

## **North Sea's Biggest Offshore Wind Projects Depend on Specialist Vessels**

By Maryruth Belsey Priebe

As the backbone of any offshore wind installation project, specialized transport and installation components – including ports, vessels, and support ships – must run smoothly and on time in order to ensure the overall financial viability of this sector of the renewable energy industry. Facing competition from other renewable



[DP Gezina vessel](#)

technologies and challenges from inclement weather and fluctuating commodities prices, the offshore wind industry has many challenges to overcome each time a new project begins. We'll survey today two large offshore wind projects, both taking place in the North Sea, to explore the types of vessels they're using to ensure the on-time and on-budget installation of everything required for these massive projects to come online.

### **DanTysk Offshore Wind Farm Vessels for Offshore Cable Laying, Foundation Works, and More**

In order to complete the challenging installation of the wind farm known as DanTysk in the North Sea – Europe's largest wind farm – the company has needed to deploy a specialized fleet of vessels. The project, which will require a building phase that lasts over a year and will cost over EUR 1 billion to complete, will require vessels for material and crew transport, installation vessels, and support vessels. When it is complete, this massive project will provide 400,000 German homes with renewable energy.<sup>i</sup>

The cable installation, for instance, has required four different vessels for linking the turbines to the offshore substation for this project. The first will be the *HAM 602*, which will be laying cable on the sea bed. Though this vessel is somewhat old – it was built in 1968 – and somewhat small compared to other vessels (measuring only 88 metres long), it is being converted with specialized components in preparation for this project. Before it begins work on the DanTysk project, it will go through a cable laying trial near Vlissingen to ensure it’s ready for the work that lies ahead.

When the conversion is complete, this vessel will have many advantages for this DanTysk Project, not least of which are its three reels which have been installed to accommodate three different cable sizes needed. By having a flexible deck layout and these three reels, the crew are able to switch between cable sizes as required.

A second vessel, the *Jan Steen*, will be burying the cable, with a bury depth of 1.5 metres below the seabed using a trenching ROV. Like the *HAM 602*, the *Jan Steen* is small and will be modified in order to work on this project. It has been fitted with new burial equipment and will also be equipped with additional accommodation modules.

In addition to the cable-laying and burying vessels, two vessels – the *Crew Transfer Vessel* (CTV) and the *DP Gezina* - will be supporting the installation process by providing offshore logistics. The *DP Gezina* is already in use in Van Oord’s fleet for installation. Within the *DP Gezina* vessel, most of the personnel working on the cable laying will be accommodated for the duration of the project – specifically those personnel (approximately 60 individuals) working on the pull-in and termination of cable ends from both Van Oord and DTOW.

Built in 2007, this ship has an integrated offshore access system that makes personnel transfer easy. Rather than doing transfers using the boat landing and ladder system, this Ampelmann transfer system allows for the safe access of personnel to the intermediate platform of the transition



[SEAFOX 5 jack-up vessel](#)

piece.<sup>ii</sup>

On the foundation works side of things, the DanTysk project is relying on a whole different set of vessels. For instance, Keppel FELS Limited was brought into the project to provide their SEAFOX 5, a multi-purpose self-elevating platform (MPSEP) for the installation of wind turbines. This newly built jack-up vessel is a 1,200 tonne heavy-lift ship that will be used to lay the foundations for the 288 MW DanTysk wind farm project.<sup>iii</sup>

The SEAFOX 5 is a 151 metre long vessel that can construct in waters up to 70 metres deep, and will be used to install the foundations in the North Sea using a crane designed to support loads of 1,200 tonnes.<sup>iv</sup> It can accommodate 150 crew in two-person cabins, though it can be adjusted to accommodate up to 300 people if necessary.

Touting the ability to provide installation services with 30% less downtime due to harsh weather, the SEAFOX 5 is said to be able to deliver projects at 50% of the cost compared to other heavy-lift vessels and complete the work within the same amount of time. Its job is to receive the monopiles, which are being built by Roermond before being loaded onto the vessel, and transport them from the Rotterdam harbor out to sea.

