
- ✓+ combined querys

Digital geological maps of Hungary

surface, various depths, tematic and regional maps at various scales

www.mafi.hu





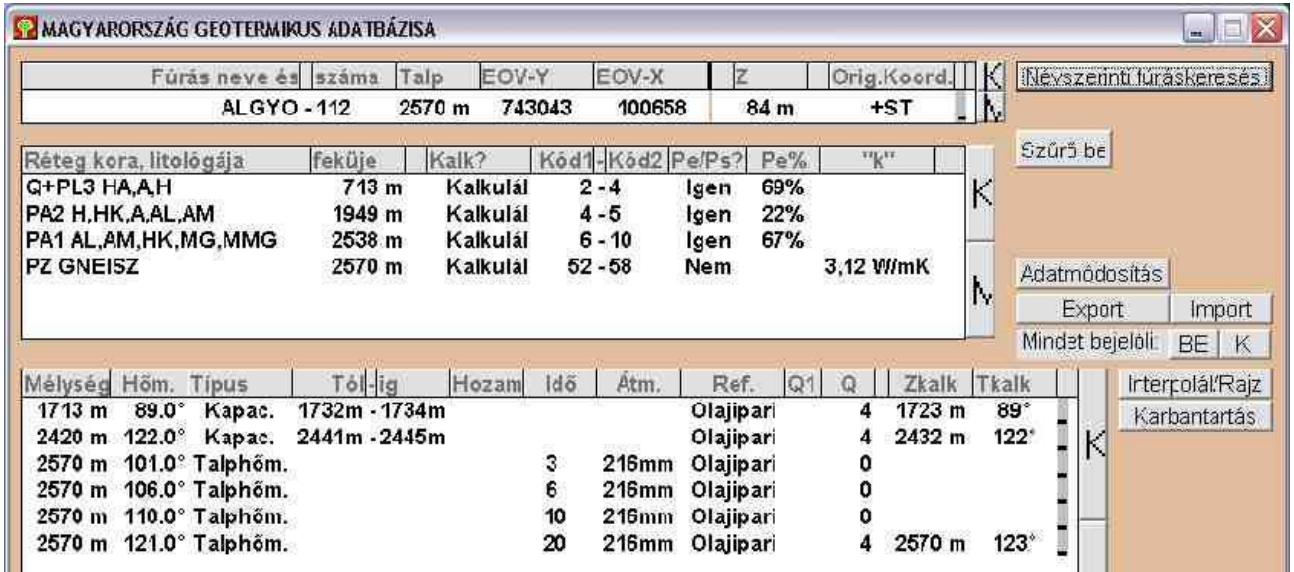
Geophysical databases at ELGI

- ✓Seismics (2D reflectional)
- ✓Well-logs (partly hard copyl)
- ✓Geoelectric
- ✓Magnetotelluric
- ✓Gravity
- ✓Air geophysics

