



CASE STUDY: SCANDLINES FERRIES

HYBRID RETROFIT

Shareholder confidence increases when companies invest in comprehensive efficiency retrofits. Scandlines, a Northern European ferry operator, has increased its shareholders' confidence by implementing multiple efficiency and hybrid technology upgrades.

Scandlines runs seven ferries on two short sea routes between Denmark and Germany, four of which it retrofitted, and to which two brand new hybrid ferries are being inserted as part of its long-term zero emissions goal. Scandlines expects to save 10-15% on both fuel consumption and carbon emissions for the vessel on the Rødby-Puttgarden route once the technology is fully implemented.

OPPORTUNITY

Scandlines realized there was a strong business case for implementing a Green Agenda as well as branding value to be gained. Operating within Northern Europe and ferrying passengers from two countries with ambitious low-carbon agendas, the ferry operator felt an ever-increasing demand to transition down a low-carbon pathway. In addition, Scandlines saw its low-carbon investment as a hedge against increased oil prices and carbon charges.

SOLUTION

Scandlines has continually implemented small efficiency improvements to its vessels over the years. However,

it recently took the first major step to achieving its zero emissions goal by installing a hybrid technology on four of its vessels: large battery banks in a diesel/electric setting. It conducted a pilot on the first two vessels in 2013–2014 and, after rigorous analysis into both the savings and operational quality of the hybrid system, upgraded two more vessels in 2014 and 2015. Scandlines expects to save 10–15% on both fuel consumption and carbon emissions for each vessel once the technology is fully implemented.

As this was one of Scandlines' first major upgrades to its vessels, its operational department reached out to technology providers to explore the technology options available. It discussed its planned retrofit with a number of providers, including Siemens, which eventually provided the technology. Siemens and the Scandlines technical team chose an energy storage system consisting of a control device and a 1.6 to 2.6 MWh battery bank with 252 to 399 lithium polymer batteries. The batteries, which have a ten-year warranty, compensate for the vessels' varying energy requirements (Figure 1) and allow the vessels to function with only one diesel generator in operation at a time, whereas previously there would be one to three generators operating at any given time. The

diesel generator is operated at its optimal efficiency, a constant 85–90% load at sea and in ports compared with a conventional diesel electric ferry that operates at 40–55% load at sea and 8–10% load in port (Figure 2).

Scandlines carried out the retrofits primarily during regularly scheduled dry dock, and also took the vessels out of service for a few hours at night. Each vessel received continuous monitoring equipment to monitor the fuel savings, and was then re-sea trialed following its retrofit.

Scandlines financed the project through a combination of grant funding and its own equity. It secured 50% of the costs through a grant from the Trans-European Transport Networks (EU TEN-T) programme for the first two vessels and 20% for the conversion of the remaining two vessels. The remaining cost was funded through Scandlines’ own balance sheet.

RESULTS

Scandlines expects to recoup its own investment through the efficiency gains from the retrofits. This will primarily come from the fuel savings achieved by implementing the technology, as well as from additional associated cost savings such as reduced engine running hours, improved maintenance, and improved auxiliary systems (such as the cooling water).

Fuel prices have dropped since initial planning for and completion of the retrofits, making the expected savings not as high as initially calculated. Nonetheless, following the re-sea trialling of the vessels, Scandlines confirmed 10–15% fuel and carbon savings. Although the EU grant shortened the payback, and a combination of low oil prices and a longer-than-expected implementation process has lengthened the payback, Scandlines estimates that the cost saving will result in a five-year payback—still within its acceptable eight-year window.

Figure 1: Reduced diesel generator demand with hybrid system

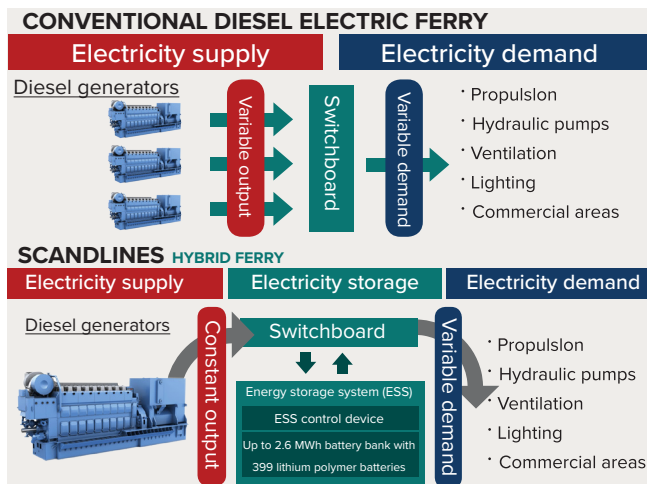
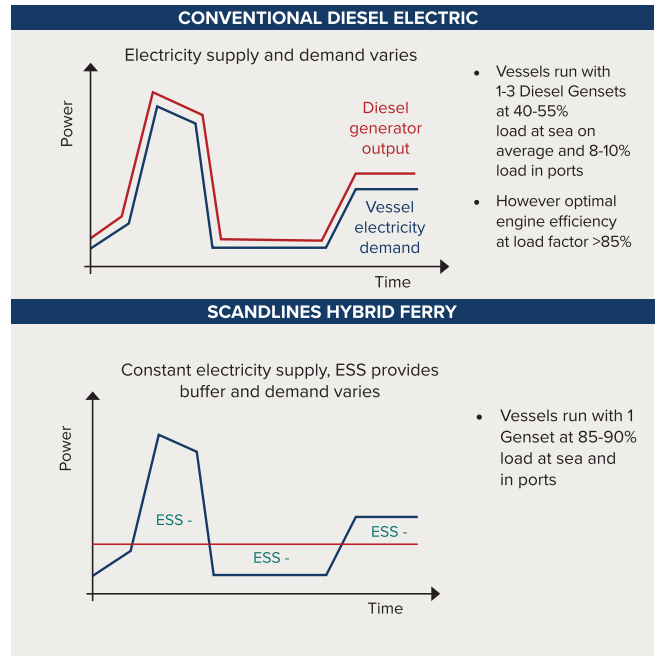


Figure 2: Hybrid battery meets variable energy demand



About Carbon War Room

Carbon War Room (CWR) was founded in 2009 as a global nonprofit by Sir Richard Branson and a group of like-minded entrepreneurs. It intervenes in markets to accelerate the adoption of business solutions that reduce carbon emissions at gigaton scale and advance the low-carbon economy. CWR merged with Rocky Mountain Institute (RMI) in 2014 and now operates as an RMI business unit. The combined organization engages businesses, communities, institutions, and entrepreneurs to transform global energy use to create a clean, prosperous, and secure future. The combined organization has offices in Basalt and Boulder, Colorado; New York City; Washington, D.C.; and Beijing.

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