

An aerial rendering of a geothermal power plant facility. The main structure is a large, rectangular building with a dark, flat roof supported by a blue metal frame. It is surrounded by lush green trees and a paved parking area. A road or path leads towards the building. The background shows rolling green hills under a clear sky.

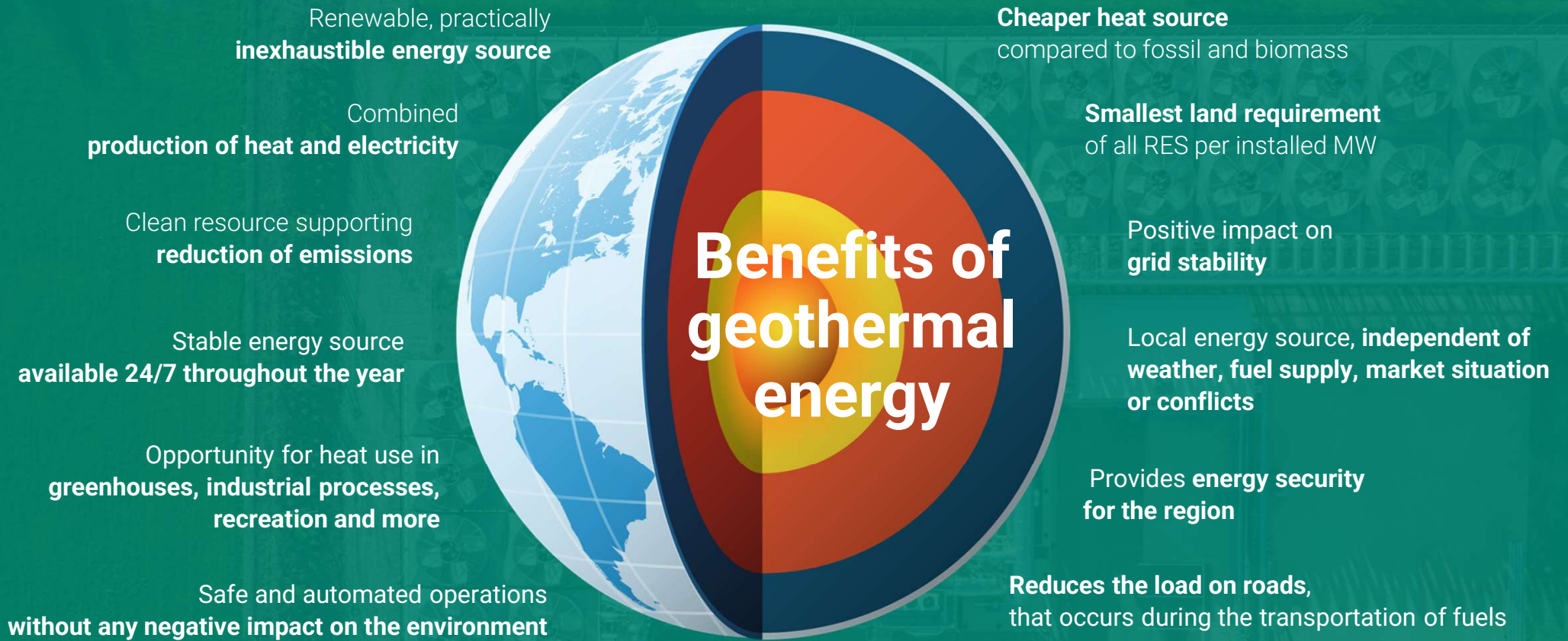
Development of Geothermal Energy in Slovakia

Prešov – PW Energy, a.s.