Geothermal database

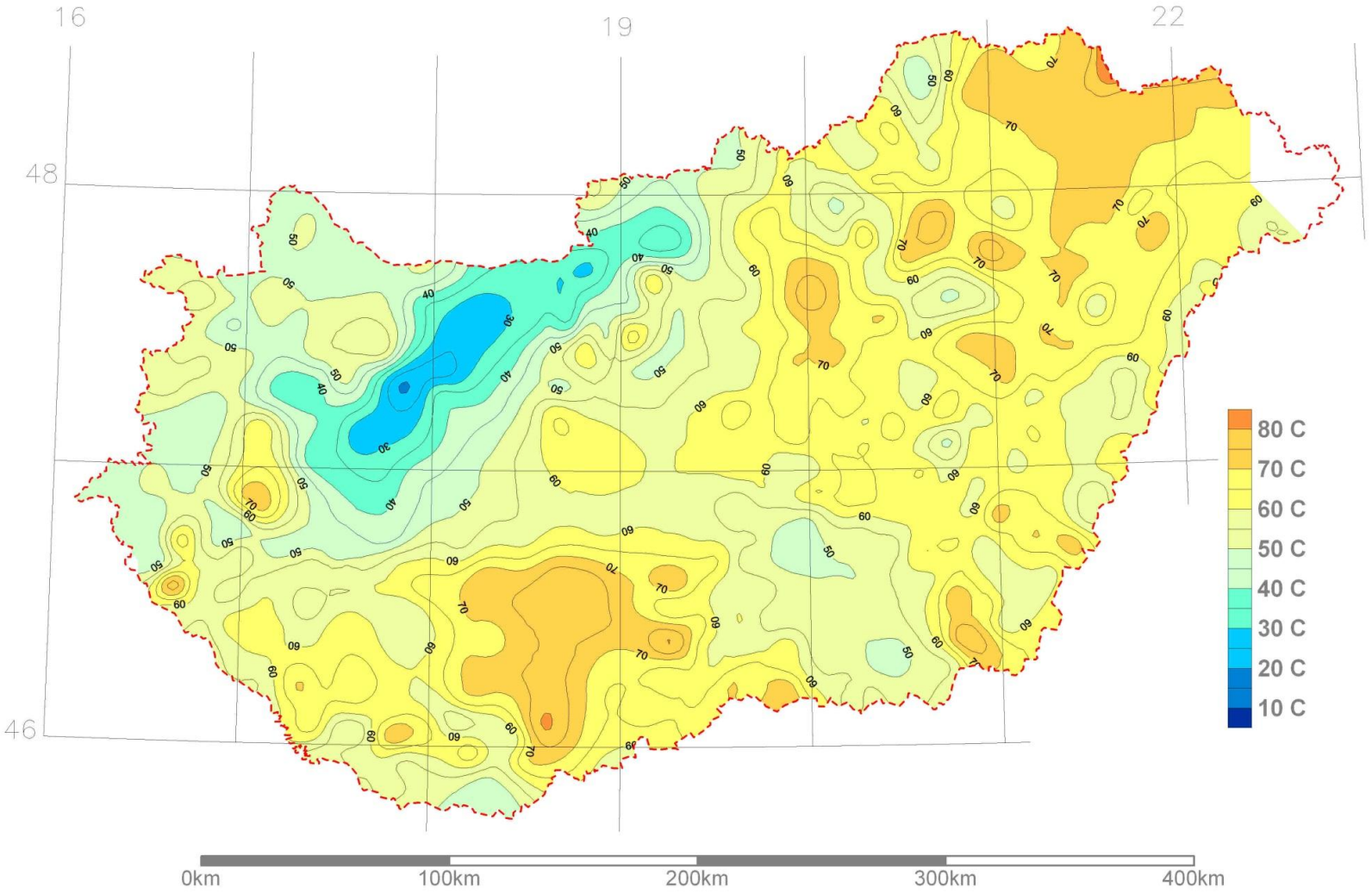
based on compilation of P. Dövényi at Eötvös Loránd University

- 4477 wells (drilled before 1993, mostly CH wells)
- deeper than 200 m, temperature higher than 30 °C
- 55 000 temperature measurements (T- depth datasets + simplified lithology. e.g. basement carbonate)
- Types of measurements:
  - steady state condition measurements (majority, mostly BHT)
  - measured during production tests (DST)
  - T data calculated from outflow water temperatures

