



**GEOtherMAL**  
IWG

Iceland  
Liechtenstein  
Norway grants



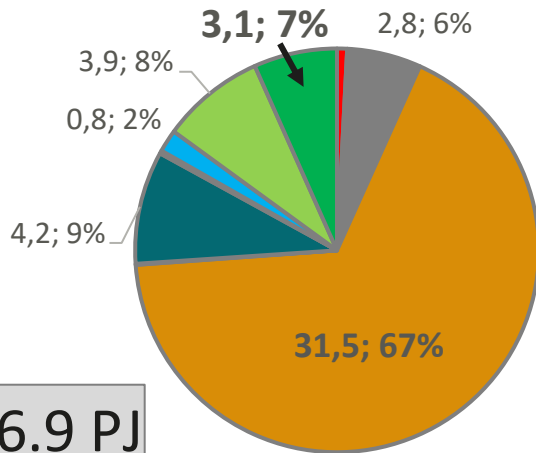
REPUBLIC OF SLOVENIA  
MINISTRY OF THE ENVIRONMENT,  
CLIMATE AND ENERGY

# Geothermal Energy in HUNGARY

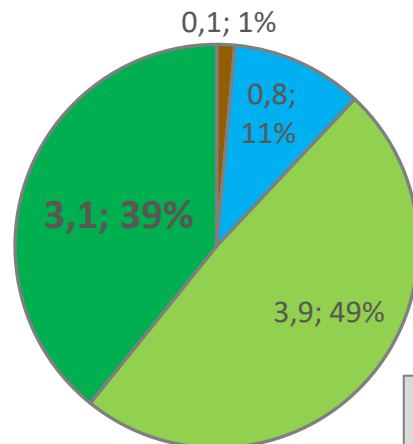
Imre Szilágyi

# Geothermal heat production, 2022E: 3.1 PJ

Share by sources (PJ ; %)



Renewables (PJ ; %)



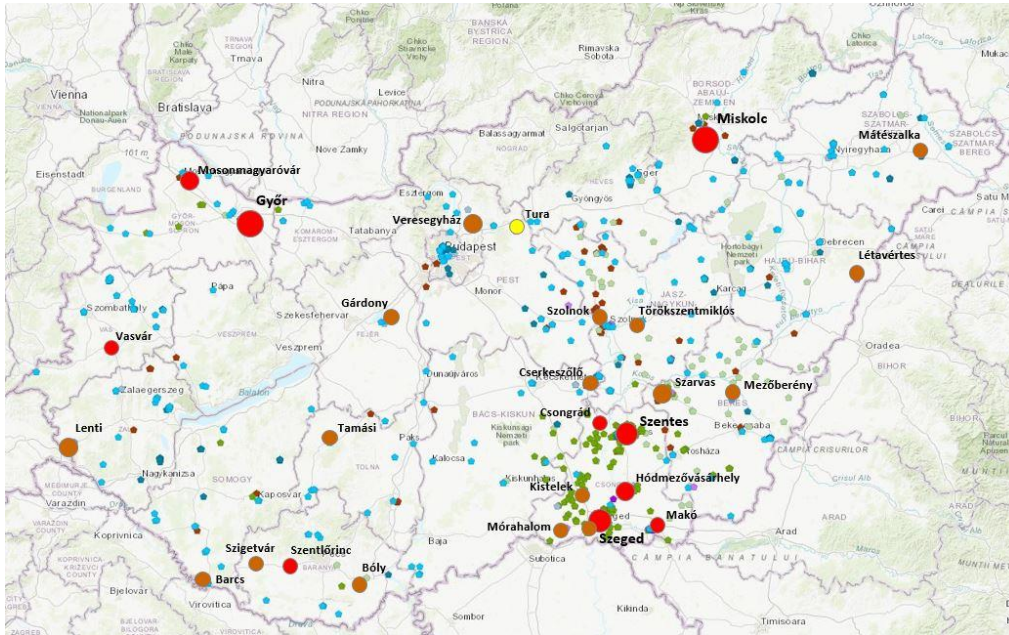
- Nuclear
- Coal
- Gas
- Oil
- Other
- Biogas
- Waste
- Biomass
- Geothermal

- Biogas
- Waste
- Biomass
- Geothermal

# Geothermal production

Geothermal production, 2022E: 6.6 PJ - ~ 1000 thermal wells

Share in primary energy production: 1.5%



- District heating
- Town heating
- Agriculture
- Balneology & space heating
- Industrial heating
- Power

GHSP, 2021: ~ 161 GWh (0.6 PJ)

UTES, 2021: ~ 4 GWh (0.01 PJ)

# Geothermal production

Installed capacities, 2021: 1.02 GW

- Agriculture – 402 MWt
- District & town – 330 MWt
- Balneology & buildings – 263 MWt
- Industrial – 28 MWt
- Power – 3.3 MWe



