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REPUBLIC OF SLOVENIA
MINISTRY OF THE ENVIRONMENT,
CLIMATE AND ENERGY

Successful Hungarian Project: The Szeged District Heating Transition

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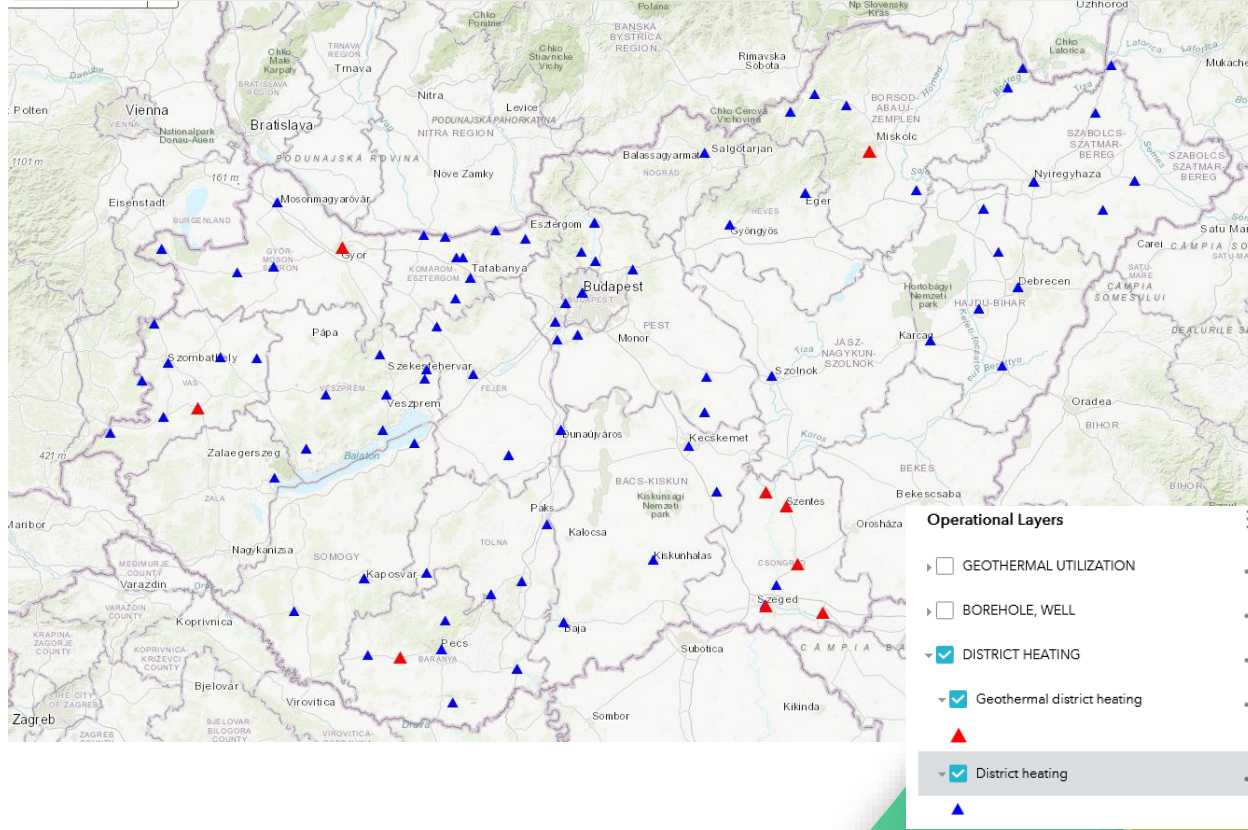
Geological Survey of Supervisory Authority of
Regulatory Affairs (SARA)

Introduction

- Hungary is in transition on geothermal energy utilization, since the legal framework and the authorization process have changed this year.
- Up to this point geothermal energy utilizations from above depth 2500 meters was permitted by water authorities, while projects with depth below 2500 meters were subjects to mining concession.
- From now on, geothermal utilizations (except balneology and agricultural) fall under the Mining Act (*1993. XLVIII. law and 20/2022. (I.31.) SZTFH decree.*)
- This legal change was enhanced by the significant changes of energy market in 2022.
- Since the entry into force of the new legislation application of numerous geothermal projects have been submitted to the mining authority (over 70).
- Aim of the projects are mostly binary power plant, thermal water heating of public buildings and industrial parks and district heating systems. The first permissions were issued at the end of summer.

- The Mining Bureau and the Geological Survey divisions of SARA (Supervisory Authority for Regulatory Affairs) aim to help geothermal developments through websites and chat-rooms with organized geological, geophysical and hydrogeological information (OGRE https://map.mbfisz.gov.hu/ogre_en/#).