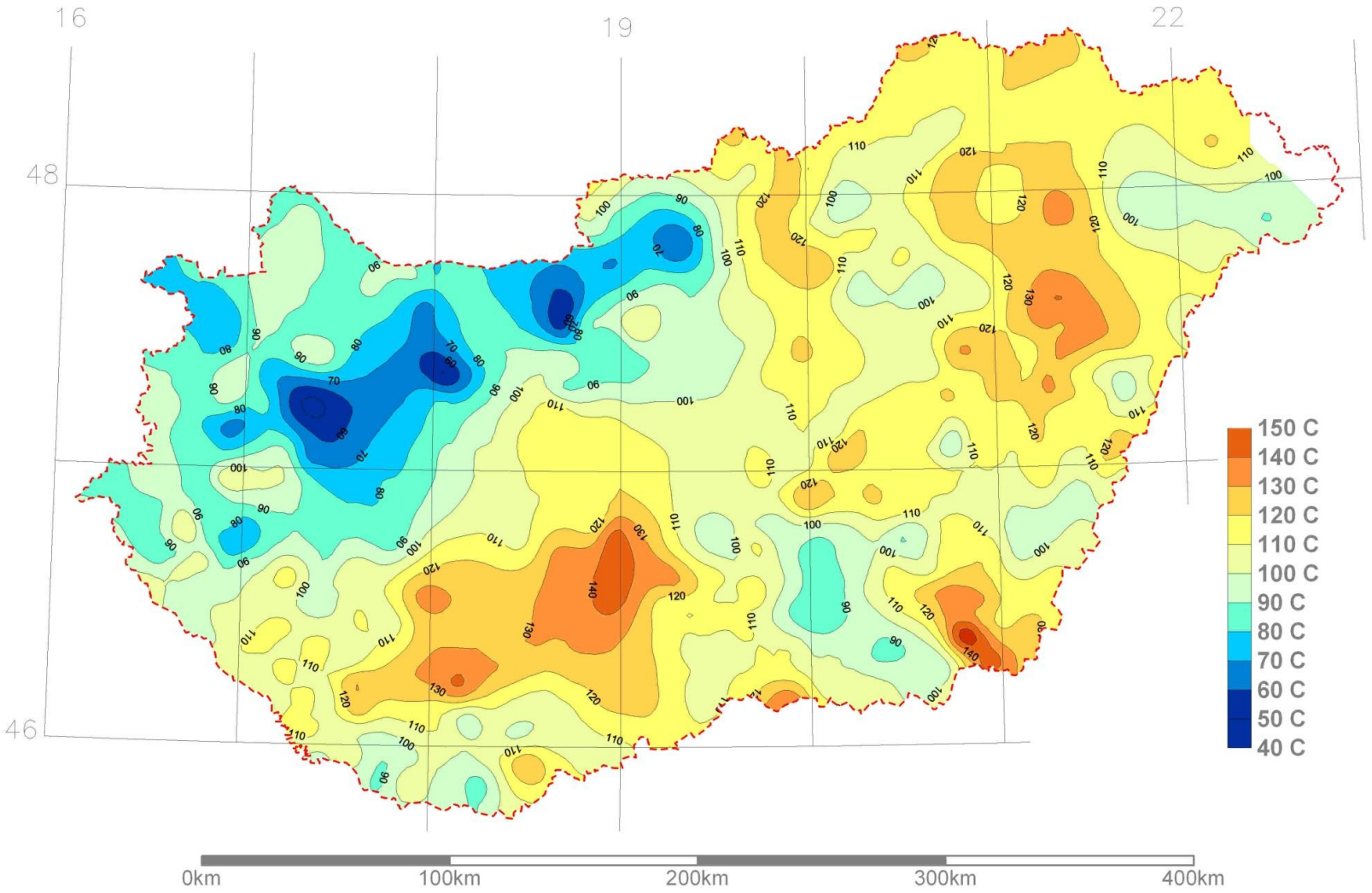


corrections needed!

Temperature at -1000 m bsl



Temperature at -2000 m bsl



Hydrogeological databases

ownership, data handling, access rights are shared among water management authorities and institutions – not clear

(Water Research Institute (VITUKI), Regional Inspectorates for Environment, Nature and Water („green authorities”), National Water Management Chief Authority (OVF), etc.

cadastral register of thermal water wells: basic data, screened intervals, static and dynamic groundwater level, yield, outflow temperature, status of well

quality and quantity databases of groundwaters related to the integrated river basin management plans (Water Framework Directive) (www.vizeink.hu)

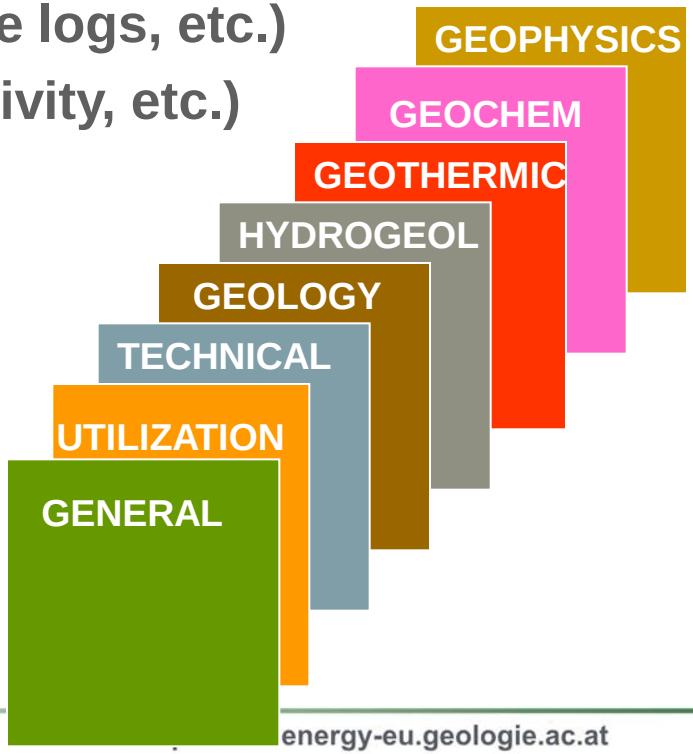
Multi-lingual joint database (MS-Access)

