

Digital twin optimisation for MEG injection boosts Shell Ormen Lange natural gas production by 1.3%

LOCATION

Norwegian Sea

OPERATOR

Norske Shell

FIELD

Ormen Lange gas field

OVERVIEW

The deep-water Ormen Lange field is a subsea development with four well templates that connects to an onshore production facility (Nyhamna). It supplies around 20% of the UK's total gas consumption via Langeded, a 1,166 km pipeline.

Challenge

Monoethylene glycol (MEG) is commonly used in oil and gas wells and pipelines to prevent hydrates from forming, especially in cold offshore deepwater gas facilities. Reducing the amount of MEG injected increases gas production, with 1m³ of MEG equaling about 2000 Sm³ of gas.

This has led Shell to work on optimising the MEG injection rate. However, limited flow control of MEG injection at each wellhead made it difficult to achieve the precise injection rate, highlighting the need for an optimisation routine.

Solution

A team of domain experts from Falkor and Norske Shell collaborated to address the challenge. With a digital twin, model inputs are processed through data analytics and optimisations to provide essential parameters for decision-making in seconds. Equipped with the right data, operators can make higher quality decisions to accurately achieve their injection targets.

By leveraging the versatile optimisation service in the digital twin, which can be applied to various optimisation scenarios across industries, the team created a sophisticated MEG injection optimisation workflow that provides control room operators with parameters for better decision-making and delivers significant operational benefits.

Results

As the second largest gas field on the Norwegian Continental Shelf, Ormen Lange plays a key role in delivering natural gas to the European market. In 2023, the MEG optimisation algorithm **increased the Ormen Lange gas production that is shipped to the UK and continental Europe by more than 1%**, proving the power of digital twins to significantly improve production output.



*The typical UK household consumes 12,000 kWh of gas per year, and 1 Sm³ natural gas provides about 11 kWh of energy.