Honeywell

Honeywell Brings Energy Accounting to Remote Offshore O&G Production

Case Study

Using Honeywell digital twins and asset performance libraries, Lundin Norway creates a precise method to perform energy accounting on its North Sea O&G platform. The detailed insight they gather drives continuous improvement of operations and supports their entrenched mission to reduce CO_2 emissions.

About Lundin

Operating approximately 200 km offshore of the Norwegian west coast, the Lundin Norway Edvard Grieg platform serves a critical role in North Sea oil and gas production. Strategically situated within the Utsira High, the Edvard Grieg serves as an oil and gas "field center" – meaning the Edvard Grieg processes the well streams from nearby fields.

Over 600Km away from the Edvard Grieg is Lundin's Oslo facility, where Lundin engineers and support staff help manage the platform in collaboration with platform operators. One vital tool they use for monitoring the platform's processes and equipment includes Honeywell Forge – Enterprise Performance Management software enabling greater flexibility in the platform's operation, while maintaining maximal productivity from process, people and assets.

Asset Performance

Having utilized Honeywell software since the Edvard Grieg was commissioned in 2015 – including use of the Honeywell operator competency module to train operators in Oslo ahead of deployment – Lundin's remote operation engineers have come to rely heavily on Honeywell Forge. This is especially evident with asset management and the use of advanced machinery models from Honeywell Forge Asset Performance Management– the asset performance management and data analytics engine within Honeywell's Enterprise Performance Management software.

Honeywell connects over 100 assets to Lundin's Oslo engineers to facilitate remote monitoring of asset efficiency and impending health issues of the platform's compressors, pumps, turbines and other equipment.

Likewise, the Honeywell solution integrates the data of other condition monitoring systems into a unified data source. Condition monitoring systems for vibration, switch gear and wells – by GE, ABB and Emerson respectively – are a few examples of the many discrete monitoring systems unified within Honeywell Forge. "We have expert monitoring systems, but it's impossible to monitor each system simultaneously," said Stig Pettersen, Principle Automation Engineer for Lundin Norway AS. "Honeywell asset software is very flexible and integrates all systems, so we've been making our KPI's so good that we rarely have to log into the expert systems."

Lundin Norway – Edvard Grieg

Applying Environmental Stewardship

"We also have other needs, like measuring environmental impact from operations toward improving Lundin's goals for stewardship, as well as showing compliance with Norwegian mandates – but we couldn't just buy an expert system for that," says Stig.

Without any additional investment, Lundin configured the Honeywell system to generate real-time "energy loss" reports through utilization of Honeywell asset digital twins.

Now Lundin can evaluate the platform's current energy efficiency and associated emissions on-demand.

So Lundin got an idea in the summer of 2018. Stig continues, "Since the Honeywell digital twins can quantify exactly how much energy we are producing at each generating asset and exactly what is being used by each consuming asset, we can do full energy accounting and calculate equivalent CO_2 emissions." Without any additional investment, Lundin configured the Honeywell system to generate real-time "energy loss" reports through utilization of Honeywell asset digital twins.

Results from the first Energy Monitoring System (EMS) report were immediately revealing, providing an objective measurement of both expected and some unexpected loss sources. Lundin can now evaluate the platform's current energy efficiency and associated emissions on-demand. Every 5 minutes the EMS calculates a running 24-hour aggregated value for energy loss. And at the end of each day the EMS saves the final calculation for presentation in a daily time-series trend. All loss calculations are divided into two categories:

- *Design loss:* loss caused by operating equipment that is not suited for the desired process operating point (e.g. loss from oversized pumps and motors, undersized valves, etc.).
- *Operational loss:* loss caused by equipment degradation and/or the machine forcibly operated off-optimal due to non-standard process conditions or upsets.

Benefits

The report itemizes the 70MW power generating capacity of the platform relative to 11 primary energy consumers and 6 smaller consumers. From the daily loss averages Lundin has identified losses that can be reduced in the coming months. It is not feasible to eliminate all losses, but what Lundin is actively seeking to eliminate translates to an average of $580 USD/day (5300 NOK) for every percent of reduced power generation. Given the 24/7 operating nature of the Edvard Grieg, a 5.5 percent reduction would translate to $1.23M/yr in potential energy savings and 5.6 KMT/yr of potential CO_2 emission reduction. In more comprehensible terms, the level of CO_2 that Lundin seeks to reduce through its initial process improvements is equivalent to removing 1174 average sized automobiles from roads – forever.

"Most [losses] are operational, which we can more readily control through process improvement and optimization," said Stig. "The harder area to address is design losses. It's not feasible to eliminate all losses, but since we now have a rolling calculation we can tell exactly how much, say, turbine and compressor fouling is costing us. Now we see both the performance and economical effects immediately following wash maintenance." Meanwhile, design losses might result from having specified an oversized piece of equipment during the platform's design. More commonly, however, an oversized pump, for example, was a conscious choice by engineers who often accept the trade-off of running off the best efficiency point (BEP) in favor of having extra capacity available for future operational flexibility.

Regardless, the information will be used when considering equipment usage on the Edvard Grieg and additionally, will be passed on to engineers for consideration in sizing equipment on future Lundin platform designs. By doing so Lundin is confident that they are taking the best approach possible to minimize environmental impact going forward.

See the video:
https://www.youtube.com/watch?v=YbQY2IY8-MA

Learn more about how Honeywell APM can improve overall effectiveness of plant assets and processes, by visiting Smarter Asset Performance Management.

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SS-19-06-ENG
August 2019

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