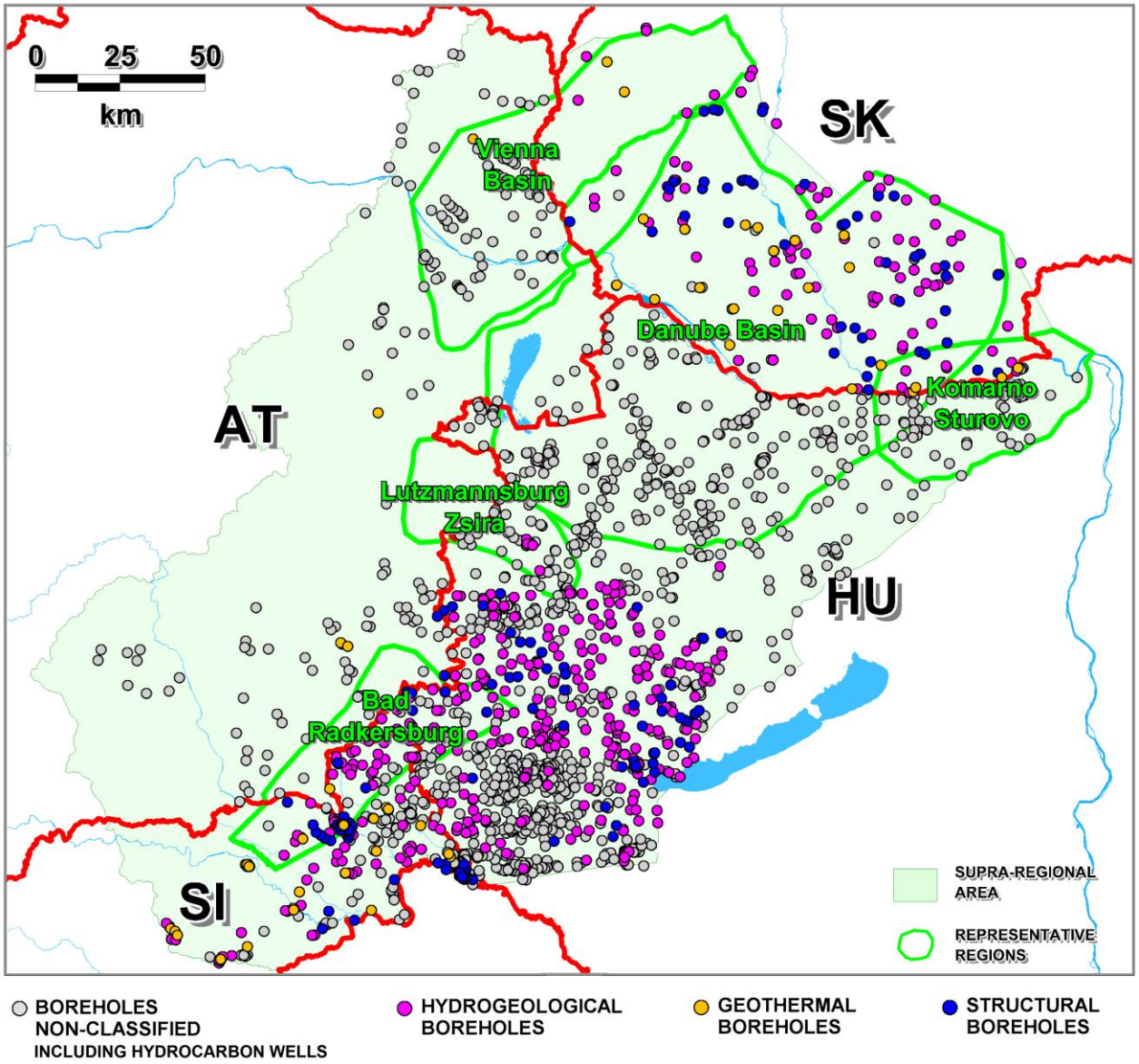
438 parameters, 12 main parameter groups

general (borehole identification, purpose, ownership, etc.)
utilization (heating, balneology, agriculture, reinjection, etc.)
technical (borehole dimensions, screened intervals, etc.)
geology (lithology, stratigraphy, facies, etc.)
hydrogeology (permeability, porosity, pressure logs, etc.)
geothermics (BHT, T-outflow, thermal conductivity, etc.)
geochemistry

