

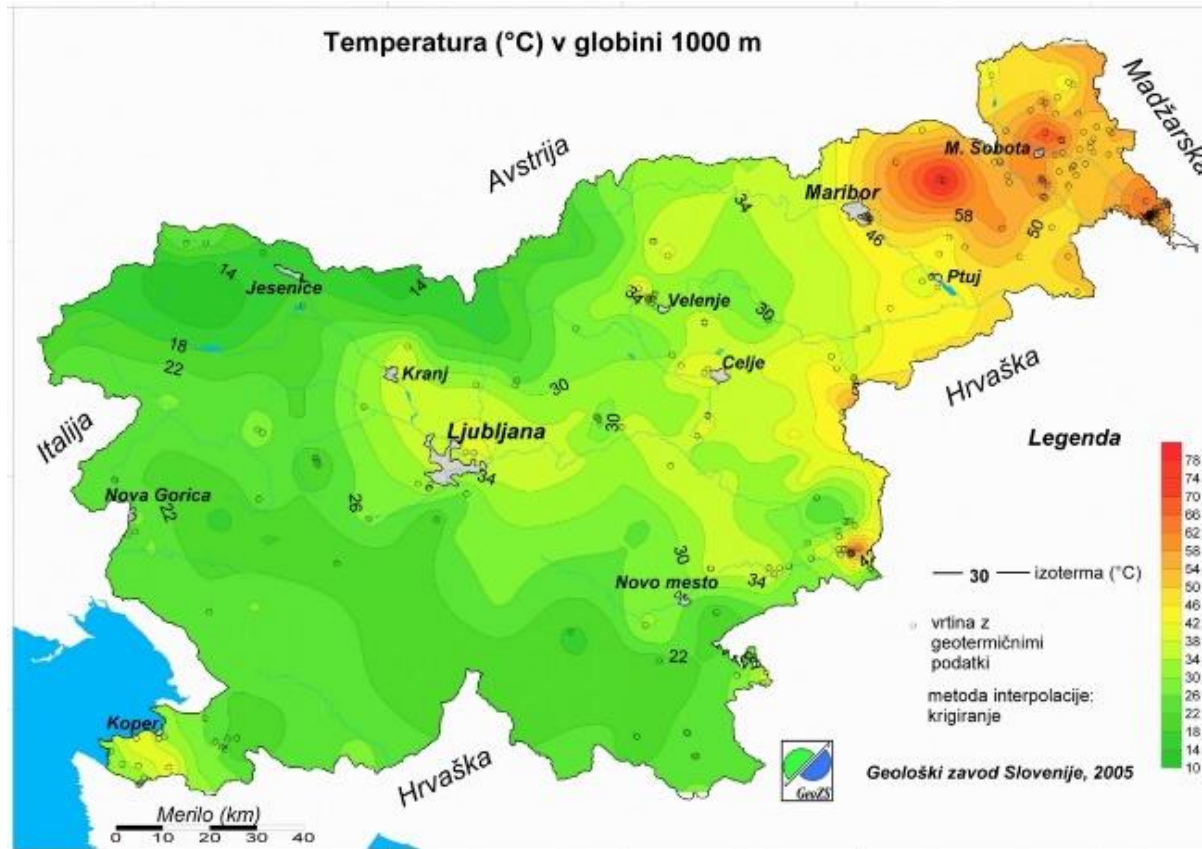
# GEOHERMAL PROJECTS IN SLOVENIA

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# OVERVIEW OF GEOTHERMAL POTENTIAL



- **SHALLOW GEOTHERMAL**  
depth up to 300 m  
temperature up to 25°C
- **MIDDLE GEOTHERMAL**  
depth from 300 m to 2.000 m  
temperature up to 75°C
- **DEEP GEOTHERMAL**  
depth above 2.000 m  
temperature up to 100°C