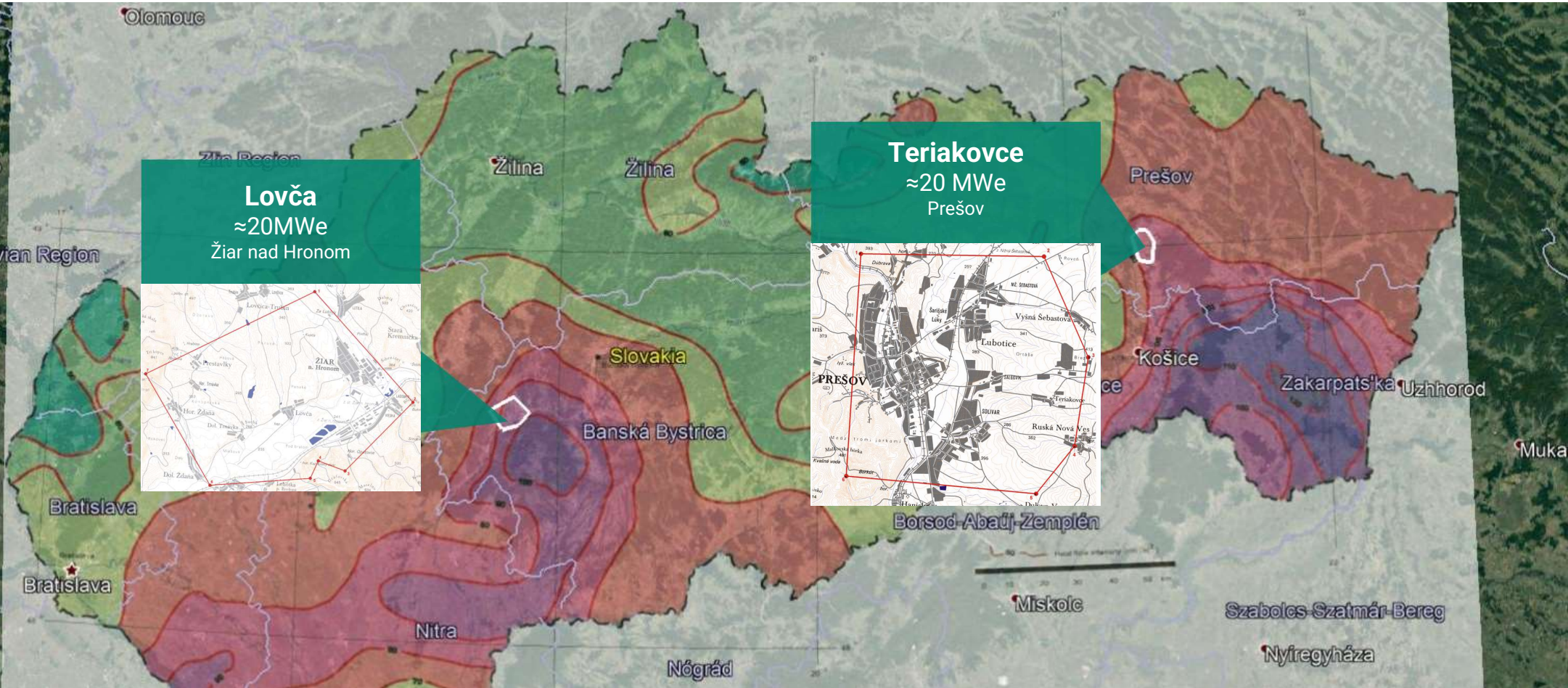
Žiar nad Hronom – PW geoenergy a. s.

(joint venture PW Energy, a.s. & Stredoslovenská energetika Holding, a. s.)

Benefits of Geothermal Energy