- basic chemistry
- isotopes and noble gases
- organic components
- trace elements
- gas analyses

geophysics (borehole logs)



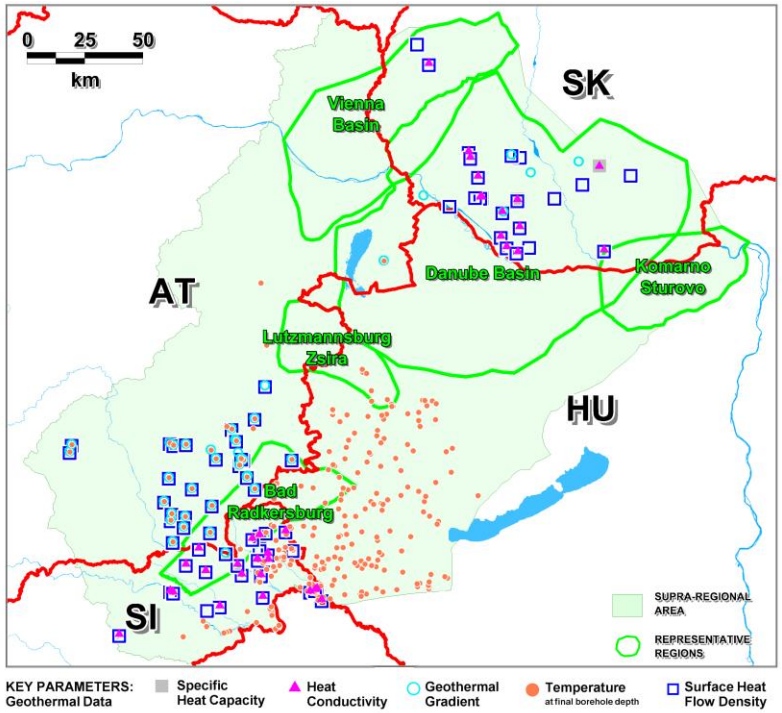


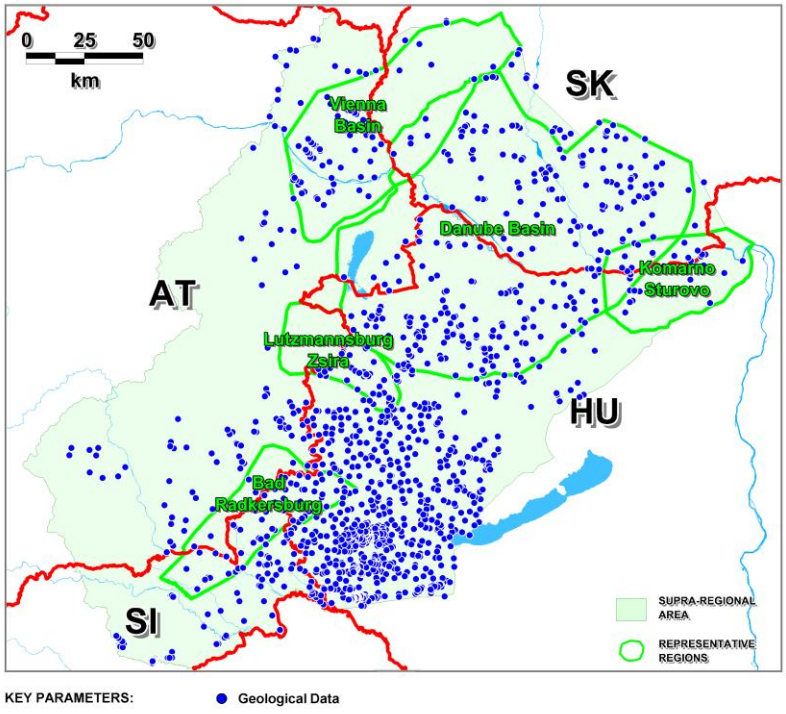
Expert database:
~ 2500 boreholes

Public database

selected parameters of general data, geology, hydrogeology, geothermal and chemistry

	groupe of parameters					Objects
	hydrogeology	**geothermal**	**gas**	**chemistry**	**general**	
ŠGÚDŠ	45	0	1	32	59	59
Geo-ZS	90	61	0	73	126	129
MÁFI	518	355	97	421	742	742
GBA	0	58	17	43	60	115
All	653	474	115	569	987	1045





