

Geyser Geothermal Pump Cut Power Use by 28%, Eliminated Additional 1.9 Tons CO₂ Emissions

CHALLENGE

Produce 5000 m³/day, of geothermal fluid from a 164°C-reservoir for use in producing clean energy.

SOLUTION

Deployed the 740 series Geyser geothermal pumping system powered by a permanent magnet motor.

RESULTS

- Accommodated average flowrate of 5127 m³/day
- Reduced power consumption by 28% compared to competitor pump
- Performed reliably in a 164°C-reservoir for 40 weeks and counting
- Saved 3,158 kWh of electricity and prevented 1.9 tons of CO₂ from entering the atmosphere

Looking for a Reliable, High-Temp, High-Flow Pump

A geothermal energy producer needed to install a downhole pumping system that could withstand reservoir temperatures of 164°C (327°F) and produce an average of 5000 m³/day (1.1 million gal/day)—of water for use in generating clean electricity.

Selecting the Geyser Geothermal Pumping System

The energy producer decided to install the 740 series **Geyser geothermal pumping system** from Novomet in 244-mm (9⁵/₈-in.) casing at a depth of 406 m (1,332 ft).



The Geyser geothermal pumping system has been in operation for 280 days and counting and has prevented an additional 1.9 tons of CO₂ emissions from entering the atmosphere compared to a competitor's pump in the same region.

Aydin, Turkey

To stand up to the high temperatures and flowrates, we upgraded the motor lead extension (MLE) connector, commonly called a pothead in electrical submersible pumping (ESP) systems, with a water-tight design. We also upgraded the protector to accommodate the high flowrate, used high-performance cable, and replaced all elastomers with high-temperature materials.

Delivering Results

After coming online, the 740 series Geyser pumping system easily handled the flowrate, which averaged 5127 m³/day (1.35 million gal/day). At the time of publication, the Geyser system had run reliably for 40 weeks.

Further Reducing CO₂ Emissions

Perhaps more importantly, Novomet is contributing to the producer's goal of reducing carbon emissions. By using high-efficiency pump stages and an energy-saving permanent magnet

motor, the Geyser pumping system reduced the electricity required to pump a cubic meter of water. The next closest competing geothermal pump in the region uses 1.25 kWh per cubic meter of water produced. The Geyser system consumes only 0.9 kWh to produce the same volume of water. On average, the Geyser pump is delivering 28% more fluid per kilowatt, reducing the carbon emissions required to generate clean geothermal electricity.

The Geyser geothermal pumping system installed on this well produced 1.44 million cubic meters (316 million gallons) of geothermal fluid. Calculated by taking the average kWh used per day and multiplying that by 280 operating days, the Geyser pump has saved 3,158 kWh of electricity, and prevented an additional 1735 kg (3,789 lb*) of CO₂ emissions from entering the atmosphere compared to a competitor's pump in the same region.

Using Efficiency to Further Reduce CO ₂ Emissions		
Runtime	280 days and counting	
Avg Production	5127 m ³ /day	1,354,410 gal/day
Total Production	1 435 560 m ³	315,779,054 million gallons
Competitor Electricity Used to Produce Geothermal Fluid	1.25 kWh/m ³	1.25kWh/220 gal
Geyser Electricity Used to Produce Geothermal Fluid	0.9 kWh/m ³	0.9 kWh/220 gal
Electricity Saved by Using the Geyser Geothermal Pump	3,158 kWh over 280 days	
Carbon Emissions Prevented by Using the Geyser Geothermal Pump	1735 kg	3,789 lb* 1.9 tons

* Based on 1.2 lb of CO₂ emissions per kilowatt-hour according to the most efficient power generation methods reported in the [U.S. Carbon Dioxide Emissions in the Electricity Sector projections](#), published January 7, 2019.