

# Case Study: Artificial Lift

Location: Turkey



## ESP boosts high-enthalpy geothermal well production, adding 1.7 MW of renewable power to the grid



Aligns with United Nations Sustainable Development Goal 7—Affordable and Clean Energy

**REDA Thermal\* power-efficient geothermal electric submersible pump (ESP) withstands high downhole temperatures, enabling a Turkish geothermal field operator to increase sustainable energy generation.**

### The objective

Zorlu Enerji, one of the largest geothermal operators in Turkey, has numerous high-enthalpy wells in its Kizildere Field, with bottomhole temperatures ranging from 210 to 245 degC [410 to 473 degF]. Liquid and steam production from these wells is used to generate electricity. The wells are free flowing at 80–250 t/h [350–1,100 galUS/min], with the potential for higher production, which would increase the low-carbon energy flowing into the power grid. Attempts to increase flow rates using third-party ESPs had, however, proved unsuccessful because the pumps could not withstand the high temperatures at the setting depths, resulting in uneconomic run lives.

### The solution

SLB proposed its REDA Thermal ESP, which was specially developed for high-enthalpy geothermal wells to deliver elevated flow rates—reliably, efficiently, and with low parasitic load. This ESP features high-horsepower permanent magnet motors and advanced materials to withstand hot geothermal fluids.

Zorlu Enerji decided to proceed with a pilot installation in a well with 9<sup>5</sup>/<sub>8</sub>-in casing and a temperature of 213 degC [415 degF] at the pump setting depth; the well was flowing unaided at 126 t/h [555 galUS/min].

### The results

The REDA Thermal ESP has already surpassed third-party geothermal ESP run lives manyfold and increased production by more than 55% to 196 t/h [863 galUS/min]. With the ESP's low power consumption of 0.4 MW, the result is a net increase of 1.7 MW in the geothermal power supplied to the electricity grid. Pleased with the performance of the REDA Thermal ESP, Zorlu Enerji has requested 14 additional units for Kizildere Field, together with digital services for ESP monitoring and surveillance. These services will enable collaboration between Zorlu Enerji and SLB



REDA Thermal ESP was run into a geothermal well in Kizildere Field to improve flow rate.



Enhanced well production enabled the geothermal power plant to increase its electrical output.

ESP and reservoir domain experts on an ongoing basis to further drive performance, enabling this operator to lead efforts to support Turkey's renewable energy strategy.

As Turkey continues to diversify its mix of renewable sources for electricity generation, projects such as Zorlu Enerji's geothermal power plants are valuable in helping the country advance toward energy security.

\*Mark of SLB

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