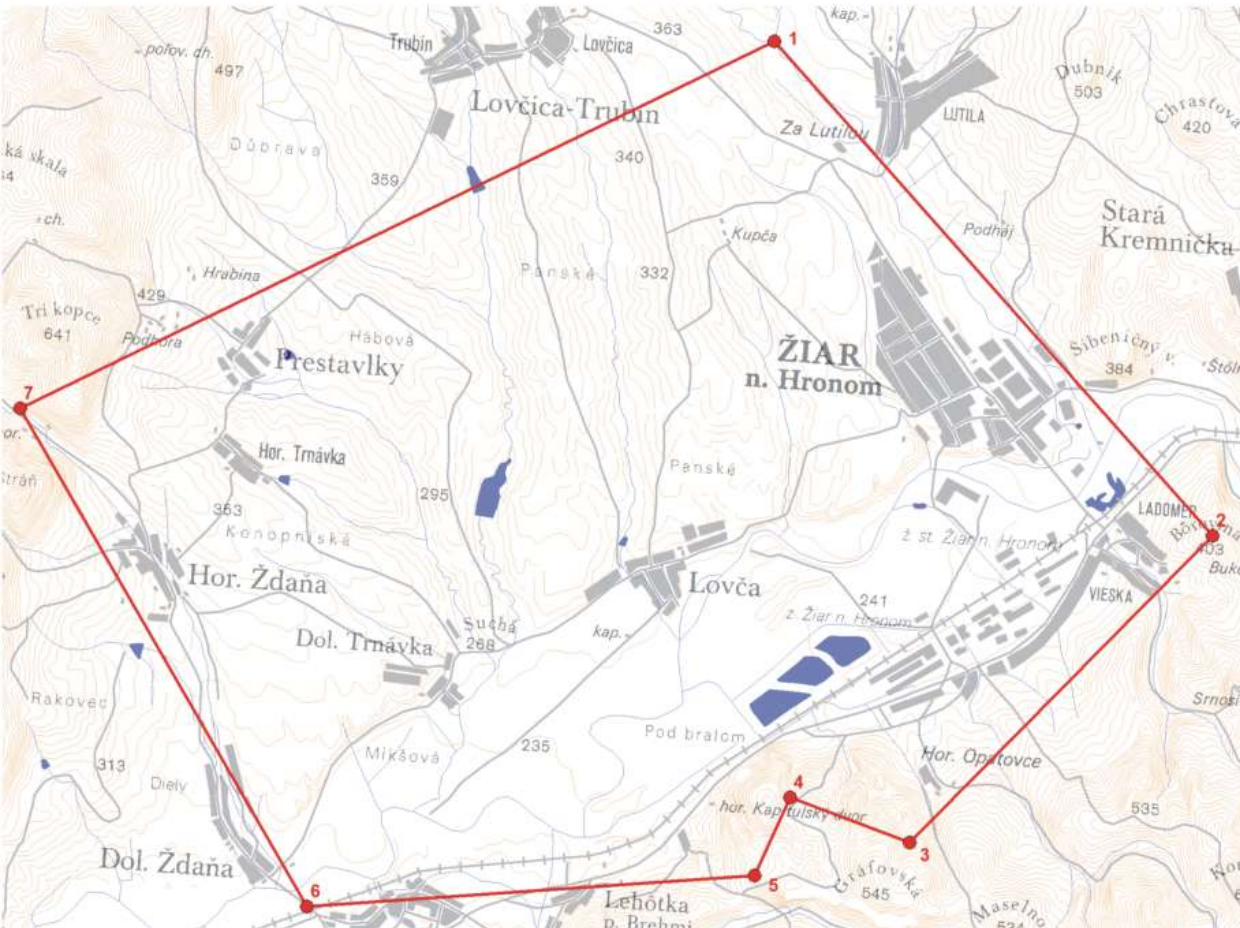
It is estimated that in the depth of three to five kilometers of Earth's crust, enough heat is preserved to cover human energy consumption for at least another 100,000 years.



