

Solution for ESP power saving up to 50% in complicated wells operation

Challenges

- High power consumption
- Low efficiency of standard ESP systems

Complicating factors

- Solids up to 2,000 ppm (2,000 mg/l)
- Inorganic salts deposit
- High gas factor
- Flooding
- Unstable inflow
- Submersible equipment operation in deviated wells

Results

- Power saving up to 25-50%
- Enlarged pump efficiency by 12%
- 2-3 times wider operation range
- Stable operation of the equipment
- Reduced % of failures compared to standard equipment
- Reduced CAPEX

The complicating factors drive down the efficiency of submersible equipment, so most of the wells worldwide need to optimize power consumption. Our solution saves power due to the use of the Lex Ultra-High-Speed ESP (UHS ESP™), steadily operating in harsh environments and reducing workover costs.

The artificial lift is the most energy-intensive process in oil production. Fluid production and maintenance of reservoir pressure consume more than 70% of overall oil output power.

Quite often, there are complicating factors in the well (solids, salts, flooding, gas issues, variable inflows, etc.) that affect the overall production efficiency. Given the standard equipment design, the traditional rated speed, and outdated configurations, the overall efficiency of the entire system can rarely achieve more than 25-50%.

The main contributors to low efficiency are the pump which efficiency falls dramatically beyond the operation range and in harsh environments, and the motor, which is mostly the Asynchronous Motor with its low nameplate and operation efficiency.

This low efficiency raises power operation costs and results in a loss in the reliability of equipment.

A standard solution would be replacing equipment with schedule size and changing the Asynchronous Motor with the PMM, whose efficiency is higher. However, the limited adjustment range prevents them from adapting to the variable conditions and steadily maintaining high efficiency.

We have created a new power-saving solution, replacing the standard ESP with the unique Ultra-High-Speed ESP - Lex **UHS ESP™**, capable of reaching the operating speed of 12,000 rpm.

Our engineers thoroughly collect and analyze the candidate wells data and produce accurate calculations to tailor up our selection of equipment package for maximum ROI.

Based on aerospace technologies, our Ultra-High-Speed submersible permanent magnet motors have the efficiency up to 92%, which produces:

- increased efficiency of each ESP assembly, especially the pump, which efficiency factor can be enlarged by 12%.
- 2-3 times wider operation range to adapt to varying inflow.
- 2-3 times fewer stages and smaller overall ESP size than in standard equipment due to 12 increase of head pressure

Such an approach results in power saving to 25-50% and avoiding maintenance and replacement cost thanks to optimization of equipment standard size.