



COBRA cable

From concept to connection



A permanent electricity connection between the Netherlands and Denmark

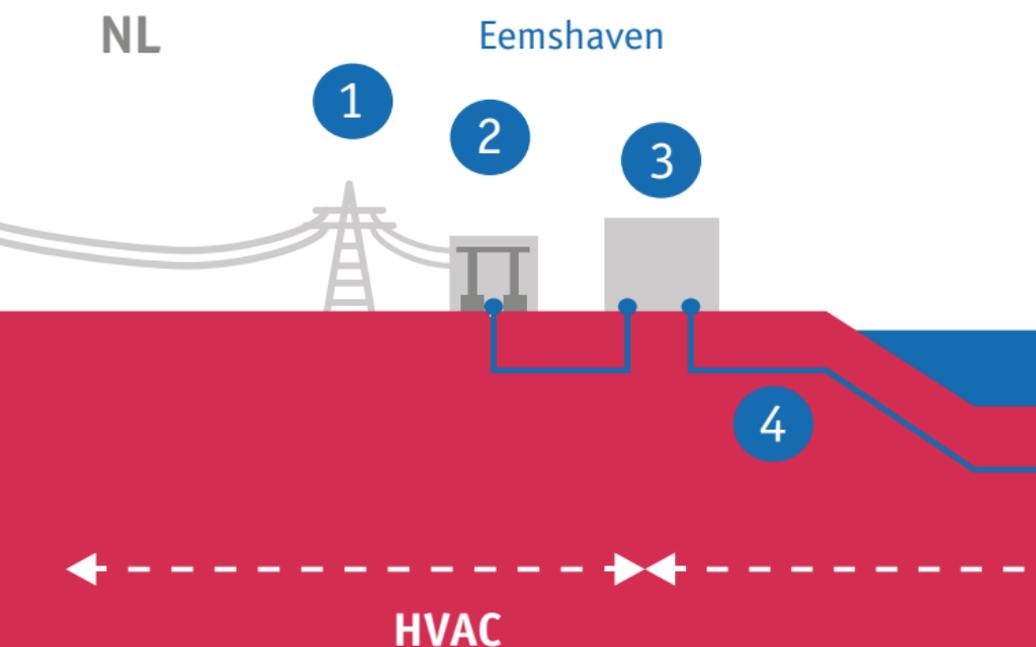
TenneT and Energinet.dk – the operators of the Dutch and Danish high-voltage electricity grids – are installing a submarine cable that will directly interconnect the high-voltage grids of the two countries. The COBRACable will have a capacity of 700 MW, will be around 325 kilometres long, and will run from Eemshaven (the Netherlands) to Endrup (Denmark) via the German sector of the North Sea. Two onshore converter stations – one in the Netherlands and one in Denmark – are needed to connect the cable to the existing grids.



Energinet.dk and TenneT are investing in the COBRACable to achieve the following aims:

1. Facilitating the transport of renewable energy

The supply of wind energy is variable due to the influence of weather conditions, and the production and consumption of electricity usually takes place at different geographic locations. Adequate transmission capacity is therefore essential to ensure the growth and success of renewable energy. The COBRACable has been designed to facilitate the direct transport of wind energy generated at offshore wind farms.



2. Creating a strong, interconnected European electricity grid

A power link between Denmark and the Netherlands will help to achieve the EU's goal of creating a stronger and more interconnected European electricity grid.

3. Enhancing the security of supply in the Northwest European electricity market

The COBRACable will contribute to the security of electricity supply in various ways. It will provide a back-up for other connections in the event of failures, and will help to integrate the variable supply of renewable energy in a balanced manner.

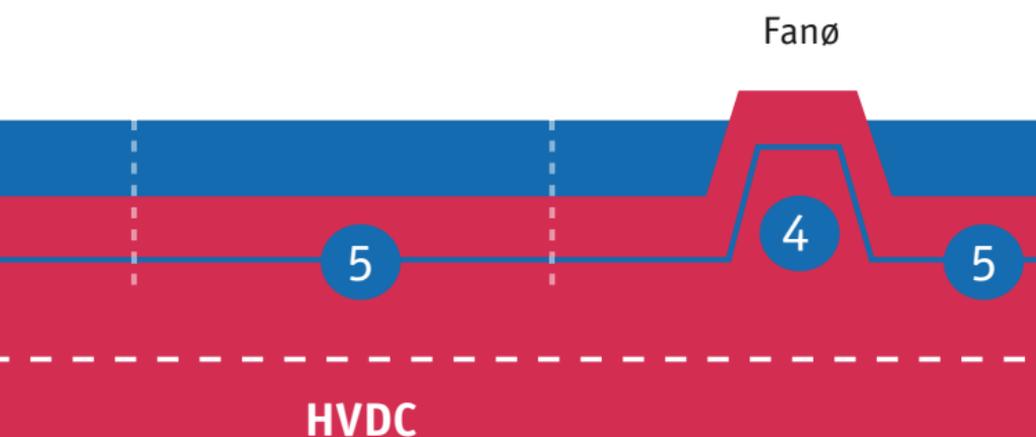
4. Creating a more level playing field

Like other interconnectors, the COBRACable will contribute to the development of an internal European electricity market, which is an important priority of European energy policy. In particular, the COBRACable will contribute to the further integration of the Northwest European electricity market.