# GEO THERMAL UTILIZATION

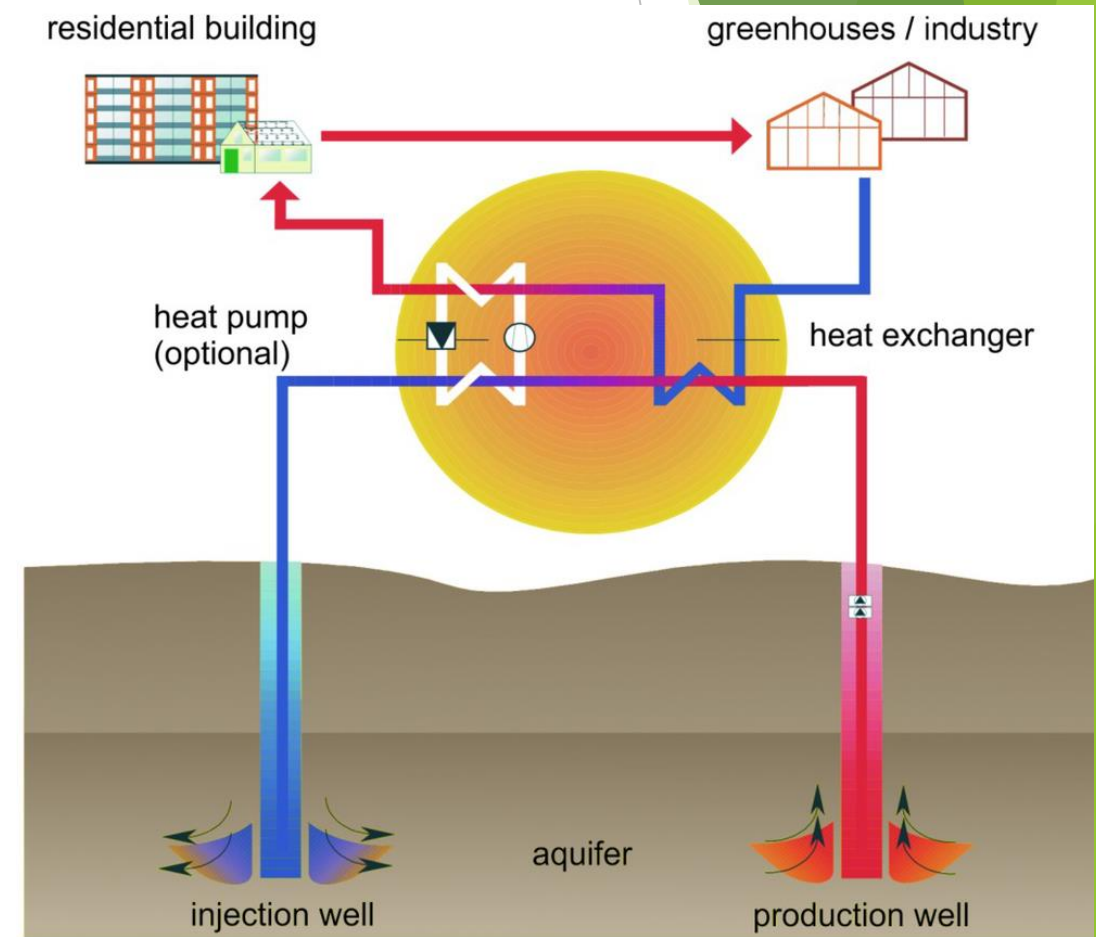
## SHALLOW GEOTHERMAL

- ▶ Recognized as an important renewable resource.
- ▶ Widely available, environmentally safe and economically sustainable.
- ▶ Encouraging environment and subsidizing investments in the entire area of Slovenia.
- ▶ This type of energy use has been on the rise for the past few years.
- ▶ The most widespread method of using geothermal energy.

