FPSO energy efficiency and emissions performance

Overview

A major independent Energy company recently partnered with leading sustainability company ERM OPEX to monitor and manage energy and emissions from its Floating Production Storage and Offloading (FPSO) facility located in the UKCS North Sea.

Customer Needs

- Establish carbon lean operations (highest output with the lowest energy and carbon costs)
- Integrate carbon emissions into operational decision making and creating a carbon culture
- Demonstrate industry leading performance to meet corporate and key stakeholder commitments

Solution

The company harnessed emissions.AI digital technology to gather data and delve deeper into the FPSO's emissions profile, with a view to developing and implementing a strategy for operational decarbonisation .

The solution provides enhanced routine reporting and tracking of energy, emissions and efficiency as part of day-to-day operations. Driving forward the use of this data and intelligence to actively operate with the lowest energy consumption and carbon emissions will further strengthen the company's social licence to operate, in line with their Low Carbon Transition Plan.

In addition to lowering emissions across the FPSO, other broader efficiencies are identified and realised, boosting energy efficiency and minimising carbon, fuel and energy costs.

How was the energy and emissions digital twin created for the customers FPSO?

Phase 1 Set-up

ERM OPEX used P&IDs, OEM information and lab data to build a digital twin of the FPSO covering Energy Efficiency and Flaring. 12 months of data from the historian was used to train the model on how the facility operates.

Phase 2 Data modelling, calculations and AI layer

All of the major energy sources, consumers and flare systems for the specific FPSO were included such that energy and emissions could be fully reconciled from sources to consumers across the scope boundaries as well as to existing carbon reporting submissions.

Phase 3 Live testing, onboarding and training

The customers teams were consulted on the calculations and methodologies used to build the digital twin and subsequently onboarded and trained in all aspects of the solution.

Phase 4 Implementation

Customer teams use the product and have everything at their fingertips. The ERM OPEX subject matter experts are on hand to review outputs, analysis and support users.

ERM

emissions.AI

FPSO energy efficiency and emissions performance

Impact

By implementing emissions.AI, the company now has continuous access to granular, up to the minute emissions data, analysis and actionable intelligence, displayed and relayed to the user through an intuitive interface. As a result, the customers operational teams can:

- Understand and visualise live CO_2 emissions for all main sources across the facility
- Demonstrate energy and emissions performance against best achievable for any scenario
- Automate data analysis to underpin fuel source, configuration and mode optimisation
- Share energy and emissions information across the organisation to meet various ESG requirements

emissions.AI allows operational teams to access accurate and up-to-date information on all the main energy consumers on the facility. Emissions from power generation and flaring are monitored and displayed giving users a detailed understanding of their energy use and associated CO_2. Multiple displays within the solution detail the performance of the compression, oil, and water equipment further supporting the level of detail that is required.

The customer is using the solution to identify deviations and inefficiencies which were previously hidden. These include leaking blow-down valves, calibration issues on meters, excess diesel consumption, sub optimal start up routines, event related flaring, and excess flaring when purging fuel gas.

"Ageing assets can be challenging for a whole host of reasons, not least in terms of maintaining uptime and efficiency.

The added challenge of lowering the carbon footprint of our production adds additional complexity. However, we now have a tool at our fingertips to help inform operational decision making in this area. It is also helping us to build a more complete picture of what's going on, allowing us to better predict plant performance and focus attention on where we can have an impact.

The new solution enables us to get right down to a very granular level on our emissions performance, for example, how we're using our fuel gas, compressor efficiency, oil trains, seawater lift pumps, our flare profile and more.

We effectively have built a digital 'emissions twin' of the installation, which gives us instantaneous insights into the conditions required for best performance as well as identifying areas for improvement."

Operations Team Lead, Energy Operating Company

ERM

emissions.AI