T-JAM

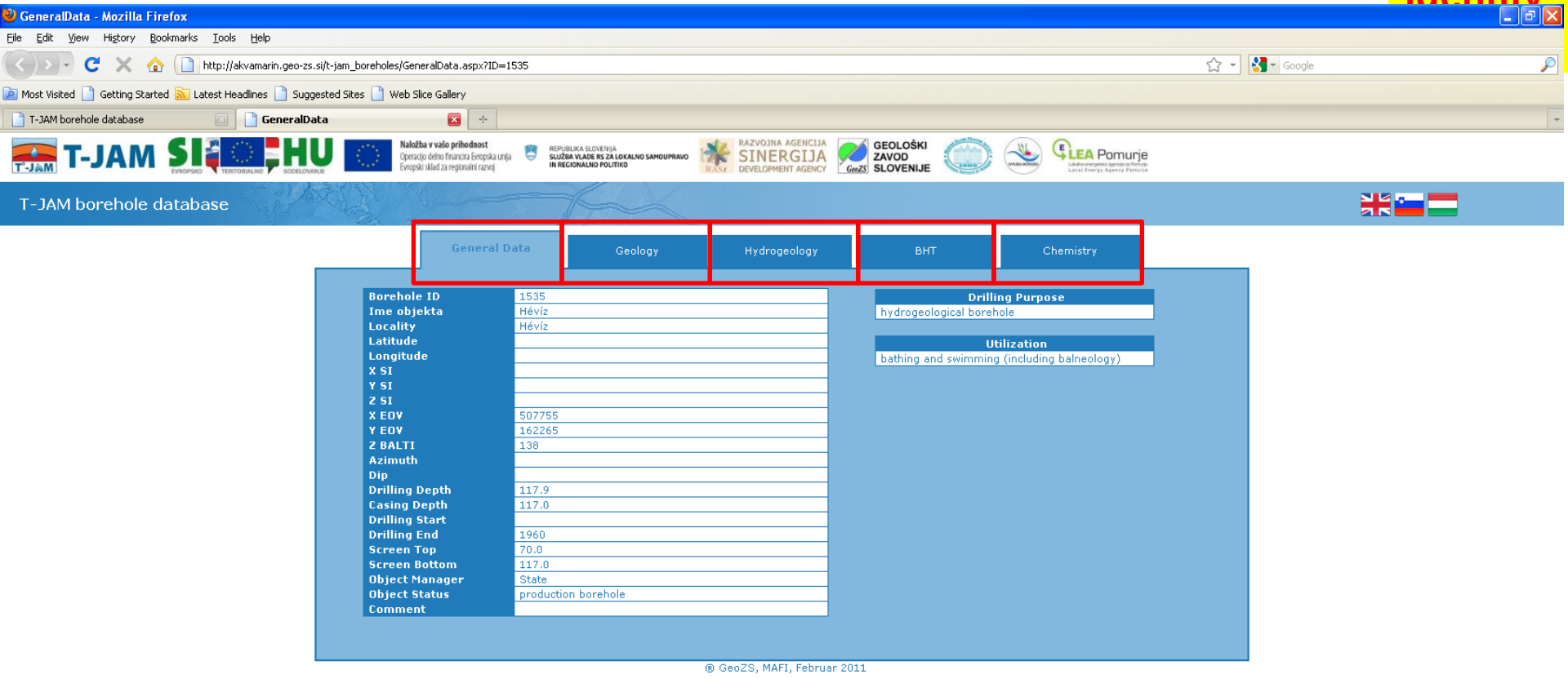
Table name	Hungary		Slovenia	
	expert	public	expert	public
General data	792	158	404	99
Drilling purpose	792	158	439	103
Water use	792	158	427	123
Utilization parameters	148		293	
Geological records	10379	2606	477	477
Hydrogeology data	136	136	524	80
Water temperature at well-head	194		232	
Bottom hole temperature	310	179	132	0
Core thermal conductivity	0		124	
Surface heat flow density	0		26	
Chemical parameters	14498	4735	10885	3878
Pumping tests	0		416	

expert: 792 HU, 404 SI
public: 158 HU, 99 SI

T-JAM

Query in the multi-lingual geothermal database

Identify



Project results | - Windows Internet Explorer

http://en.t-jam.eu/project-results/

Live Search

Kedvencek | Javasolt helyek

Project results |

www.t-jam.eu

Oldal | Biztonság | Eszközök

T-JAM

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SI HU EUROPEAN TERRITORIAL COOPERATION