# GEO THERMAL UTILIZATION

## MIDDLE GEOTHERMAL

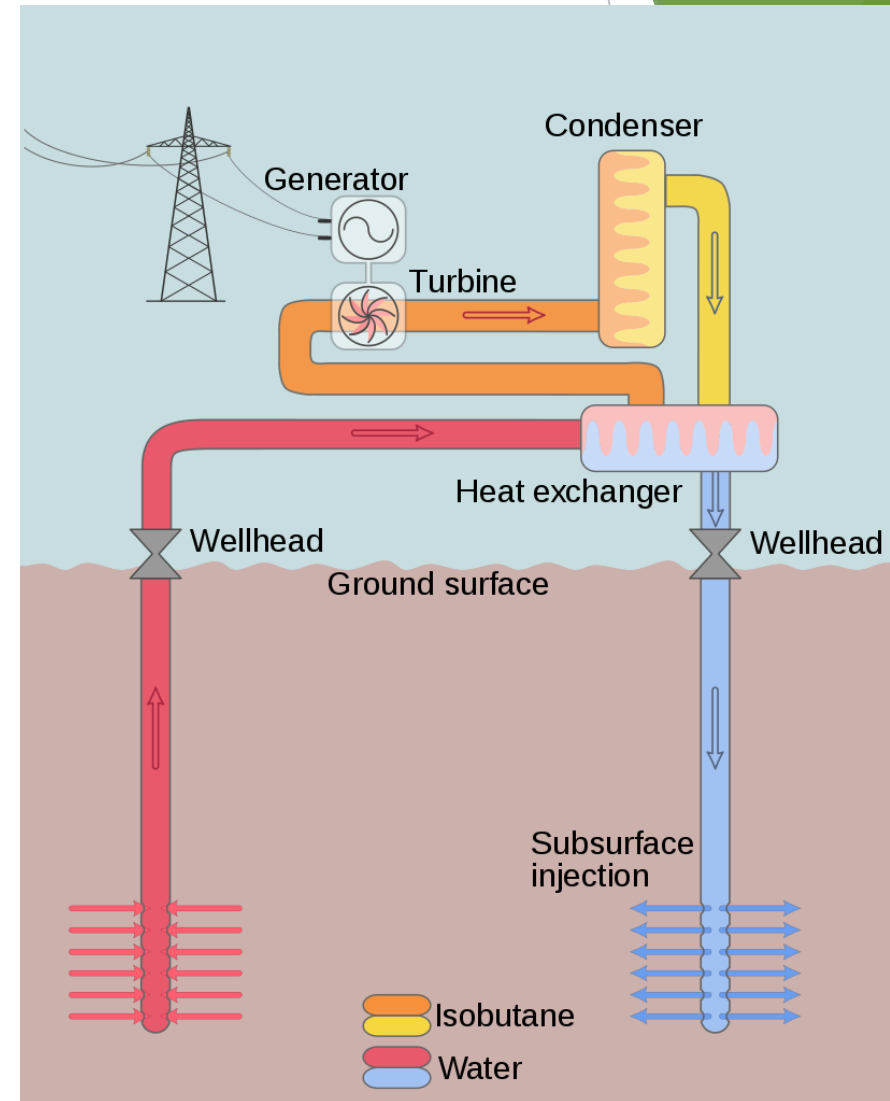
- ▶ a locally important source of energy geothermal,
- ▶ systems with significantly higher temperatures,
- ▶ it is primarily used for balneological,
- ▶ purposes use via heat exchangers,
- ▶ heating of buildings, district heating and heating of greenhouses.



# GEOHERMAL UTILIZATION

## DEEP GEOHERMAL

- ▶ not developed,
- ▶ location uncertainty,
- ▶ high implementation costs,
- ▶ there are indications that deep geothermal energy can be found at depths greater than 4.000 m,
- ▶ there are not enough suitable research wells in the Republic of Slovenia,
- ▶ seismic acquisition is mandatory.



# ONGOING PROJECTS

## ▶ Shallow geothermal projects

- ▶ are widespread and implemented on a daily basis all over the state.

## ▶ Middle geothermal projects

- ▶ The last project was implemented in 2012/2013.
- ▶ Currently an active project in Moravske Toplice (Mt-9).

## ▶ Deep geothermal projects

- ▶ One close loop system established in Lendava (Pg-8).
- ▶ New legislation in place to help development.



# ONGOING PROJECTS

## ▶ Middle geothermal projects

- ▶ Currently one active project in Moravske Toplice (Mt-9).
- ▶ More efficient use of energy.
- ▶ Improving the balance of production and extraction.

## ▶ Goals and Challenges

- ▶ Improving the regional aquifer pressure for long lasting production.
- ▶ No possibility to get just one well for production, a doublet is mandatory



