

Case study

Onboard Ship Energy Storage System Norway

Norwegian ship company installs onboard energy storage system

Project Summary

Project: Viking Queen offshore support vessel

Location: Norway

Client: Eidesvik

Load peak demand: 1600 kW

Power Management System: ARTICS
Smart Energy

Main components

- PCS and ESS containers installed on the ship's main deck
- 654 kWh energy storage system with 1,600 KVA bidirectional DC/AC AFE converter
- DNV-GL class lighting, ventilation, fire detection and extinguishing system
- Cooling System Unit



The challenge:

To improve the energy efficiency for Eidesvik's fleet of vessels

Eidesvik Offshore is a Norwegian ship company that specializes in offshore logistics, seismic and underwater operations. With two dozen ships in its fleet, the environmentally sensitive company has a keen interest in finding ways to reduce fuel consumption, emissions and maintenance costs.

For The Viking Queen, one of its offshort support vessels, Eidesvik sought an energy storage solution that would help it achieve these goals.

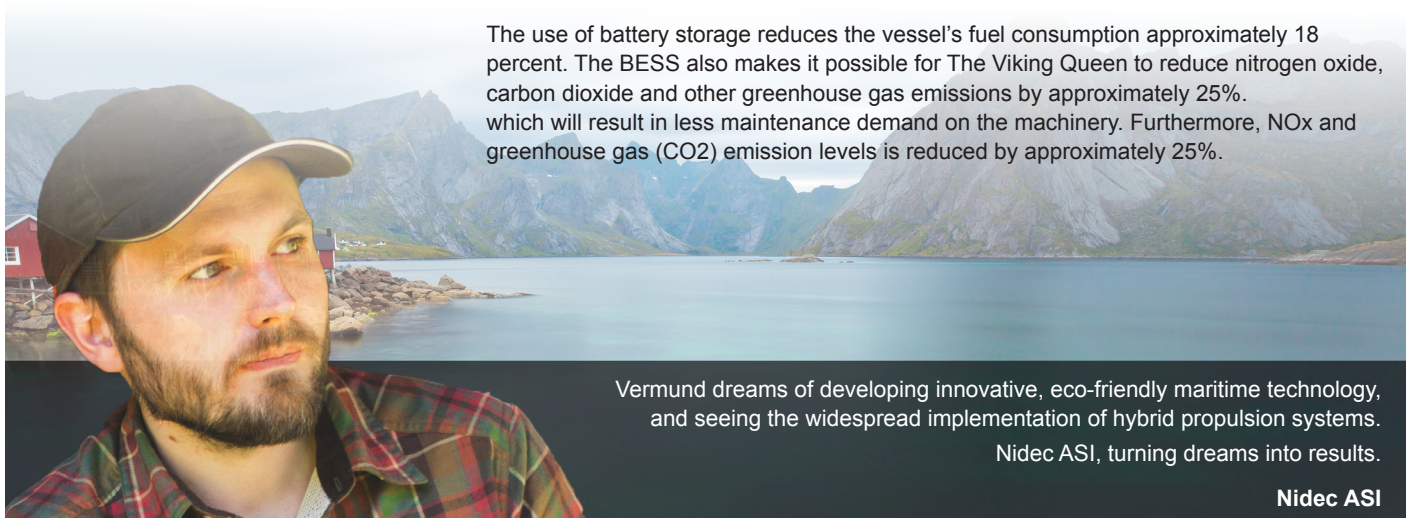
The solution:

Retrofit the Viking Queen with an onboard battery energy storage system

A vessel that is equipped with an onboard battery energy story system (BESS) can reduce fuel consumption by creating a more optimal load on a ship's current motors. A BESS also makes it possible to shut down operation of one of a ship's engines, resulting in lower maintenance demand on the machinery. Compact in size, these flexible systems are a good option for vessels that lack room below deck for the addition of a battery room.

With these factors in mind, Eidesvik made the decision to retrofit The Viking Queen with a BESS, making it the first already-operating offshore vessel to benefit from such a system. Provided by Nidec ASI, the 650 kWh, 1600 kW containerized solution was custom-designed to match the vessel's operating profile.

The use of battery storage reduces the vessel's fuel consumption approximately 18 percent. The BESS also makes it possible for The Viking Queen to reduce nitrogen oxide, carbon dioxide and other greenhouse gas emissions by approximately 25%, which will result in less maintenance demand on the machinery. Furthermore, NOx and greenhouse gas (CO2) emission levels is reduced by approximately 25%.



Vermund dreams of developing innovative, eco-friendly maritime technology, and seeing the widespread implementation of hybrid propulsion systems.

Nidec ASI, turning dreams into results.

Nidec ASI

Battery Energy Storage Container

- A 20-foot-high cube battery container
- Battery modules in a rack configuration
- Enclosed cabinet for housing racks
- Electrical connections between the modules, including connection cables to the power electronic container (PCS), DC power fuse boxes, 400V and 220V power supply and 24V power supply
- Data logging equipment
- Battery management system (BMS), including cables for connections to the PCS container
- Lighting, ventilation and fire detection, and fire extinguishing system that meets DNV-GL class rules
- A closed-air cooling loop cooled through an air-to-water heat exchanger.

Power Conversion System Container

- A 20-foot-high cube conversion and transformer container
- Two bi-directional DC/AC converters (Active Front End) for the generation of DC Bus
- Two power elevator transformers (530V/690V) between the conversion system and the vessel network
- All electrical protection systems on the DC side (to the battery) and AC side (to the ship)
- Auxiliary voltage system
- Fire detection system
- Cooling system unit
- Power management system
- Defined interface between the ship and the battery system



Electrical and specific data for ESS & PCS

IEC & DIN VDE standards and DNV rules are general references for the equipment

Network features

- Short-circuit power: between 80MVA with 4 connected generators and 9MVA with 1 connected generator
- Phases: 3
- Network voltage: 690V +5%
- Frequency: 60 Hz +/-2%
- Rating: IT

Power Conversion System

- Maximum Active Power: 1,600 kW
- Converter Apparent Power: 1,600 KVA
- Used converter: 2 x GTW32K3KSNA62-A169

Battery Energy Storage System

- Total energy: 654 kWh
- Maximum C rate: 3
- DC network voltage range: 700 – 1000V
- Earth connection diagram: IT (no pole grounded)