Search string search>

Project | Partners | Project results | Current | Contact | Photo gallery

2. meeting of project group

Second coordination meeting of project group was February 11 2010 in Sombately.

več...

Kick off meeting

Project partner have been participating at a kick off meeting at September 10 2009 in Moravske Toplice.

več...

Project results:

- Structural-geological model
- Geochemical, geothermal, hydrogeological model
- Mathematical model
- Recommendations for the use of the best technology practice
- Definition of the potential transboundary thermal water flow direction
- Suggestion of the delineation of the potential common thermal groundwater body
- Identification of the transboundary geothermal potential
- Guidelines on the joint transboundary managment of the potential transboundary thermal aquifers
- Guidelines on the joint transboundary monitoring of the potential transboundary thermal aquifers
- Demonstration heat pump
- Publication of the joint final results on the internet in form of 3-lingual publication
- Joint 3-lingual publication on the CD-s
- 2-lingual leaflets on the best technology practice for heat pumps
- Project webpage.

The results of the project will require making better prognoses on the reasonableness of deep research for the capture of thermal water in cross border interest areas. The project will contribute to establishing common border geothermal aquifers, which have formed between Styria, north-east Slovenia and west Hungary. Enhanced cooperation and joint management of cross-border aquifers is of strategic importance to the neighbouring country. The joint promotion and publications of the project will achieve a higher level of awareness among the general public on both sides of the border.

RAZVOJNA AGENCIJA SINERGIJA DEVELOPMENT AGENCY

GEOLOŠKI ZAVOD SLOVENIJE

LEA Pomurje

Internet | Védett mód: bekapcsolva | 100%

MÁFI Level... | VIgeoterm.... | Dokument... | Project res... | Slavko Sola... | mafi-bemu... | Vizek.ppt | HU | 18:09

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

Transenergy_en - Windows Internet Explorer

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

Fájl Szerkesztés Nézet Kedvencek Eszközök Súgó

Kedvencek Javasolt helyek Ingyenes Hotmail

Transenergy_en

Oldal Biztonság Eszközök

trans energy te

CENTRAL EUROPE
COOPERATING FOR SUCCESS.

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

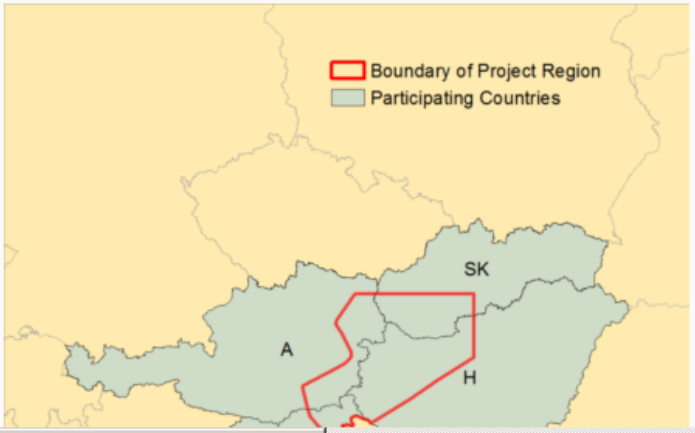
This project is implemented through the CENTRAL EUROPE Programme co-financed by the ERDF.

Transenergy — Transboundary Geothermal Energy Resources of Slovenia, Austria, Hungary and Slovakia

- Home
- Aims of TE
- Involved Organizations
- TE Team & Contact
- Results
- News
- Links

Welcome to the website of Transenergy!

This website informs about a central European project, which started in April 2010. The aim of "Transenergy" is to create a common geothermal information system in four central European countries. Having an environmental focus the purpose is seeking for sustainable, transboundary utilization of geothermal energy resources.



Kész Internet 100%

Start HU