Hungarian district heating locations and realized geothermal systems



- Entrepreneurs were challenged by the drastic change of legal and licensing procedures, lots of questions and inquiry are arised
- In the case of ongoing developments and existing systems, further developments are still facing many challenges, as the authorization is partly carried out under the old and partly under the new legal environment.
- Though there are numerous towns with district heating system only 9 locations are supplied by geothermal energy.
- One of the largest scale development is the [Szeged District Heating System](#), where the geothermal transition is realized step by step and still is an ongoing process.

Operational Layers

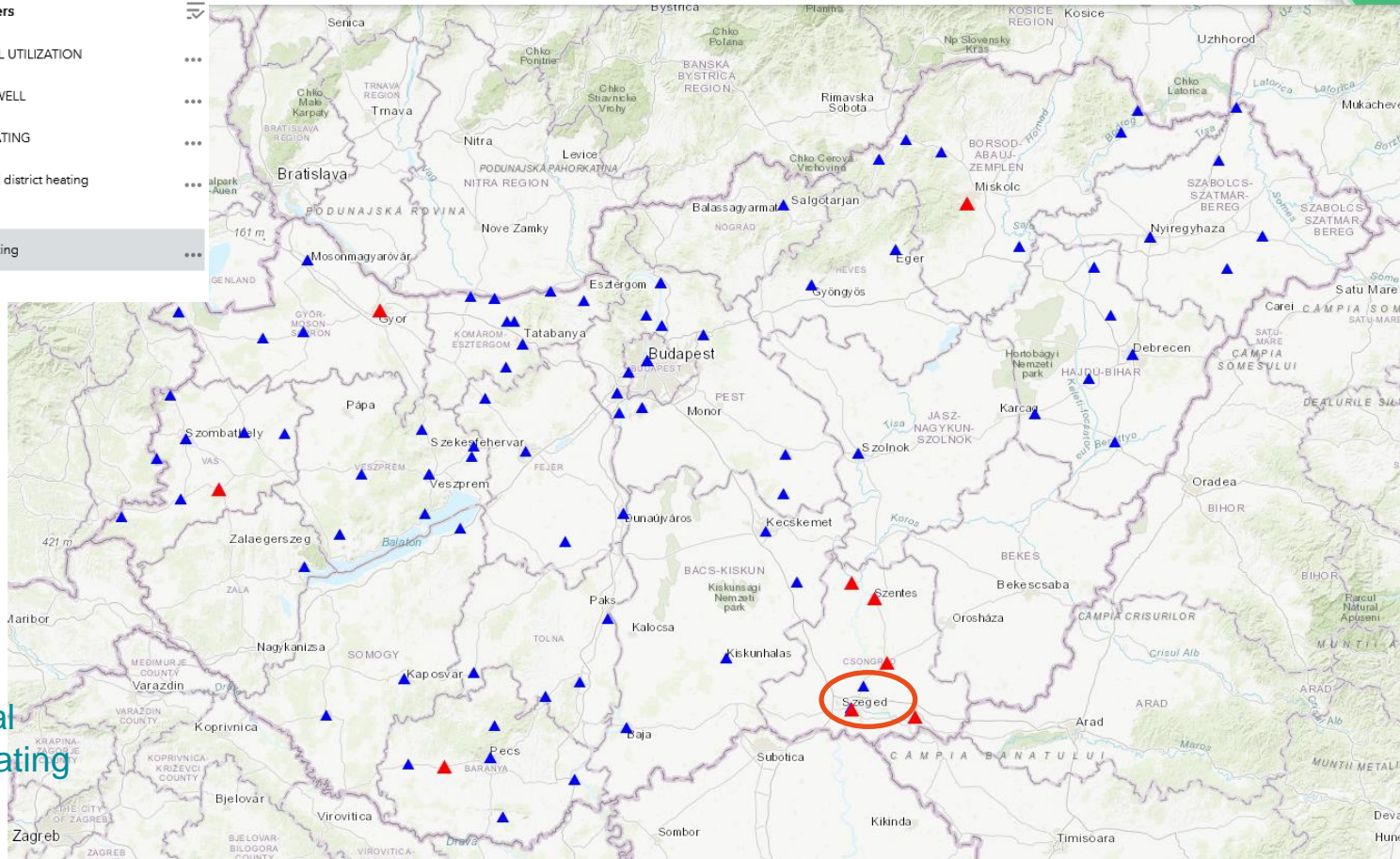
GEOTHERMAL UTILIZATION

BOREHOLE, WELL

DISTRICT HEATING

Geothermal district heating

District heating



Szeged
Geothermal
District Heating
System

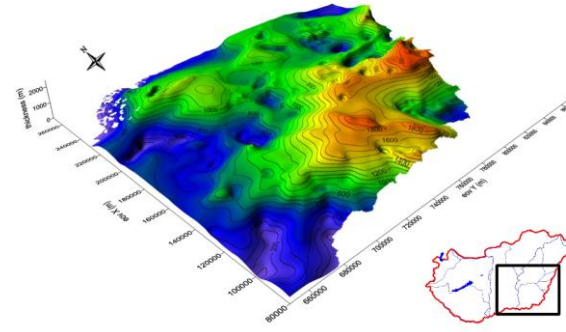
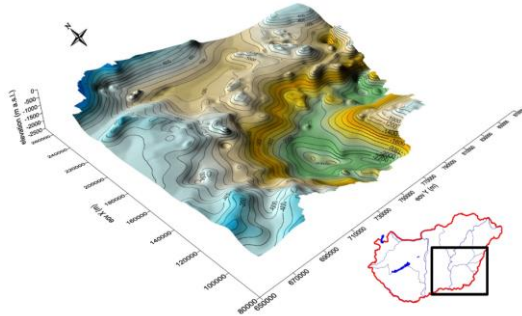
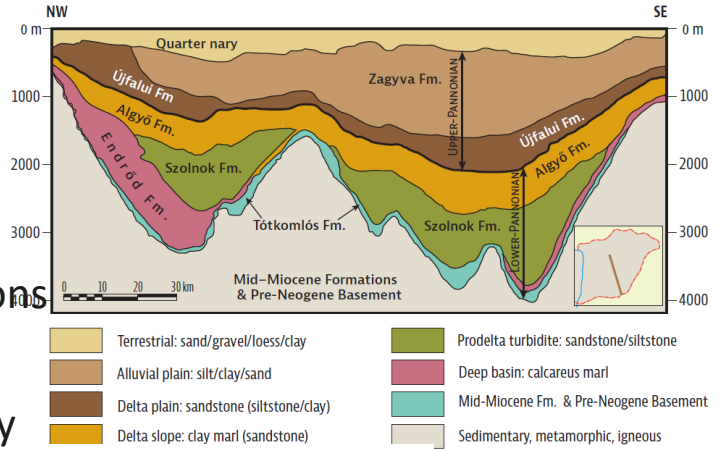
The Szeged District Heating System

- Information is from **SZETÁV**, the District heating company