On February 7, 2013, the SEAFOX 5 left Vlissingen headed for the DanTysk project after several delays due to building and weather challenges.<sup>v</sup> It was carrying the 80 monopiles that will be attached to the 80 foundations and transition pieces.<sup>vi</sup> It will continue to work on the installation of monopile foundations until late fall 2013.<sup>vii</sup>

Finally, the Pacific Osprey is another crucial piece of the fleet for the DanTysk project. This ship, which was commissioned by Vattenfall from Danish provider Swire Blue Ocean, is one of the largest installation ships in the world of its kind. Designed specifically for the installation of the 80 Siemens wind turbines, the Pacific Osprey can operate in nearly any type of weather due to its improved stability. The configuration of the ship also allows it to install the turbines onto foundations even with 2.5 metre waves and wind speeds of up to 20 metres per second.

In addition to these vessels, Vattenfall commissioned the construction of an accommodation platform to be installed by Stadtwerke Munich in the middle of the North Sea. This platform, which will provide quiet rooms, hot showers, internet

access, TV, and other creature comforts, will be used by the maintenance team for the wind farm starting in 2014. In all, the platform will have accommodation space for 50 people and can be used 365 days every year, even during the harsh winters of the region.

This is the first time a platform like this has been constructed in Germany, following in the footsteps of the oil and gas industry. It was deemed an absolute necessity given the extreme distance from shore at which the farm will be situated – commuting by ship every day would take too long and might result in risks due to sea sickness and safety that would render workers unable to complete shifts. In addition to comforts like those already mentioned, the platform will have workshops, storage areas, catering facilities, washing facilities, offices, and areas for leisure activities, and will be anchored to the ground to provide a stable, comfortable environment.<sup>viii</sup>

### **Trianel's Borkum Offshore Wind Farm Installation Vessels**

Another significant project going on in the North Sea is that of Trianel's Borkum offshore wind farm. This EUR 1.6 billion, 400 MW project that will have 80 wind turbines when complete is planned in two stages (each with 40 turbines), the first of which has already been started – as of April 24, 2013, 40 of the foundations had already been completed.<sup>ix</sup> Located 45 km to the north of the German island of Borkum, will generate enough energy for 400,000 German homes. In the end, the wind farm will be completed by the third quarter of 2013 if all goes according to plan.<sup>x</sup>

One of the vessels working on this project is the *Oleg Strashnov*, a heavy lift vessel that was used to lift the 2,400 tonne deck onto the substructure for the internal transformer platform needed for the farm. This platform will now allow the next phase of the project to go forward – that of erecting the wind turbines themselves.<sup>xi</sup>

For turbine installation phase of the project, the *MPI Adventure* vessel will be employed for installing the AREVA M5000 turbines, each of which will have a 5 MW capacity.<sup>xii</sup> This vessel, which is scheduled to have already started work, is a wind turbine installation vessel (WTIV) that can transport, lift, and install the turbines and their foundations. The vessel has a crane with a 1,000 tonne capacity as well as a secondary crane with a 50 tonne capacity. It can operate at depths of 40 metres

and has the ability to jack with 6,000 tonnes of cargo on board. It also has accommodations for 112 people.<sup>xiii</sup>

Another important vessel for this project is the *Stanislav Yudin* installing jacket which will be used for Borkum West II. Built with a 2,500 metre revolving crane, the heavy duty crane specialist vessel has an eight-point mooring system and 2,500 m<sup>2</sup> of free deck space. It has already begun to transport the 900 ton, 60 metre high tripods used in the construction site, two at a time.<sup>xiv</sup>

The vessels needed for both of these projects have been built and/or retrofitted for very specific purposes – customization that is required in an industry where efficiency and cost-effectiveness are strongly tied to the suitability of the vessels. As these projects have demonstrated, by choosing the right vehicles for the right work, installation can continue at a pace that ensures completion as close to the deadlines as possible.

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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](http://JadeCreative.com).

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