Case study: Permian Basin, Texas

Gas lift-to-ESP conversion increased cumulative oil production by 200%, net gain revenue by 20%

An operator in Texas faced production constraints due to gas lift system limitations, leading to bottomhole pressure drawdown restrictions and well downtime above 20%. This created an unstable situation, and the operator reached out to Baker Hughes looking for alternatives to increase oil production, stabilize operations, and reduce downtime by converting some of the existing gas lift wells to electrical submersible pump (ESP) systems.

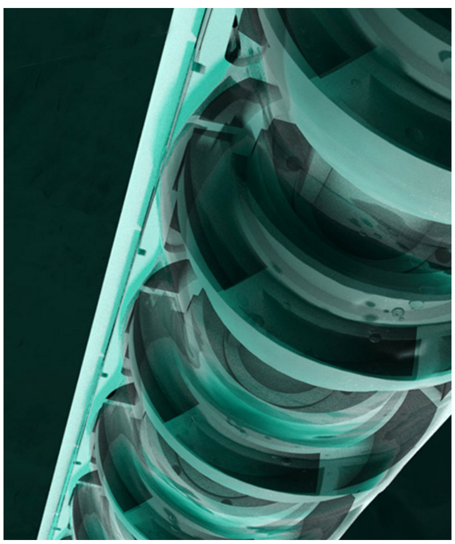
The Baker Hughes Permian Engineering team worked with the Customer Production Engineering team on ESP proposal designs for two wells. By simulating the maximum future output production and the minimum pump intake pressure, the engineers were confident the ESP system would run steady and long-term.

The first ESP system was designed with Baker Hughes Performance series 400P high-volume pumps (P35 stage) combined with the high-volume, gas-handing Multi-phase Performance Series 400P **MVP™ G42 pumps** to extend the ESP operation during the well production cycle. The second system was proposed a taper pump using **FLEXPumpER™ extended range pumps** that provide an unmatched operating range for steep production declines.

Overall results after 165 days for Well A and 125 days for Well B pilot wells have been outstanding, with the total cumulative oil production increasing over 200% for both candidates.

The two pilot wells also successfully improved the fluid level drawdown considerably about 2,000 ft (610 m) by ESP system compared to the previous gas lift wells. Yes, the oil cut is increasing by almost 6% in both wells. In addition, the operational downtime in both wells was reduced from over 20% to 0.5% by using the Baker Hughes ESP system.

The Baker Hughes solution recorded a net revenue incremental increase of approximately 20% and 250% rate of return of the initial capital investment (CAPEX).



As unconventional production rates decline, operators typically switch out pumping units or artificial lift production methods. The FLEXPumpER pump eliminates this requirement with a flow range from 50 to 5,500 BOPD (7.9 to 874 m^3/d), maximizing production while extending ESP system run life.

Challenges

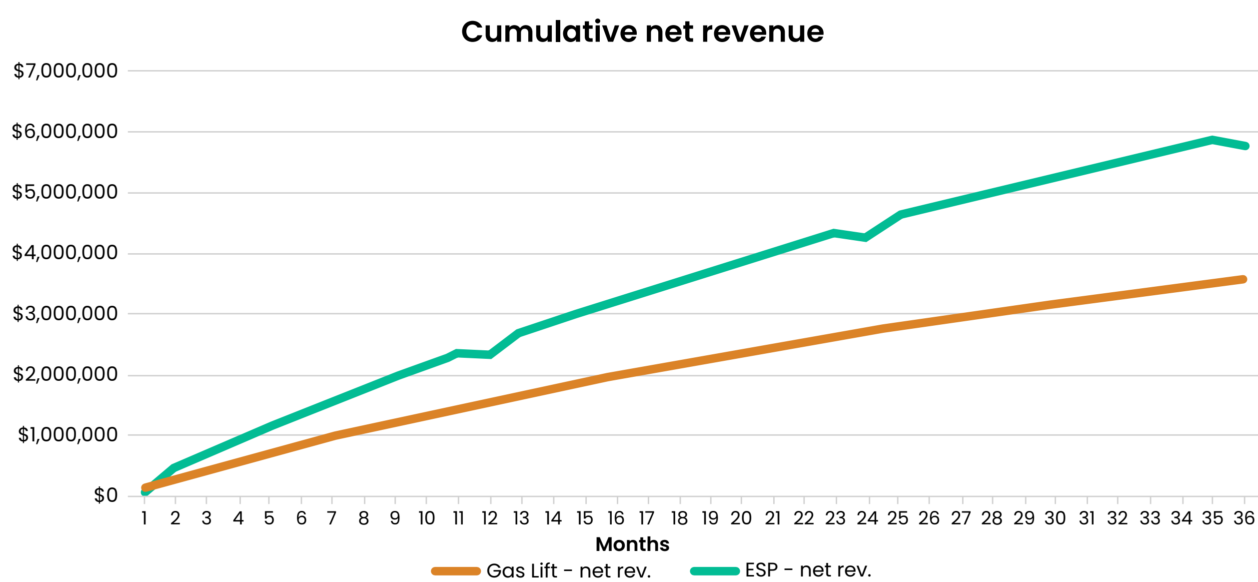
- Oil production optimization using current ALS
- Bottomhole pressure drawdown constraints
- Excessive operational downtime

Results

- Increased cumulative oil production over 300% for both wells combined
- Incurred an incremental net revenue of approximately 20%
- Realized a 250% rate of return of the CAPEX
- Improved well drawdown
- Enhanced wells uptime by reducing the operational downtime to less than 1%
- Experienced no health, safety and environmental (HSE) issues or nonproductive time (NPT)

		Well A	Well B
Days for analysis - pre workover		**165**	**125**
Gas lift data	Cummulative oil	22,720	3,725
	DT%	19%	21%
	Average GLR	192	95
	Average WC	94%	95%
	Total fluid	2,268	845
	Injection rate	780	500
	Op GLV depth	4,000 ft (1219 m)	5,300 ft (1645 m)
ESP data	Cummulative oil	56,037	27,025
	DT%	0.34%	0.62%
	Average GLR	430	413
	Average WC	89%	88%
	Total fluid	3,224	1,805
	PIP	1,350	1,937
	Oil increase	**247%**	**726%**

Results from Well A and Well B demonstrates the improved efficiency of the ESP system over gas lift.



After three years, cumulative net revenue from ESP wells delivered nearly $6 million USD while the conventional gas lift operations only realized $3.5 million USD.