




**HONEYWELL
FORGE**

HONEYWELL BRINGS ENERGY ACCOUNTING TO LUNDIN NORWAY

Using Honeywell digital twins and asset performance models, Lundin Norway creates a precise method to perform energy accounting on its North Sea O&G platform. These detailed insights drive continuous improvement of operations and support their mission to reduce CO2 emissions.

Case Study



A recurring ROI of 1100% and potential energy savings of \$2.5 million per year, Lundin reduces costs and potential carbon emissions by 5.6 KMT per year – that’s equivalent to removing 1174 automobiles from the road forever.

BACKGROUND

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 processing the well streams from nearby fields to supply both Norway and United Kingdom.

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 – a prodigious feat for the 400+ employees. One vital tool they use for monitoring the platform's processes and equipment is Honeywell Forge – an enterprise performance management software enabling greater flexibility in the platform's operation, while maintaining maximum productivity from process, people and assets.

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 Forge integrates asset and process information providing a powerful tool that uncovers inefficiencies and reduces energy usage. For Lundin, that meant connecting over 100 major assets and more than 3500 secondary assets to their Oslo-based 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.”

CHALLENGE + SOLUTION

Carbon minimization is imperative to good stewardship, as evident in Lundin's culture, as well as showing compliance with Norwegian mandates, so the ability to measure environmental impacts from operations to gain real-time insight into the Edvard Grieg's carbon emissions and

energy consumption data was essential.

Together, Lundin and Honeywell developed digital twins as a basis for energy management. 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 CO2 emissions.” Without any additional investment, Lundin configured the Honeywell system to generate real-time “energy loss” reports through the 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.

“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.

RESULTS

The EMS report generated for the Edvard Grieg itemizes the 70MW power generating capacity of the platform relative to 11 primary energy consumers and 6 smaller consumers. Preliminary data serves as an indicator in what Lundin is actively seeking to eliminate, which 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 CO2 emission reduction.¹ In more comprehensible terms, the level of CO2 that Lundin seeks to reduce through its initial process improvements is equivalent to removing 1174 average sized automobiles from roads – forever.

The valuable information gained from utilizing Honeywell Forge Asset Performance Management software 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.

1. Investment outcomes assume US\$110,000 invested over 5 months, leveraging pre-existing installed Honeywell APM software solutions

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