- Szeged is a university town, health center of southeast Hungary, with population of **162 000**,
- District heating supplies
 - **27 256** residents, **433** institutions
 - **23** boiler houses with 1-20 MW boilers and **239** heating centres
 - **215** km pipelines
- Consumption
 - Natural gas **27 128 571 m³/y**, electricity **6 433 618 kWh**, **55 417 t/y** CO₂ emission
 - Output heat energy **573977 GJ/y**, domestic hot water **193 374 GJ/y**
 - Total output **767351 GJ**



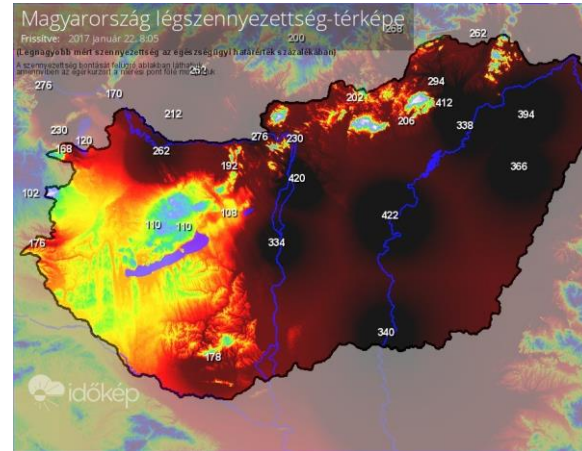
Possibilities: the Geothermal Potential

- Thickness of the thermal aquifer: 1,800 – 2,000m
- Geothermal gradient: 150% of the world average
- Average well yields: 90 °C, 70 m³ /hour
- First wells for artesian drinking water with oil indications
- Reservoir well researched by CH industry
- Already operating geothermal systems, spa's in nearby towns



Possibilities: Heat market

- sizeable heat-market
- insecure and expensive energy supply
- run-down DH infrastructure
- bad air quality
- natural gas from free market
- state controlled end-user prices