GHSP, 2021: ~ 81 MW

UTES, 2021: ~ 4 MW

# Geothermal exploration

## Permit requests (as of 06.12.2023)

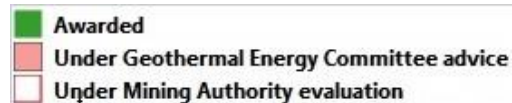
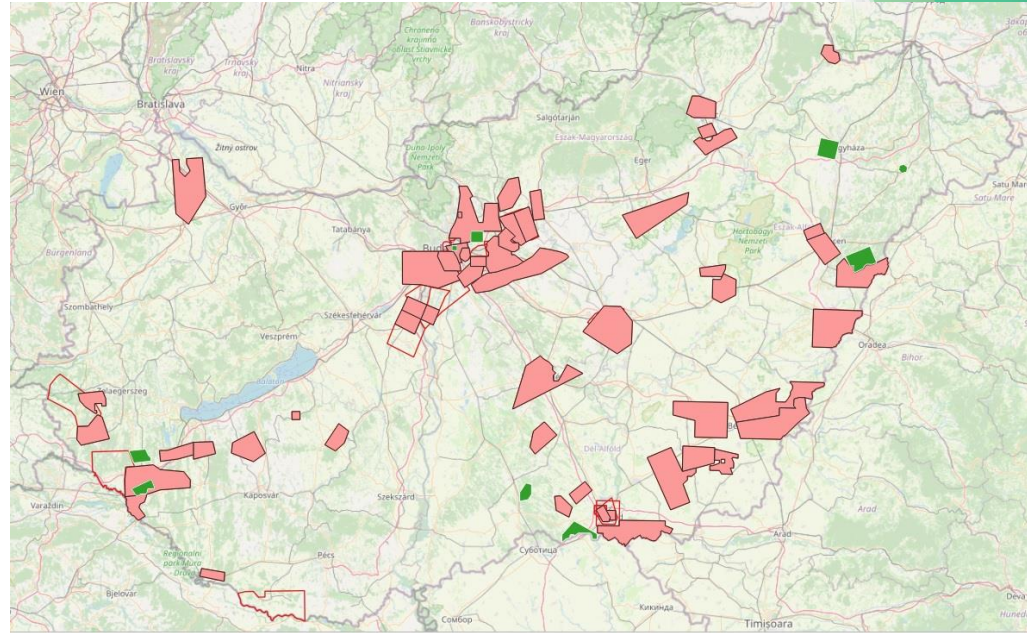
- Awarded: 9
- Geothermal Energy Committee: 56
- Mining Authority: 15

## Exploration targets

- Fractured carbonates
- Porous sandstones

## Business goals

- Power & heat cascade
- Industrial heating
- District heating



Status: 06 Dec. 2023

# Strategy & policies

## Strategy goals

- Increase geothermal energy usage by 20% (from 6.4 to 8.0 PJ) till 2026
- Double share of geothermal in total heat production (from 6.5% to 12%) till 2030

## Policies

- National Energy Strategy
- National Energy and Climate Plan

## Growth opportunities (in decreasing order)

- Industrial (incl. agriculture – food) and town heating cascades
- District heating
- Power

# Regulation & permitting

## Legal framework

- Mining Act (Act No. XLVIII of 1993) – Exploration and exploitation of mineral resources
- Decree No. 20/2022. (I.31.) § 12-15 – Exploration and usage of geothermal energy
- Decree No. 178/2023. (V.12.) – Geothermal Energy Committee

## Permitting

- Exploration permits issued by the Mining Authority (4+2 years)
- Drilling permits
- Exploration closing report – Protective zone (exploitation license)
- Geothermal utilization contract (35+17.5 years)

## Regional authorities involved in permitting

- Water, Environmental and Nature Protection Directorates & Others

# Commerciality & subventions

## Commerciality per sectors

- **Power:** Operational cash-flows positive; Investment returns may not be secured
- **Industrial heating:** Market pricing may provide positive NPVs
- **District heating:** Uncommercial (regulated prices, fixed returns, lack of incentives)

## Subvention plans

- Second Swiss Contribution Support Measure (SM06)
  - Improvement of geothermal energy efficiency (12 mn CHF)
- Recovery and Resilience Facility 2
  - Subsurface risk mitigation (64 mn EUR)
  - Preferential loan scheme for geothermal investments (450 mn EUR)



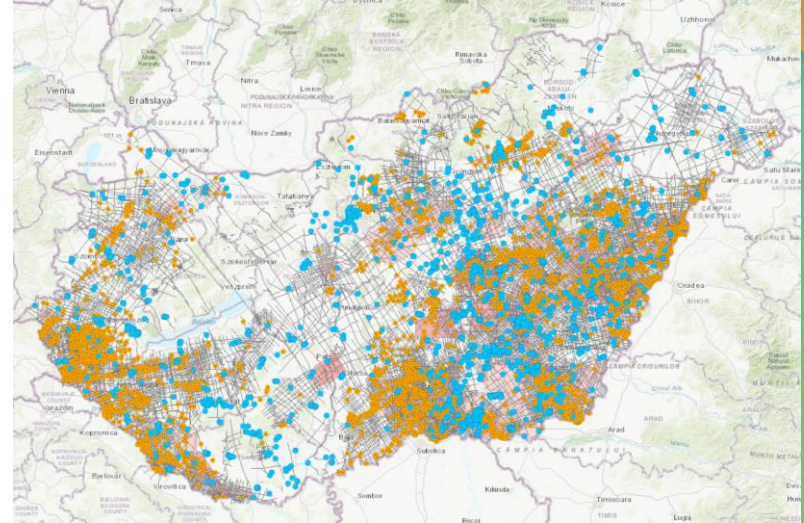
# Strengths & challenges

## Strengths

- Excellent resource base
- Exploration maturity (seismic data, wells)
- Availability of geoscience database
- Geothermal Information Platform (OGRe)

## Challenges

- Increasing geological risks – Moving out from the geological comfort zone
- Reinjection – Clogging problems with porous reservoirs
- Aquifer management – Vulnerability; Interference with other fluid production zones
- Capacity building – Drilling rigs; Surface constructors, Human expertise



# Conclusion

Significant existing geothermal heat production

High unrisked resource potential – Increasing geological risks

Extensive exploration campaign – Ambitious strategic goals

Highest growth potential in industrial and town heating

For district heating commerciality is a bottleneck

Subventions: risk mitigation & preferential loan