

ENGINEERING
TOMORROW

Danfoss

Case study | Danfoss Heat Exchangers

Empowering geothermal expansion in Zakopane in Poland

Together with our long-term and trusted partner Geotermia Podhalańska in Poland, Danfoss Heat Exchangers is ready to take geothermal production to the next level



Geotermia Podhalańska, harnesses an impressive 98.89% of geothermal resources for heating homes and generating hot water.

Superior resilience and ability to withstand exceptionally high pressures

Geothermal is emerging as a rapidly expanding sector for Danfoss Heat Exchangers, providing an opportunity for engineering innovation to solutions tailored to geothermal plants, ultimately contributing to a reduction in fossil fuel consumption and CO₂. Together with our long-term and trusted partner Geotermia Podhalańska in Poland, we are ready to take geothermal production to the next level.

Heating 1,900 private homes

Geotermia Podhalańska is a prominent player in geothermal energy for district heating utilities. The company emerged as a leading force in the field of geothermal energy to district heating utilities during the 1980s and 1990s.

This period marked the inception of the first buildings integrated into the geothermal heating network, coinciding with the establishment of Geotermia Podhalańska S.A., dedicated to leveraging hot water for commercial purposes.

By 1995, the company had successfully sold 18 TJ (terajoule) of geothermal heat, serving a network encompassing 27 customers.

Heat sales amounted to 533,316 GJ, with 1,563 heat consumers and 1,870 facilities connected to the network. The ordered capacity increased to 78,466 MW and heating up to 83°C. In 2022, 68 new facilities with an ordered capacity of 3,334 MW were connected to the heating network. Today, Geotermia Podhalańska provides heating to almost 1,900 private homes.

Advantages

Interest in harnessing geothermal sources in Podhale emerged as early as the mid-19th century, with the renowned hot springs in Jaszczurówka near Zakopane capturing widespread attention.

These springs, characterized by their popularity, owed their existence to the infiltration of rainwater to profound depths. Here, the Earth's heat acted upon these waters, warming them, and prompting their upward ascent through tectonic cracks under the influence of hydrostatic pressure.

Notably, despite the average annual air temperature in the region being 4.8°C, the waters boasted an average temperature of 18°C - a testament to the remarkable geothermal potential of the area.

In 2022, the geothermal system supplied 98.89% of the heat demand, with gas boilers meeting 1.08%, and oil boilers fulfilling 0.03% of the remaining heat demand*.

*Source: Historia | Geotermia

The outcome

The outcome of this project has been remarkable, as it has augmented the capacity to produce heat from renewable sources by an impressive 6.71 MW, underscoring the project's significant contributions to sustainable energy production and environmental success.



The transformative power of geothermal energy shines brightly. Especially, in countries relying on fossil fuels for heating buildings. Its advantage is its independence from weather conditions and renewable nature. We look forward to contributing to your next geothermal project!

Yuriy Fetisov, Head of HVAC, Gasketed and Welded Heat Exchangers, Danfoss



The solution

The collaboration between Geotermia Podhalańska and Danfoss Heat Exchangers started in 2019 when they requested a design for four 25-bar heat exchangers to benefit the maximum of geothermal energy seven kilometers below the surface.

In 2019, the project reached successful completion by enhancing the efficiency of primary energy utilization and curtail energy consumption by strengthening energy production from renewable sources.

The delivery, installation, and assembly of high-capacity heat exchangers from Danfoss have been implemented, each with a capacity of approximately 8 MW. In 2023, Geotermia Podhalańska was ready to expand and reached out to Danfoss Heat Exchangers.

Sales Driver Zaur Kuteliya in Danfoss Heat Exchangers highlights:

"Geotermia Podhalańska expressed such satisfaction with our initial heat exchangers that they promptly ordered an additional four units when planning their expansion."

We supplied four S221 Titanium Alloy heat exchangers (AISI 316 Ti) with a capacity of 31.2 MW (7.8 MW each). Geothermal applications require titanium plates due to their resistance to chloride.

