



## Riffgat Offshore Wind farm - The first commercial wind farm in the German North Sea

### The project:

Situated 15 km northwest of the German island of Borkum, Riffgat is the first commercial offshore wind farm in the German North Sea. It consists of 30 wind turbines with a total capacity of 108 megawatts: enough to provide clean, sustainable energy for around 120,000 households.

nkt cables was selected by the transmission system operator, TenneT, to carry out a challenging offshore turnkey project: to supply the connection from the Borkum Riffgat offshore wind farm to the German transmission grid. The challenges included a cable route that runs across a tidal estuary, a National Park, and a WWII ammunitions dumping area.

The export cable route runs from the wind farm, past Borkum, through the Osterems (the eastern estuary of the River Ems), and to the landing point on the German mainland at Pilsum. It comprises a total 48 km of 155 kV cable in 5 sections, connected together with 4 offshore joints.

nkt cables provided a complete turnkey solution for the entire export cable project that encompassed everything from planning to material production, installation and testing.

### Key Facts:

- Location: 15 km northwest of the German island of Borkum, in the North Sea
- Principal: TenneT Offshore GmbH
- Builder: EWE
- Quantity of order: 51 km of 155 kV export cable
- Building time: 2011 - 2014





## The aim:

nkt cables delivered a complete solution for TenneT Offshore GmbH: planning, project management, engineering, production, and installation including final testing. nkt cables manufactured and delivered all the necessary materials, with 51 km of 155 kV export cable being produced at nkt cables' state-of-the-art factory in Cologne, Germany. The corresponding HV accessories for the project were also produced by nkt cables dedicated accessories plant in Cologne, Germany.

## The contract:

The Riffgat project presented a range of challenges, many of them related to the varied environments where work had to take place. Working in tidal areas needs particular consideration, particularly with regard to safety and emergency planning. Special attention was needed for operations involving the transition from offshore cable laying on the seabed to onshore underground cable laying via horizontal drilling. Tidal mud flats make it difficult to move personnel, materials and equipment between sea and shore at low tide. nkt cables solved the problem by building special wooden walkways to allow free movement at any time, regardless of tide levels.

Part of the cable route runs through environmental protection areas in the Wadden Sea National Park. Additionally, prior to nkt cables' involvement, the cable route had been planned to go across a Second World War ammunitions dumping area. These factors created challenges that demanded a high level of expertise and specialised methods.

Intermediate storage of cables was splitted by nkt cables' on its own barges and nkt cables subcontractors, vessels and TenneTs' storage facilities. All installations, both on- and off-shore, were executed by nkt cables' installation teams together with the marine specialists Bohlen & Doyen, nkt cables' trusted partner for all marine works on this project.

A great number of explosive objects were subsequently detected on the seabed along the cable route. Cable laying had to be stopped at one point to ensure the clearance of a narrow cable laying corridor. nkt cables and Bohlen & Doyen developed special cable-laying processes to allow operations to continue in safety. This was the first time a cable has been installed through an ammunition dumping area in the German North Sea. Professional input from all involved parties and team members was fully utilized to assess the complex situation, and to find the best procedures for a safe way of getting the job done under difficult circumstances.

With the final high voltage test on 30th and 31st of January 2014, nkt cables demonstrated that it had successfully completed the full scope of the work. The particular challenges of the Riffgat project gave nkt cables an opportunity to show that it is able to handle large, complex and challenging turnkey projects with professionalism, transparency, flexibility and total dedication.