# PERMITTING

## ▶ Execution permits

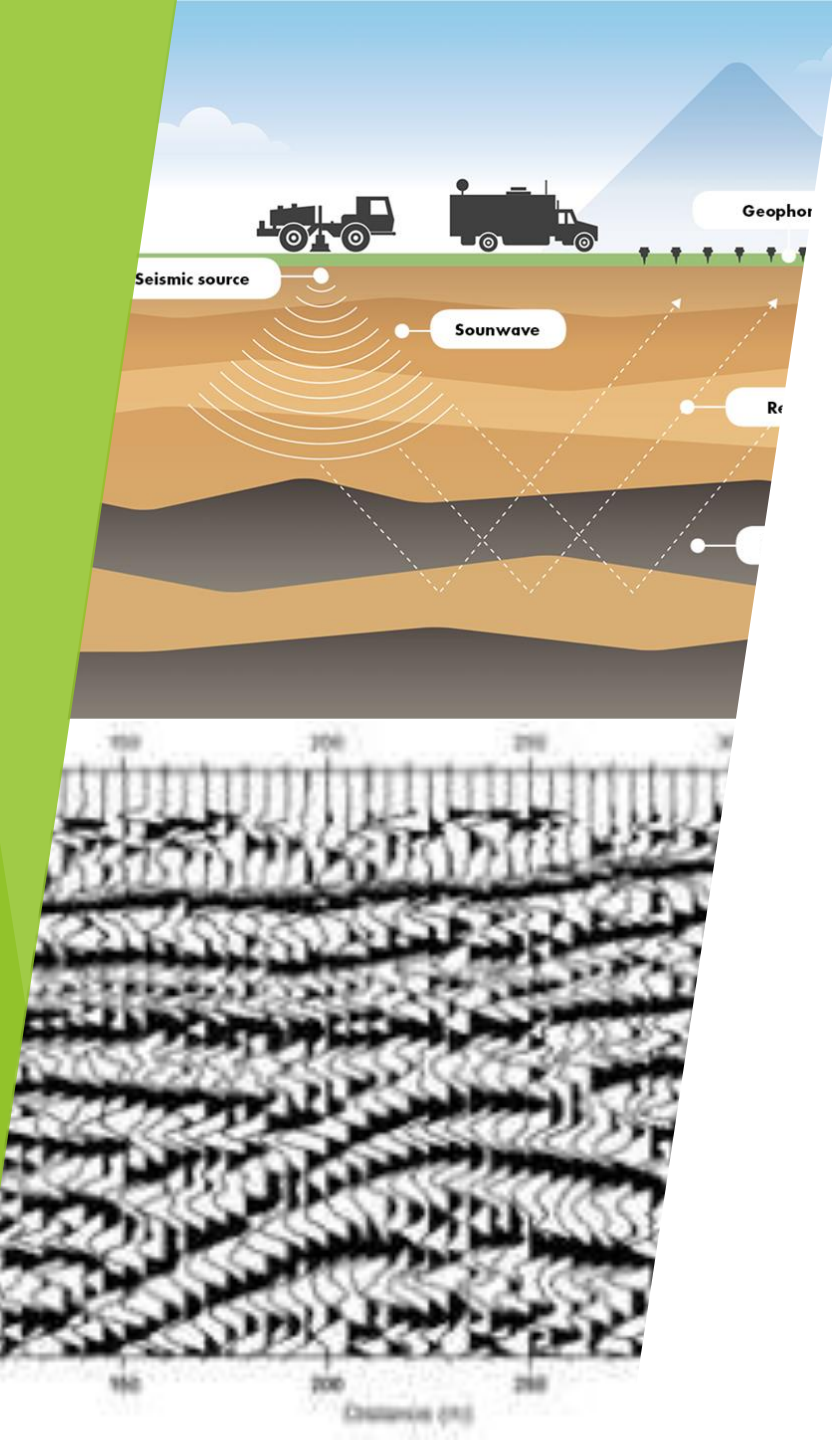
- ▶ permit for groundwater research,
- ▶ water consent,
- ▶ execution of a preliminary procedure (EIA).

## ▶ Drilling Contractor

- ▶ No Slovenian Contractor for middle and deep geothermal drilling.
- ▶ International tender.
- ▶ Certification of contractors.







# FIRST STEP

## ► Geology

- 2D seismic available, but old.
- New geophysical data would be appreciated.
- Depth prediction of target aquifers.
- Injectivity capability of aquifers.

## ► Land limitation

- Hard to get building permit.
- Drilling deviated wells.

# OPPORTUNITIES AND CHALLENGES

- ▶ **Establishing a stimulating environment for the further development of geothermal energy**
  - ▶ Create a legislative framework within which the conditions for users of geothermal energy are defined.
  - ▶ Establish a single platform that will regulate all geothermal resources.
  - ▶ Establish appropriate monitoring for existing users.
- ▶ **Considering global trends and the tendency to use renewable energy sources, Slovenia has a great opportunity**
  - ▶ It is important to continue the trends in shallow geothermal.
  - ▶ Activities in the field of middle geothermal energy should be increased.
  - ▶ Deep geothermal energy has a potential that remains unexplored and consequently untapped.

# OPPORTUNITIES AND CHALLENGES

## ▶ **Economic aspect**

- ▶ The costs of developing medium and deep geothermal energy are high.
- ▶ Introduction of systemic financing in medium and deep geothermal energy.
- ▶ Provide funds from existing concessions.
- ▶ Establishment of reinjection on all geothermal systems.

# CONCLUSION

- ▶ Geothermal energy is not always the first choice for energy supply.
- ▶ Given the natural conditions, it is necessary to define the priority use of geothermal energy in individual regions of the Republic of Slovenia.
- ▶ Shallow geothermal is practiced very widely with subsidizing. Therefore, the use of renewable energy sources throughout the territory of the Republic of Slovenia is increasing.
- ▶ It would make sense to prepare legislation that would only regulate this area.
- ▶ Providing funds for the further development of medium and deep geothermal energy, would help to create a better environment for such investments