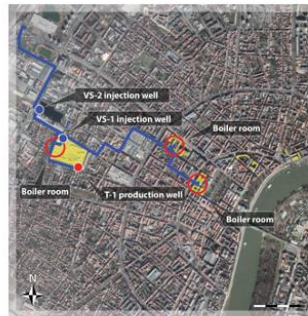


Transition to Geothermal

- 2014: Two privately owned geothermal heating circuits are built and start to operate in Szeged providing for the University, the single largest heat consumer in the city
- 2017: Integration of geothermal energy is initiated in the 15 largest heating circuits of the DH Company in Szeged (the single largest air polluter of the city), offering a cleaner and more secure alternative for DH and HMW production
- Plan is 9 well triplets, 1 production well with two reinjection wells
- 97 thermal wells exist at Szeged
- 23 for energy production (1 well 1962, 2 wells 1983, 1 well 1996)
- Since 2013 19 wells were drilled, among them 11 reinjection wells



Switch our heating circuits to geothermal



Summary of the 9 projects

- Started late **2019**
- Total budget: **63 000 000 Euro's**
- **50%** EU funding (ERDF), **50%** private investment of the drilling / operator company
- Total number of residences: **26 338 (97%)**
- Total number of institutions: **233 (54%)**
- Natural gas saved (energy): **595 887 GJ/year (82%)**
- Natural gas saved (volume): **17 525 718 m3 /year (68%)**
- Thermal energy in district heating: **536 298 GJ/year**
- CO2 emission saved: **34 699 t/year (65%)**

SZETAV will purchase the heat content from the geothermal operator

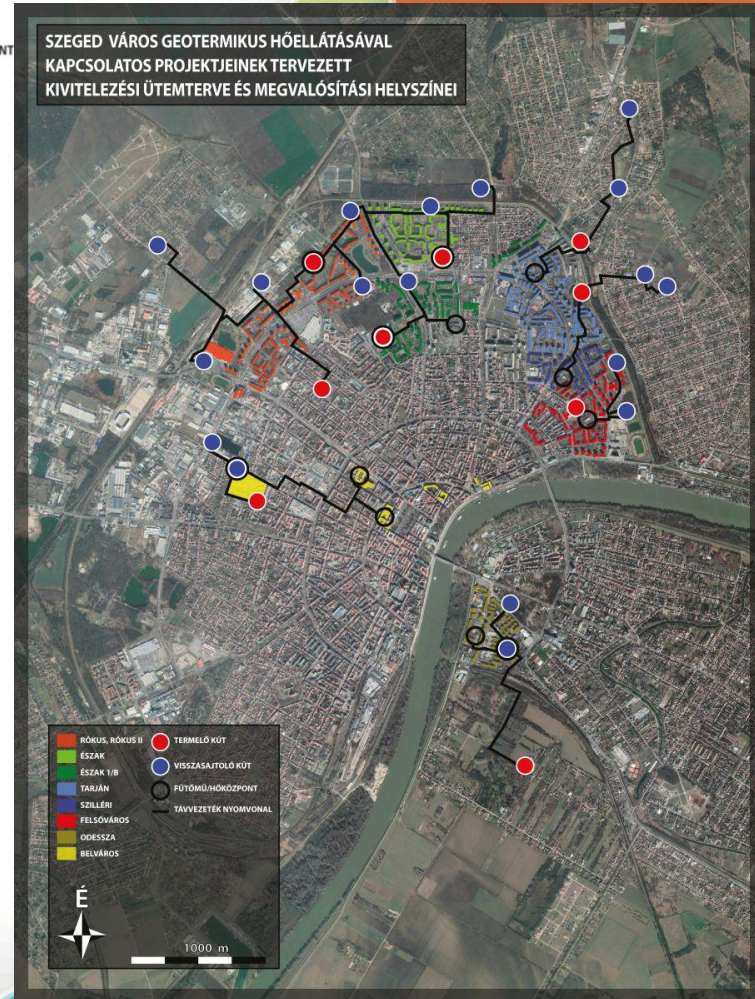
Present progress

- Drillings are on-going
- 2 rigs working in the city 24/7
- 9 wells are completed, 2 being drilled simultaneously
- Complaints about noise, smell and mess
- Most of these problems are addressed to the DHC, but basically all these are assumed by the drilling / operator company, not us.
- Nevertheless, the City Hall is about to start a new “Green Szeged” campaign and the geothermal developments will be the flagship project of that.

Conclusion

The Szeged geothermal system

- is a well-thought-out, well-founded project,
- Strong geological, hydrogeological knowledge base
- developed step by step,
- development is still ongoing,
- where politics and university experts support the DHC .





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THANK YOU FOR YOUR ATTENTION