

The *HelWin alpha* converter platform

Photo: Overdick

# Converter platform design from oil and gas industry

**HELWIN ALPHA** The recently installed converter platform *HelWin alpha* is based on a design taken from the oil and gas industry. In the following, the platform's technical specifications are detailed.

In 2010, the Dutch electricity transmission system operator TenneT, responsible for connecting offshore wind parks in the German North Sea to the power grid, awarded the contract for design, fabrication and installation of the offshore converter platform for the wind parks Nordsee Ost and Meerwind to a consortium led by German engineering and electronics giant Siemens. At the end of August 2013, SeaReenergy Offshore, a Hamburg-based company that

transports and installs components for offshore wind projects, reported the successful installation of the wind power converter platform *HelWin alpha*. Four tugboats positioned the topsides above the subsea structure, and it was lifted hydraulically to its final position 22m above sea level. The subsea structure had been installed in June at a water depth of approximately 23m some 85km off the German North Sea coast north-west of the island Helgoland.

Measuring 75x27x50m, the 12,000-tonne topsides is the largest platform ever installed in the North Sea. It was towed from its production site in Wismar, Germany, to the offshore site in seven days and positioned in four days. Together, the two wind parks will have a capacity of 576 MW, which is sufficient to provide electricity for more than 500,000 households. The platform converts the alternating current power generated by the wind parks to direct current,

ensuring minimal loss during transmission to shore.

## Design from the oil and gas industry

The design and installation engineering of the platform was subcontracted to Overdick, a naval architecture and marine engineering consultancy in Hamburg that is specialised in the design of self-installing platforms. Overdick based the design on its MOAB® (mobile offshore application barge) concept, making the

## Preferred repair & conversion partner

We are the trusted name for the repair and modification of a diverse range of vessels. We also lead the industry in FPSO, FSO and FSRU conversion and upgrading.

We continue to grow our range of solutions, including our expertise in retrofitting Ballast Water Treatment Systems.



**Keppel Shipyard**

# EUROPORT 2013

connecting the maritime world

November 5 - 8, Ahoy Rotterdam

## PIONEERS IN MARITIME TECHNOLOGY

Register now for a free visit!  
www.europort.nl/registration



For pioneering technologies in offshore visit Europort!

From 5-8 November 2013, world port city Rotterdam is the ultimate meeting place for maritime pioneers. Europort has a strong focus on advanced technology and complex shipbuilding. Get in touch with the industry leaders, meet over 1,000 exhibiting companies from 35 countries and join one of the many conferences and seminars on advanced technology.

Thursday morning the 7<sup>th</sup> of November the focus is on offshore, with the subject 'Going into the Deep'. For an updated programme and exhibitor list, please check [www.europort.nl](http://www.europort.nl) or download the Europort app.



[www.europort.nl](http://www.europort.nl)



platform independent of offshore cranes.

Overdick said it had originally developed the MOAB® concept for the offshore oil and gas industry, where it has been used in several small- to medium-sized platform installations in various marine environments. The platforms are designed around a self-floating hull equipped with a temporary hydraulic jacking system, which is employed to lower the platform legs onto the jacket foundation and then raise the hull out of the water and to its intended elevation. Since the jacking system is required only for the period of offshore installation, it is hired, readily available, from any of the contractors on the market. According to Overdick, this approach makes the project independent of heavy-lift vessels, which may be too expensive or – as in the case of the *HelWin alpha* platform – simply not available with the required lifting capability.

The *HelWin alpha's* topsides was designed with a watertight hull. This allowed it to be fabricated in the dry docks of German shipbuilder Nordic Yards, where the platform was the second of four contracts for converter substations to be built in Wismar and Warnemünde. After the yard's work on the hull was completed, the topsides, ballasted to float with an even keel, was floated out by flooding the dock and towed to the installation site without the need for a transport barge. During towage, the platform's six legs were secured in a raised position and would later be lowered onto the pile foundation.

The offshore operation was the most critical juncture in the fabrication and installation of the project. Prior to installation of the topsides, the foundation piles and installation of the cable tower had already been completed in the field. The topsides rests on six foundation piles with a diameter of 3.2m. Due to the relatively shallow water depth of only 23.3m at the *HelWin alpha* site, no jacket substructure was necessary to brace the piles and legs. The

piles provide a foundation for the platform similar to the monopiles frequently used for wind turbines. Their correct layout and spacing was ensured by driving the piles through a template, which was temporarily placed on the seabed and later recovered when pile driving was completed.

The cable tower stands as a separate structure and accommodates the J-tubes for the incoming AC cables from the wind parks as well as the outgoing DC cables to the landside power grid. The pump casings and discharge lines for seawater are also fitted on the cable tower along with the boat landing, which will later provide access to the facility. The cable tower was installed as a conventional offshore lift by crane barge and is secured by four 2m piles of its own.

After the piles and cable tower had been installed in the offshore campaign in early and mid-summer, the favourable weather window in late August provided an opportunity to install the topsides, Overdick said. It was connected to the mooring grid and carefully positioned over the piles by four tugs. The legs were then lowered by the jacking system before it lifted the topsides out of the water.

Upon completion of the structural work, the crews responsible for commissioning the electrical plant will finally take control of the platform. As the topsides was installed in one lift, Siemens has already been able to complete much of the required pre-commissioning work at the yard, minimising the workload left to be done in precious offshore man-hours.

At press time, as activities on *HelWin alpha* proceeded, its 800 MW sister platform, *BorWin beta*, also designed under Overdick's MOAB® concept as a self-installing platform, was under tow to its location north-west of the island of Borkum. In the view of Overdick, the two projects demonstrate that experience gained in the oil and gas industry can be of great benefit in the new offshore wind industry.