

Major Ports Utilized for North Sea Offshore Wind Farms Construction and Maintenance

by Maryruth Belsey Priebe

There are many logistics challenges related to the construction and operation of large-scale offshore wind farms like that of Nordsee Ost, Trianel Borkum, and DanTysk in the North Sea. Each one of these major new offshore wind projects requires a port that can handle the large specialized vessels needed to transport and support the construction of the project, as well as clear channels and easy navigation to ensure efficient movement of parts and personnel throughout the project.

What's more, the terminals need to be specially outfitted with the right equipment, reinforced infrastructure, and ample space to accommodate the large wind turbine components – not only for storage before transport, but in most cases also for the pre-assembly or complete assembly of wind turbines and foundations before they are taken offshore where they will be installed. This poses tremendous challenges for existing and newly built ports, with retrofitting and customization of layouts and infrastructure needed in order to ensure the quickest and safest logistics systems possible, both during the installation phase and for years to come as the farm is operated and maintained. The following is a brief survey of some of the largest offshore wind farm projects currently under construction and how they're dealing with port-related challenges now and in the months and years ahead.

Nordsee Ost Offshore Wind Farm Prepares Eurogate Container Terminal Bremerhaven Port

The Nordsee Ost, a large wind farm installation planned for the eastern portion of the North Sea near Heligoland, Germany, will be developed by RWE Innogy. The 48 turbine farm, which will have a 295 MW capacity once complete with an anticipated commission in 2014, will be located



[Orange Blue Terminal](#)

19 miles north-east of Helgoland. The \$1.13 billion farm will generate 1.1 terawatt hours of electricity, which is enough to provide power for 310,000 homes and is comparable to a modern gas-fired power plant in its capacity.

Supplying the build and the ongoing operation and maintenance of the offshore wind farm will require excellent logistics and good connections with onshore ports. As such, a two year lease was signed by RWE Innogy with Eurogate Container Terminal Bremerhaven for the use of their Bremerhaven container port. This will form the base for operations during the development of the wind farm, and will also be used in a different capacity once the project is complete for ongoing operational support.ⁱ

The Eurogate Container Terminal Bremerhaven is a 17 hectare area that will be leased by the company for the pre-assembly and shipping of the 48 wind turbines to be provided by REpower. It will also be the location for assembling the foundations. The turbines will then be transported offshore where they will be fully assembled at the wind farm site.ⁱⁱ

In order to prepare this port for the project, the subsoil of the mooring berth needed to be reinforced to handle the installation vessel used by RWE Innogy for erecting the wind farm without any port-related restrictions. Additionally, the surface of container terminal 1 was prepared by being cleared, removing individual containers, reconnecting container bridges, and shifting some existing operations further north.ⁱⁱⁱ

Room was also made to house 30 RWE employees to work directly from the port. This has included the construction of two new apartment blocks on Heligoland near



the port for the operations and maintenance staff to use now and in the future. The buildings will house a total of 30 apartments giving each staff member a private space. RWE Innogy, which is slated to operate the Nordsee Ost wind farm from Heligoland for 20 years, will use these

[Eurogate Container Terminal Bremerhaven](#)

accommodations for many years to come.^{iv} These apartments blocks were completed in February 2013.^v

RWE Innogy has also been working hard to prepare the infrastructure of the port for future operations, a project that will cost the company € 10 million. Additional houses will be constructed for the project by the logistics company, EMT. In the southern area of the port, RWE Innogy is preparing to construct a service station, as well as complete the construction of new roads. As these upgrades are being completed, RWE will use temporary facilities in the form of offices, warehouses, and sanitary containers set up until the final service station is complete. Not only will these areas be used for marine coordination functions, they will also be purposed for interim storage of spare parts, tools, and other components needed for the construction and maintenance of the farm.^{vi}

Trianal Borkum Offshore Wind Farm Uses Eemshaven Terminal for Port Base

For the Trianal Borkum offshore wind farm, the new Eemshaven multi-purpose terminal located at the mouth of the Ems River on the Dutch side, was just completed (June 26, 2013). This Orange Blue Terminal, as it is called, covers 20 hectares of space and will be the hub for the offshore wind logistics for the Borkum project. Here, the sections for the wind farm will be consolidated and preassembled.

This location is ideal for the Borkum wind farm and other wind parks located along the Dutch and German coast because of the short channel navigation it can offer. Not only does this channel not have any locks to impede the traffic of specialized vessels, the most specialized installation ships can easily navigate the channel and access the port where they can be jacked up as needed. It also provides efficient handling, temporary warehousing, and pre-assembly space for the large components used by the industry.

The logistics area for the Borkum wind farm covers an area of approximately 216,000 m², and includes a quay of 694 metres long. By accommodating any type of cargo with specialized equipment, this port can provide efficient operations as well. In particular, it has a heavy lift platform in the loading quay area where offshore wind components can be loaded and unloaded relatively efficiently.^{vii}

Esbjerg Port the Hub for DanTysk Offshore Wind Farm Project

For the DanTysk offshore wind project in the North Sea, the central port will be the Esbjerg, which is situated in the Danish town of Esbjerg on the North Sea coast. This port, which is 120 years old, is located very close to the manufacturing plants from which the components will originate, making it an ideal location as it will save time and transportation costs, as well as minimize risk of damage during transports onshore. Here the pre-assembled wind turbines will be loaded on to ships that will transport them out to sea where they will be installed. This port also serves as a base for Vattenfall from which they supply and maintain operations of 900 wind turbines on behalf of six European countries in the North Sea. In the future, all maintenance and supplies for the DanTysk project will also be provided out of this port.^{viii}

In April 2013, the first nacelles for the DanTysk project arrived at the Esbjerg port via an articulated lorry on a trip that lasted just a few hours.



These 88 metre high and 12 metre long components are approximately the same size as a school bus and will be shipped to the port over the coming months from the Siemens' Danish plant in Brande where they will be stored until needed in specially prepared storage areas.^{ix}

[DanTysk nacelles](#) arriving at the Esbjerg port

For Large-Scale Offshore Wind, Large is the Only Way to Go

Learning from the oil and gas industry, the wind energy sector is fast coming into its own as a mature sector able to work through complex challenges such as those posed by the planning and construction of ports suitable for big installations such as the Nordsee Ost, DanTysk, and Borkum offshore wind farms. Lessons learned along the way are informing the operations of these companies and will not doubt inform

the direction of future projects as they reach for ever-more ambitious offshore energy targets.

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Maryruth can't help but seek out the keys to environmental sustainability - it's the fire that gets her leaping out of bed every day. With green writing interests that range from sustainable business practices to net-zero building designs, environmental health to cleantech, and green lifestyle choices to social entrepreneurship, Maryruth has been exploring and writing about earth-matters and ethics for over a decade. You can learn more about Maryruth's work on JadeCreative.com.

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