The solution by Danfoss Heat Exchangers has demonstrated superior resilience to deformation and ability to withstand exceptionally high pressures – exceeding the capabilities of traditional titanium plates. As an additional advantage, they are cheaper than 100% titanium."

FACTS ABOUT GEOTHERMAL ENERGY

- Geothermal energy is classified as a renewable energy source due to its virtually limitless reservoir: the Earth's hot interior
- Geothermal can be harnessed through various methods. One common approach involves pumping hot water to the surface, where it is converted into steam. This steam is then used to rotate an aboveground turbine, generating mechanical energy that is subsequently converted into electricity using a generator.
- Additionally, geothermal energy can be directly harvested from underground steam reservoirs. It is not limited to electricity generation alone; geothermal heat pumps are another valuable application. These pumps utilize the Earth's warmth to heat and cool buildings, offering an energy-efficient solution for residential and commercial spaces.
- In summary, geothermal energy encompasses a range of techniques, from the conversion of hot water into steam for electricity generation to direct utilization of underground steam and heat pumps for heating and cooling purposes. This versatility makes geothermal energy an increasingly important player in the quest for sustainable and climate-friendly energy solutions.

Want to learn more about our geothermal portfolio?

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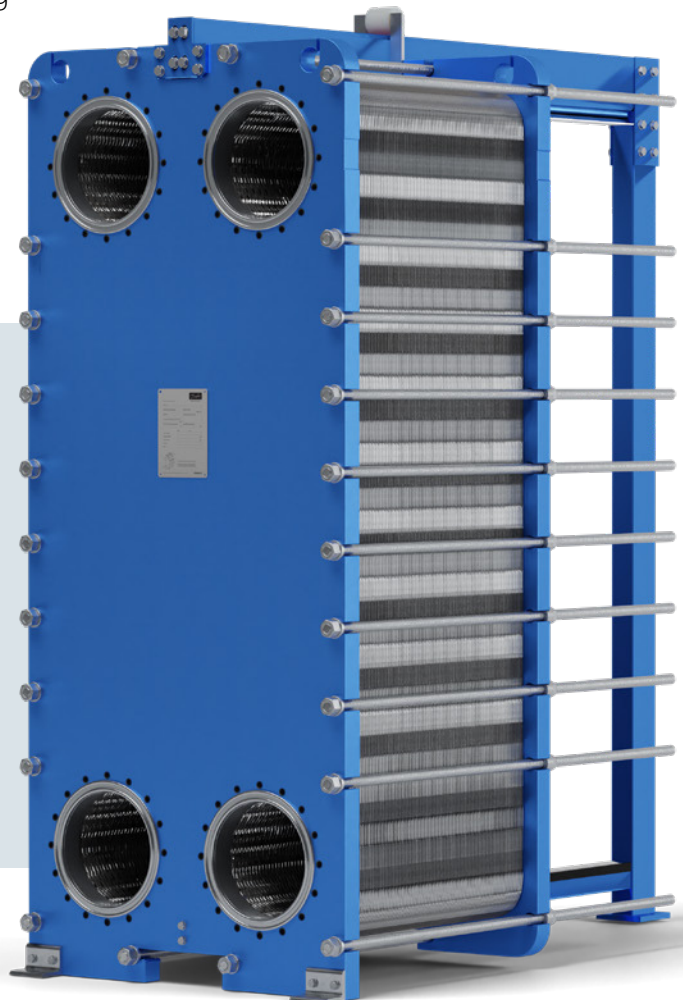
If you would like to know more about how we can help you succeed, please visit our website heatexchangers.danfoss.com or contact your local sales representative.

Facts about Danfoss Heat Exchangers

We design our heat exchangers in close cooperation with our customers to perfectly match the thermal requirements of any duty.

Throughout the years we have developed what has become the largest plate portfolio in the world. Having an option for every application and duty enables us to fine-tune each solution to the specific task at hand.

Optimized to minimize energy consumption and reduce service and maintenance costs, our heat exchangers have competitive prices and a long lifetime.



Danfoss A/S

Climate Solutions • danfoss.com • +45 7488 2222

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