- Identified based on **years of research** done by **leading Slovak and World experts**
- Identification of concessions has been done by experts from the fields of:
 - Geology
 - Geophysics
 - Hydrogeology
 - Geothermal resources exploration
- **Mr. James Koenig**, leading expert in the field of geothermal exploration and founder of GeothermEx took part on the exploration and identification of the concessions and is still an advisor to PW Energy
 - World's most significant geothermal resources have been developed thanks to the work of Mr. Koenig



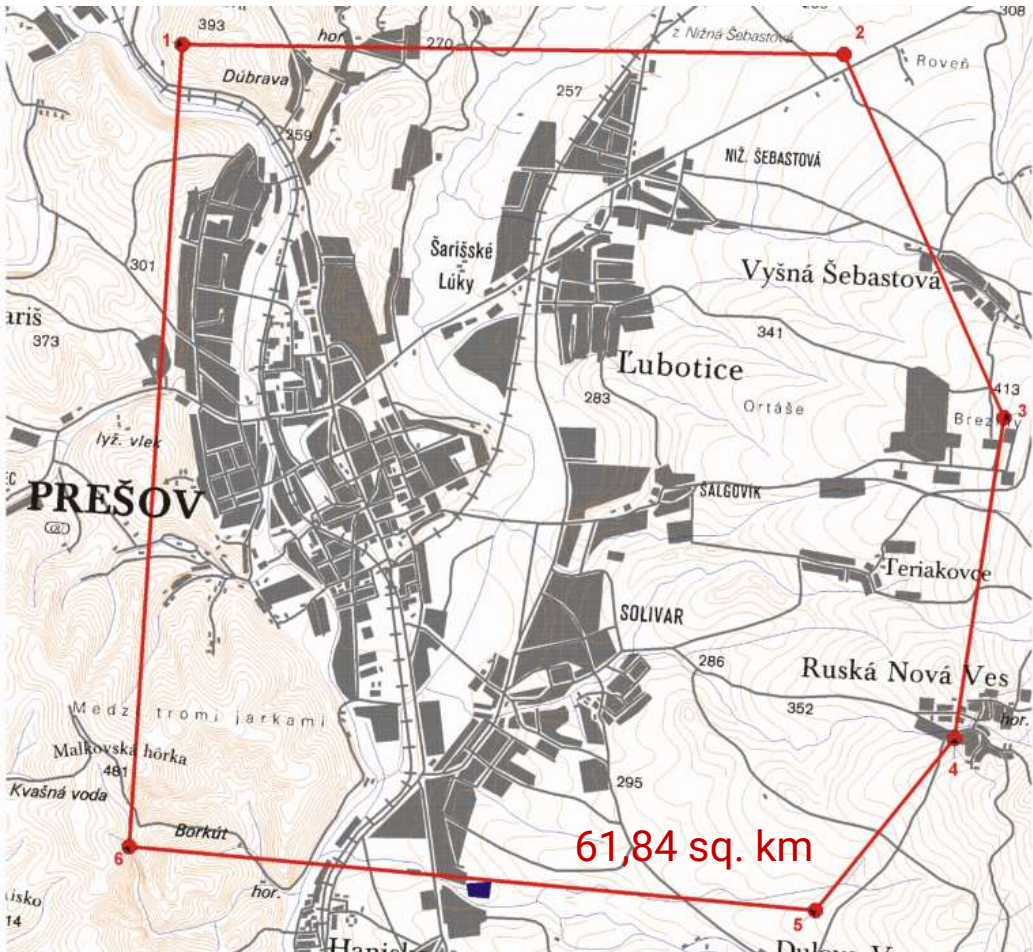
Lovča Concession Status



Strategic partner

- Geological survey and target reservoir assessment competed.
- Additional seismic survey performed in 2019 on profiles with total length of 18,5 km
- EIA for the 1st phase in an advanced stage with expected finalization around Q3 2023
- Land plots for project's first phase development have been acquired.
- Drilling of the exploratory well is planned for Q2/Q3 2024 with reinjection well following
 - Tender documentation in review by the national agency for public procurement

Teriakovce Concession Status



- Geological survey and target resource assessment completed.
- Additional seismic survey performed in 2019 on profiles with total length of 14,5 km
- Existing pilot well from 70s provided data on heat and water
- Resource is considered discovered
- EIA process completed
- Land plots for project's first phase development have been acquired.
- Exploratory well drilling planned for second half of 2024.

Performed surveys and research indicate that the **potential capacity of each concession is around 250 MW thermal, equal to around 20 MW electric** by using binary power plants - ORC.

Based on the expected parameters, it is **possible to utilize the geothermal resources for:**

- Production of **electricity using ORC**
- Direct heat supply to local industries and district heating
- Residual heat use:
 - Potential for district heating supply for the city of Prešov
 - Potential heat supply to local industries
 - Cooling
 - Heating of green houses
 - Recreation - heating of public pools
 - Food processing
 - etc.



Anticipated annual production by both fully developed projects = 6 power plants:

- Electricity:
 - combined capacity \approx 40 MWe
 - generating \approx 280 GWh / year

Anticipated parameters of the aquifer:

	Depth	Temperature
Top of the aquifer	\approx 3000 m	\approx 125°C
Bottom of the aquifer	\approx 4000 m	\approx 165°C

Anticipated parameters and capacity of one well at the well head:

Mass Flow	Temperature	Electric potential
\approx 60 lps	\approx 140°C*	\approx 2,1 MWe**

* Based on the latest findings about the geological structure, it is possible that the well head temperature will be higher than anticipated.

** Potential electricity production capacity is calculated based on ORC output temperature of 62°C



Project development for the construction of ≈ 20 MWe is planned in two phases, within 3 power plants, **on each concession**:

1. **First phase** – development of one geothermal power plant with an installed capacity of $\approx 6,5$ MWe, with a **planned investment** ≈ 62 mil. €
2. **Second phase** – development of two additional geothermal power plants, with collective installed capacity of ≈ 13 MWe, with a **planned investment** ≈ 123 mil. €

Totaling to ≈ 20 MWe within three power plants, with a **total planned investment** ≈ 185 mil. €

Anticipated annual gross production of energy in a fully developed project:

- **Electricity (20 MWe) ≈ 140 GWh / year**
- **Residual heat (70 MWth*) utilizable ≈ 170 GWh / year**

*from 62°C to 35°C

Estimates may be subject to change based on the reservoir capacity, production parameters, technology and the market situation, all of which will be specified after the initial drilling and flow tests.

“In closed-loop binary-cycle (ORC) power plants, where the extracted geothermal fluid is passed through a heat exchanger and then completely injected, the operational CO₂ emission is near zero.” [IPCC, 2014*]

Annual CO₂ savings with the PW Energy geothermal projects compared to conventional power production methods based on IPCC – LCA median data and annual cumulative production of 280 GWh of electricity.

Energy Source Type	Life-cycle assessment (LCA) [gCO ₂ eq/kWh] - median
Coal	820
Biomass - cofiring	740
Gas	490
Biomass - dedicated	230
Geothermal	38

Energy Source Type	Tons of CO ₂ per year - saved
Coal	219 000
Biomass - cofiring	197 000
Gas	127 000
Biomass - dedicated	54 000

*IPCC, 2014: Annex VI: Permissions to Publish. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.



PW Energy Geothermal power plant visualization



source: PW Energy

A photograph of a geyser erupting, with a large plume of white steam rising into a clear blue sky. The foreground shows a rocky, brownish landscape with some water pools.

Thank you for your attention

For more information, please contact PW Energy, a.s.

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