

Pump Hydraulic Upgrade to reduce energy and carbon footprint

Project scope

A European pipeline operator projected much lighter duty conditions for their crude oil transfer pumps. This is a common scenario in today's ever-evolving business world, as oilfields age and macro-economic dynamics for energy supplies increase. They realized the only way to meet the reduced head and flow conditions would be to throttle increasing amounts of pressure across the control valves. The result would be excessive energy waste, high operating costs and reduced MTBR on the equipment. Realizing there may be better alternatives, the pipeline company turned to Flowserve's Energy Advantage Program to investigate the most cost-effective way to adapt the system, considering the anticipated operating conditions.

Methodology

The Energy Advantage team compared various hydraulic options for these BB3 pump designs, using Life-Cycle Cost (LCC) analysis — including variable frequency drives, new hydraulic designs, de-staging and trimming. They also measurably increased ROI on the changes by defining the best timing of subsequent interventions. Finally, the team recommended implementing a new 2-stage rotor and de-stage dummy bushings into this 5-stage machine. One stage was reversed, and the center bushing was eliminated to avoid the need to pass the long cross-over on this opposed impeller design. The design was validated with extensive rotor-dynamic analyses and axial thrust calculations before being returned to operation and realizing savings.



Quantified & Qualified Benefits

- Power consumption reduced by **11000 MWh per annum**.
- Financial Benefit **€ 880k per annum**.
- CO₂ saving **6000 metric ton per annum**
- Increased reliability of pump and mechanical seal by operating close to BEP
- Increased reliability of control valves by reduced pressure drop

Contact us for further details - EnergyAdvantage@flowserve.com