CASE STUDY

HALLIBURTON

Germany

Intelevate™ GeoESP® virtual pump intake pressure (PIP) offers highly accurate backup for downhole gauges

Real-time calculated virtual PIP has less than 2% error versus downhole gauge readings

CHALLENGE

Geothermal wells in Germany are strictly monitored to comply with health, safety, and environmental guidelines

- Downhole gauges monitor electric submersible pump (ESP) performance often fail due to harsh conditions
- Operators need alternatives to avoid costly well interventions each time a gauge malfunctions

SOLUTION

Intelevate GeoESP virtual PIP calculation presented in real time

- Less than 2% error when compared with downhole gauge readings
- An increase in error used to diagnose possible adverse well conditions

RESULT

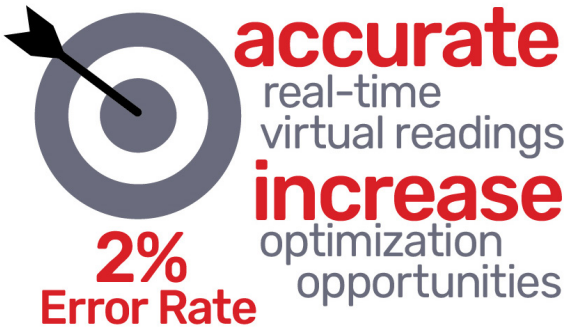
- Operators fulfill government requirements without unplanned interventions
- No need to incur additional expenses installing a backup gauge or surface hardware
- ESP run life increased
- Geothermal plant uptime increased

Overview

German geothermal wells provide energy for power generation and heating for homes and businesses. To ensure the highest level of safety for health and the environment, local authorities require meticulous monitoring and advanced tools to ensure efficient operations. Downhole gauges provide a wealth of information but are affected by harsh well conditions, including high wellbore temperatures and scale, which can affect performance or cause short run life. When there are issues with a gauge, operators need an alternative that allows them to comply with government regulations without pulling the well to replace current downhole equipment.

Challenge

Pump intake pressure (PIP) is a crucial diagnostic for the ESP system's health and the wellbore's integrity. Local governmental authorities require continuous real-time PIP values, but when the downhole gauge is faulty or fails, the well must be pulled unless there are alternatives.



Hardware solutions on the surface can calculate PIP but are often expensive, require personnel to install, calibrate, and maintain, and can have a 20-30% error rate.

SUMMIT ESP
A HALLIBURTON SERVICE

Solution

GeoESP® virtual PIP app from Summit ESP® — A Halliburton Service was developed from the Intelevate™ software platform's industrial internet of things (IIOT) device. It is a real-time calculation that considers well conditions, equipment specifications, and past performance to deliver an accurate PIP with less than 2% error when compared with downhole gauge readings. Virtual PIP can also be used to evaluate the current operating point and compare it to the best efficiency point.

Result

With this innovative technology, geothermal operators can run ESPs longer without sensor readings and unplanned interventions; operators can plan equipment replacement with ample time to minimize unnecessary downtime. The technology can also be used with the Intelevate software platform to model well conditions and equipment performance and determine if any proactive actions can be taken to improve uptime, equipment reliability, or increase production. Finally, and most importantly, with GeoESP virtual PIP, operators can fulfill regulatory requirements without the expense of extra hardware or maintenance.