5. Supporting the European '20-20-20' objectives

The COBRACable will make it possible to make more efficient use of renewable or 'green' energy. This leads to a reduction in CO₂ emissions as renewable electricity replaces the production of conventional 'grey' electricity. Because the COBRACable strongly supports the European energy and climate objectives, the European Commission has awarded the project a grant under the EU Economic Recovery Plan, and has designated it as a Project of Common Interest (PCI).

- 1 Existing electricity grid (alternating current)
- 2 High-voltage substation (alternating current)
- 3 Converter station (alternating current / direct current)
- 4 Onshore cable (direct current)
- 5 Subsea cable (direct current)



Facts and figures

Depending on the chosen route, the direct-current (DC) connection with a capacity of 700 MW \pm 320 kV will have the following features:

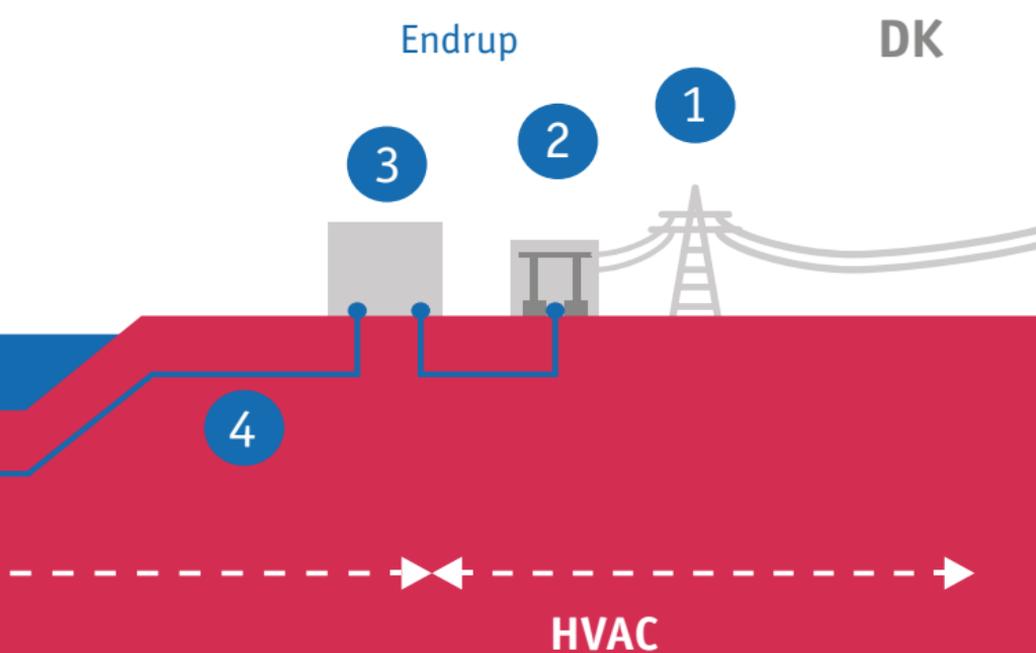
- Total length: approx. 325 kilometres
- Onshore:
 - In the Netherlands: at least 1 kilometre of onshore cable
 - In Denmark: 25 kilometres of onshore cable
- Offshore
 - 300 kilometres

Converter stations

An onshore converter station will be needed both in the Netherlands (Eemshaven) and in Denmark (Endrup). These stations will convert outbound alternating current (AC) into direct current (DC), and inbound direct current into alternating current. All onshore electricity grids are designed for alternating current. The converter stations will also make sure that the electricity is converted to the correct voltage level.

Constructing a new connection

Various construction methods and technologies can be used for the offshore construction of the COBRACable. The method or technology that is most appropriate for a particular section depends on the depth at which the cable must be laid in the seabed (on average 1.5 metres below the sea-floor), the local water depth, and the composition of the seabed (soft and dynamic, or predominantly hard). The methods also differ in terms of how quickly the work can be carried out.





Grid map of the Netherlands with the future interconnector.

Planning

End of 2015	Finalisation licensing procedure for route
End of 2015	Award main construction contracts
2016	Commencement of construction work (design and manufacturing of cable and converter stations)
2017	Commencement cable installation and civil work converters
2018	COBRA cable completed

For more information visit:

www.tennet.eu

www.energinet.dk

www.bureau-energieprojecten.nl



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