

Increasing the capacity of Denmark's power grid

Lolland-Zealand submarine and underground cable link



- Increases the capacity and reliability of Denmark's power grid
- Enables the grid to integrate one of the world's largest offshore wind farms
- Optimized cable solution minimizes power losses

Scope of supply

- Project management
- Cable system design, engineering and manufacture
- Installation of submarine cables
- Supervision of underground cable installation
- Installation of cable joints, transition joints and terminations
- Testing and commissioning

Cable data

Voltage	145 kV AC
Length	2x28 km 3-core submarine XLPE cable (Al) 116 km underground XLPE cable (Al)
Customer	SEAS-NVE Holding A/S
Completion	2010



Customer needs

Denmark is Europe's second largest producer of offshore wind power, with a capacity of 868 MW, more than double that of the Netherlands in third place. Almost one-quarter of Denmark's offshore capacity is generated at the Rødsand II offshore wind farm, the 90 turbines of which generate up to 207 MW of emission-free power.

The power produced at Rødsand II is transferred onshore to the island of Lolland where it enters a 145 kV power network operated by SEAS-NVE, Denmark's largest consumer-owned energy provider. The power is transported through Lolland and along the seabed to the main Danish island of Zealand, where the country's major load center, Copenhagen, is located.

With an additional 207 MW of wind power set to enter its power network, SEAS-NVE needed to increase the capacity and strengthen the reliability of its existing transmission system between the islands of Lolland and Zealand.

SEAS-NVE selected ABB's proposal for a high-voltage cable solution.

Why ABB?

ABB was able to propose a number of technical improvements to the initial specifications at an early stage. These improvements optimize the cable system, minimize power losses and reduce the cost of building and operating the transmission link. They also improve the capacity and reliability of the solution.

ABB has an extensive installed base of underground and submarine high-voltage cable solutions in Denmark and northern Europe. They include the world's longest underwater high-voltage cable link (NorNed) between Norway and the Netherlands, and an HVDC Light® cable solution for the world's largest and most remote offshore wind park off the nearby German coast. Most recently, ABB supplied an HVDC link in 2010 to connect the eastern and western power grids in Denmark and create the country's first nationwide power network.

ABB was able to take full responsibility for the design, manufacture, sea installation and integration of both the underground and submarine cable systems, as well as deliver within a challenging timeframe.

The ABB solution

The Lolland-Zealand cable link is a 145 kV AC cross-linked polyethylene (XLPE) double-circuit cable system with aluminum conductors. The solution comprises a 6x14.6 km underground cable on the island of Lolland, a 2x28 km submarine cable between Lolland and Zealand, and a 6x4.8 km cable to a substation near the Stigsnaes power plant in Zealand.

ABB designed an optimized double-circuit solution consisting of two cables with aluminum conductors. A double circuit enables the system to transfer more power, better manage overload, and operate at partial load even if one cable is disabled. The use of aluminum conductors helped optimize the system and reduce project costs by avoiding the use of copper at a time when prices were at an all-time high.

By designing a system with identical underground cables, ABB reduced the cost and storage requirements for spare cable. ABB commissioned the solution in October 2010.

Customer benefits

- Optimized cable solution that increases the capacity and reliability of the power grid
- Innovative design reduces capital expenditure
- Turnkey solution from a single supplier
- Supplier expertise and reliability – ABB is the market and technology leader in submarine and underground high-voltage cables

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