

The NorNed HVDC transmission link - the longest underwater high-voltage cable in the world

The 580 kilometer-long NorNed link, with a 700 MW transmission capacity, will be the longest underwater high-voltage cable in the world. The contract is with the two state-owned power grid companies, TenneT in the Netherlands and Statnett in Norway. The interconnection will lead to power trading between the two countries and increase the reliability of electricity supply.

Advantages to the European grid

The security of supply will be improved since production resources in a larger area will be able to give support at network disturbances. The electricity market will benefit by opening electricity trade between two distant, isolated markets.

Environmental benefits

Scandinavia has a largely hydro-based production system whereas the Netherlands and surrounding countries has a largely fossil based system. Hydropower is easily regulated and stored in existing dams. This allows the overall system to be optimized by using the hydropower regulating capability to cover peak loads during daytime. At nighttime, power can be transported back to Scandinavia thereby saving electric energy in water dams. The result is more stable output from the fossil plants, thus minimizing emissions.

Additionally, the stabilized grid will allow integration of new renewable generation in the form of wind power.



Flat submarine cable



The NorNed transmission route

The HVDC technology

HVDC technology offers the unique capability to build long sub sea or underground cable transmission lines with low losses. Traditional AC transmission systems with undersea cables cannot be longer than about 60 - 100 km. Beyond this the losses are prohibitive. The NorNed cable, with a length of 580 km, has losses of only about 4%.

HVDC systems, by controlling the power flow, stabilize the grid in the interconnected networks and increase the security of supply.

HVDC systems cannot be overloaded and will not contribute to cascade tripping of lines.

- Connection point Norway
 - Feda substation
- Connection point Netherlands
 - Eemshaven substation
- Ownership
 - Jointly ownership between TenneT in the Netherlands and Statnett in Norway
- Start of project
 - December 31st, 2004
- Start of submarine cable laying
 - Spring 2006
- Commercial operation
 - December 31st, 2007
- Transmission technology
 - HVDC by ABB
- Transmission capacity
 - 700 MW
- DC voltage
 - +/- 450 kV
- Cable route length
 - 580 km
- Maximum water depth
 - 420 m
- AC voltage Feda
 - 300 kV
- AC voltage Eemshaven
 - 400 kV
- Flat submarine cable
 - Mass impregnated cable
 - 2 cable cores in common armouring
 - Each conductor 790 mm² copper
 - Diameter 217*136 mm
 - Weight 90 kg/m
- HVDC converter stations
 - Convert alternate current (AC) to direct current (DC) and on the other side DC to AC.
- Power direction
 - Power can be transmitted in either direction

More information can be found on
www.abb.com/hvdc



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