Grundfos pump solution for geothermal heating

The Situation

The region of Central Anatolia in Turkey is known for having significant geothermal potential thanks to its location on the tectonic boundary of the Eurasian and African plates.

Historically, this region relied upon fossils fuels for heating, leading to detrimental environmental, health, and economic consequences. The city of Kirsehir was particularly affected, as it was the third-most polluted city in Turkey.

City leaders were concerned that if residents were to continue to rely on fossil fuels, while saving money now, the negative impacts on the environment and their health in the future would greatly exceed any immediate financial savings they were making. It would eventually lead to more future costs in environmental remediation, health care, and confronting climate change.

The Solution

The Grundfos Turkey team worked together with RST Engineering, a respected local consultancy, to provide a full end-to-end solution to optimize this district energy system for the industrial, residential, and commercial buildings in Kirsehir.

"The most important detail for a district energy system is that the demand for heating varies throughout the year, so it must be designed to handle peak loads during extreme weather conditions while remaining efficient during periods of low demand," said Murat Emir, Senior Key Account Manager at Grundfos Turkey.

The geothermal central heating and thermal water distribution system in Kirsehir uses four wells that have an average temperature of 62°C and provide a total flow of 200L/second.

"Turkey is modernising and extending the district energy networks with sustainable and long life technologies to provide sustainable services for consumers. Thanks for being a shareholder in these long term plans"

N. Murat Erdoğan
Owner, RST Engineering & Technical Consultant
Kırşehir DE Project

GRUNDFOS

Possibility in every drop

These four wells are located nearby the heating and thermal water distribution center. The geothermal district heating system operates using geothermal fluid that has a range of 54 – 62°C.

To maximize the transfer of heat energy to clean water for use in the city, plate heat exchangers were installed. The heat exchangers reduced the temperature of the return geothermal water down to 41°C. 200kg/s of geothermal water is used to produce 10.8 x 106 kcal/hour heat energy.

The system required the use of Grundfos' MPC-E pumps to be able to pump the volumes of fluid necessary in normal use, and to also provide for future peak load times during winter, where heating demand will be at its highest.

The Outcome

The tailored solution provided by Grundfos Turkey and RST Engineering helped reduce the city's reliance on fossil fuels, along with lowering carbon emissions. The move to geothermal energy has substantially decreased the carbon footprint of Kirsehir, which aligns with the Turkish government's commitment to combating climate change and reducing greenhouse gases by developing geothermal resources.

The geothermal district energy system now provides a sustainable and reliable source of heating and cooling for residential, commercial, and industrial buildings. In the city center, there are 1800 residences that are heated and fed by this water source, along with more than five commercial zones.

"Designing and implementing this system required intricate engineering and technical considerations," continued Emir. "We are proud to support our customer in reaching their goals of using less fossil fuels and lowering carbon emissions. After the success of this project, the team at Grundfos Turkey will continue to focus on DE projects in the foreseeable future."

This project has demonstrated the transformative potential of geothermal energy in addressing energy demands, reducing costs, and promoting environmental sustainability.

Grundfos Supplied

Hydro MPC-E N 4 CRNE 20-8 PN16
Pressure Vessel 500 liters at 16 Bar (NEMA)
Hydro MPC-E N 3 CRNE 64-2-2
Pressure Vessel 750 liters at 10 Bar (NEMA)
4x NK 80-250/241 AA1F2KESBQQE

Hydro MPC E

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