

Success story

Turnkey shore-to-ship power connection at Stena Line B.V. ferry terminal in Hoek van Holland, the Netherlands



ABB's shore-to-ship power solution helps Stena Line to reduce environmental impact and save money by cutting down fuel consumption.

The turnkey project is the world's biggest running Shore-to-Ship power installation using frequency converters.

Background

Ferries play a vital role in public transport infrastructure of many waterside towns and cities. Vessels remaining in port for six hours on average need electricity to run amenities such as heating, ventilation, cooling as well as galley equipment. Currently the electricity is produced with on-board diesel generators which produce constant noise, noxious emissions and the accompanying unpleasant smell. The inhabitants of Hoek van Holland, a district of Rotterdam, are all familiar with the somewhat adverse influence of the ferry terminal, especially as there is no buffer zone between the local community and the port.

Fortunately, the operator of the terminal, Stena Line B.V., a subsidiary of Stena AB, one of the world's largest ferry companies, has taken steps to mitigate this negative impact exerted on the local community and the environment. As part of the plan to cut down fuel consumption of their fleet, Stena Line decided to invest in complete electrical infrastructure needed to simultaneously power two vessels from the local grid while berthed in the port of Hoek van Holland. ABB's shore-to-ship power solution could not have been a better choice.

Solution

To support Stena Line in their ambitious plan, ABB offered a complete package based on the PCS 6000 Static Frequency Converter of 6 MVA. ABB was responsible for the turnkey project, including the design, engineering, project management, installation as well as the commissioning. The proposed solution is the outcome of a comprehensive study of the existing operation as well as the on-board protection to ensure the highest reliability of the system.

Onshore, ABB has supplied the converter substation, as well as all related civil works and cable management systems, user interface and control systems to connect the different types of ships to the port's electricity grid. The used PCS 6000 SFC Static Frequency Converter is a member of the proven PCS 6000 power converter product family, successfully operating in various applications.

On board of the ships, ABB was responsible for the engineering, system integration, equipment delivery, installation and commissioning of the shore connection system. The modifications have been executed on two ROPAX (roll-on/roll-off passenger) vessels, „The Stena Hollandica“ and „The Stena Britannica“, as well as on two RORO (roll-on/roll-off) vessels, „The Stena Transporter“ and „The Stena Transit“.



Converter station



Connecting Stena Hollandica to the local grid

As a full-scope supplier, ABB provided the complete solution which included not only the onshore and onboard installations, but also offered the technical know-how and invaluable professional experience of shore-to-ship power installations, frequency converters, system design and project execution. In addition, ABB managed to deliver the complete turnkey solution within a relatively short time. With the purchase order received in July 2011, the solution was shipped out in December 2011 and its operation started in June 2012.

Low operational impact

From the operational point of view, the system is easy to handle. After plugging in the 11 kV cable, the complete operation of the system takes place from the engine control room on board of the ship. Via the power management system on board or by manual control the ship auxiliary generator is synchronized against the local grid, generated from the frequency converter. After the synchronization the load is transferred to the shore side installation and the on-board auxiliary generators are automatically switched off.

The ship's connection to the harbour is fully automated, which means there is no assistance required from shore personnel. The process is completely seamless, without any interruption of the power onboard. After the power plug is in place, fulfilling the technical and safety regulations, the converter enters into action, charging the power components and starting to feed the loads onboard almost instantaneously.

Stena Line says: „We are very satisfied with the professional cooperation with ABB during the project and the way the Onshore Power Supply System is working now.”

Shore-to-ship power

The continued expansion of global trade has drawn the attention of several regulatory parties including IMO/MARPOL and EU to the problem of pollution caused by ships. Tough environmental legislation has been issued, forcing the shipping industry to look for ways to reduce this negative impact. As a response to increasing environmental regulations in the marine industry, ABB, a technology pioneer in High Voltage installations for marine applications and leader in frequency converter solutions, comes up with shore-to-ship power solution, a fully integrated system which helps to reduce emissions in ports by connecting ships to the port's electricity grid via shore-to-ship power connection. The solution secures a seamless automated power transfer of the ship load from the onboard power plant to the onshore source and back. This enables ships to shut down their diesel-generator sets used to create onboard electric power and plug into an onshore power source while berthed. Most ships' power generation units operate at a frequency of 60 Hz, whereas local grid in most parts of the world is 50 Hz. ABB's Static Frequency Converter constitutes a safe, economic and efficient solution which converts the grid electricity to the appropriate load frequency. To become compliant with the demanding requirements concerning port emissions, both ship-owners and ports need to rely on innovative technologies. Shore-to-ship power is an investment which both reduces the environmental burden and saves money in the long-term.

For more information please visit:
www.abb.com/ports