



Geothermal Power Plant Žiar nad Hronom

Clean and sustainable energy from underground



GEOTHERMAL ENERGY AND ITS ADVANTAGES

- ✓ **renewable** energy source, practically **inexhaustible**
- ✓ **stable** energy source available throughout the year as opposed to wind or solar energy
- ✓ contributes in overall to **lower emissions** and environmental protection
- ✓ **local energy source**, independent of international situation and conflicts
- ✓ improves the region's **energy security**
- ✓ **safe operations**; may be situated in the vicinity of agricultural production and food production
- ✓ has a **positive impact** on the stability of the distribution grid
- ✓ **reduces the road load** that occurs by transporting fossil fuels
- ✓ can provide **cheaper heat** than fossil fuels

Geothermal energy is the oldest form of energy on the planet. It represents the heat stored beneath the Earth's surface, an endless source of renewable energy, which is available constantly throughout the whole year. Estimates show that just in three to five kilometers of Earth's crust, enough heat is preserved to cover human energy consumption for at least another 100,000 years.

It can be used for electricity, heating, cooling, and energy storage for countless uses in buildings, industry, and agriculture. This makes it the most versatile and reliable renewable energy source. The projected increase in geothermal energy use in the European Union is expected to rise from the current 3 300 MWe to between 6 000 and 10 000 MWe over the next 10 years.

FIRST GEOTHERMAL POWER PLANT IN SLOVAKIA

GREEN ENERGY

The company has introduced its first project for the utilization of geothermal energy for power production within the first planned geothermal center in the Žiar nad Hronom region with a planned installed capacity of around 6,5 MWe, using the ORC technology.

Surveys and research indicate the geothermal resource has a capacity of around 250 MWt, or 20 MWe (overall potential of the Lovča geothermal concession).

The anticipated 43 GWh annual production of electricity corresponds to the consumption of nearly 20 000 Slovak households.

Anticipated geothermal parameters of the aquifer

	Depth	Temperature	Temp. gradient/km
Top of the aquifer	≈ 3 100 m	≈ 124 °C	≈ 40 °C
Bottom of the aquifer	≈ 4 100 m	≈ 164 °C	≈ 40 °C

Anticipated parameters of one well at the well head

Mass flow	Temperature	Electric potential*
≈ 60 lps	≈ 140 °C**	≈ 2,1 MWe

* Potential electricity production capacity is calculated based on ORC output temperature of 55 °C

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

Emissions of selected electricity supply technologies

Energy source type	Median Life-cycle assessment (LCA) [gCO2eq/kWh]
Coal	820
Biomass – cofiring	740
Gas	490
Biomass – dedicated	230
Geothermal	38

Annual CO2 savings with the PWE geothermal projects compared to conventional power production methods based on the above ICCP – LCA median data and annual production of 140 GWh¹

Energy source type	Tons of CO2 per year – saved
Coal	109 480
Biomass – cofiring	98 280
Gas	63 280
Biomass – dedicated	26 880

UTILISATION OF RESIDUAL HEAT



DISTRICT HEATING



HEAT SUPPLY TO LOCAL INDUSTRIES



COOLING



HEATING OF GREENHOUSES



HEATING OF PUBLIC POOLS



FOOD PROCESSING

PARAMETERS & CURRENT STATUS

PROJECT DETAILS

The project development for the construction of a total of ≈ 19 MWe is planned in two phases:

- 1. Present, initial phase** – development of a single geothermal power plant with an installed capacity of about 6,5 MWe (3 production and 3 re-injection wells).
- 2. Second phase** – development of 2 additional, similar power plants, with a collective installed capacity of about 13 MWe (6 production and 6 re-injection wells), totalling to nearly 20 MWe within 3 power plants, to utilize the maximum energy potential and keep the long term sustainability of the reservoir.

The anticipated annual production of energy in the fully developed project:

Electricity (19 MWe) ≈ 140 GWh / year
Residual heat (34 MWth) ≈ 80 GWh / year

Re-injection of the exploited geothermal water will ensure long term sustainability of the resource.

- **Geological survey and evaluation completed**
- **Land plots for project development have been identified and contracted**
- **EIA progressing in its final stage**
- **Drilling of the exploratory well is planned for Q2/Q3 2023**

¹ Schlömer S., T. Bruckner, L. Fulton, E. Hertwich, A. McKinnon, D. Perczyk, J. Roy, R. Schaeffer, R. Sims, P. Smith, and R. Wiser, 2014: Annex III: Technology-specific cost and performance parameters. In: Climate Change 2014: Mitigation of Climate Change