

Addressing every aspect of offshore

Words: Peter Robert, Offshore Wind Business Development Manager Damen Shipyards Group

As Europe strives to reach its ambitious 2020 renewable energy targets and with the trend for offshore wind farms to move into deeper and more challenging waters further from the shore – using bigger turbines and foundations – Damen Shipyards is making sure it is developing innovative solutions to serve the needs of the industry – both now and for the future.



Anyone involved in the offshore wind industry knows the pressure to get the costs down. There are various trends in the market that will play a big role in influencing the so-called Levelized Cost of Energy (LCOE) and Damen is proactive in seeing where it can contribute to making the industry more cost efficient, considering both vessel types and total logistical concepts for wind farms.

Customers are already benefiting from Damen vessels in the offshore wind sector. For instance, Damen's survey vessels and the heavy lift DP2 transport and installation vessels of Jumbo, which recently installed 131 Transition Pieces in the same amount of days at the Greater Gabbard Wind Farm, are just a few examples. Then there are the well-known Damen Shoalbusters, Multi Cats and the revolutionary Twin Axe Fast Crew Supplier 2610.

Damen has been in the sector for some time, but six months ago the company decided to employ its own "offshore wind czar" to drive the business forward. Peter Robert, Offshore Wind Business Development Manager, says Damen wants to help the industry to expedite these developments and is therefore working in close cooperation with all other parties in the value chain.

"As a shipbuilding company we need to

understand the challenges and developments in the industry so we can work together to reduce the cost of energy. In fact many of the current issues in the offshore wind business, whereby standardisation is used with the aim of reducing costs, have already been running for quite some years through the veins of Damen.

"I think there are not really any limitations to where Damen can play a role in developments, whether we develop standardized or more tailor-made, one-off solutions."

Some of the drivers for cost reduction include the technology developments such as faster, high volume installation techniques. One way of reducing costs is by utilising economies of scale by equipment standardisation and this is very much at the heart of the Damen philosophy, he stresses. "We recognise that there is a need to reduce vessel hire, make fewer repositions, and minimise operations at sea and at the same time, there has to be increased vessel utilisation."

Increasing the weather window will become even more important given that wind farms are being established further offshore. Indeed, larger vessels (meaning fewer trips to port), and shuttling are likely to become the norm.

The move towards larger turbine models should improve project economics, of course. In general, turbine sizes are increasing from the 3.6MW standard to 6 or 7MW and the industry is even seeing the emergence of the 10MW turbine. Foundations are getting bigger and jackets could well be the standard in due time.

"While 5MW+ turbines will be more expensive per unit than current models, installation and maintenance costs will be lower: The reduced number of units will lower overall CAPEX per MW (fewer foundations and array cables); taller towers will gain access to stronger winds; and improved production efficiency will increase energy conversion rates," Mr Robert stresses.

And naturally, this trend will also result in new ship designs for the installation and commissioning of these turbines. For instance, with the increasing size of turbines the minimum lifting capacity of an installation vessel should be at least above 500 tons. And with this trend of turbines getting bigger and bigger, the time of just increasing crane capacity will be over, Mr Robert points out. "This will make way for innovative designs which will significantly reduce installation time and cost."

When it comes to the move further offshore, specifically when considering

many of the UK projects coming up, this too, will have specific cost impacts.

Due to longer transfer periods between supply ports and sites, installation costs will increase and the use of clear weather windows will be less efficient. Operations and maintenance costs will rise in a similar fashion and require new working methods, which may include onsite accommodation.

These trends require an entirely new logistical approach to offshore wind, he says. "A daily transit from port will not pay anymore. Sea basing concepts are the way forward."

Sea basing and feeding solutions

Damen is looking at feeding and sea basing solutions. "Jack up vessels should be used for installation not just transit purposes, there is a real need for feeding solutions. With a day rate of a vessel at \$200,000, it doesn't make sense to use it for transit purposes. The Jack up should be used for tasks that it can carry out best – installation. At the moment Damen is developing a solution that might be very interesting for the offshore wind market.

"With sea basing we are looking at the logistical set up, how operations and maintenance are carried out – should it be a floating or fixed platform, or could it act as a safe haven for smaller vessels."

Offshore Wind Maintenance Barge

Damen has already thought ahead and – together with Workshops – developed its pioneering Offshore Wind Maintenance Barge, which will provide a base for remote infield operations. The accommodation barge is 72 m long and can be equipped with a suitable crane or other vessels on board. A new version of 91 m long, for 140 people has already been fully engineered. This platform can function as an accommodation for personnel, a storage place for critical spare parts, or a safe haven for small crew transfer vessels.

And when it comes to foundations, if the current plans go ahead, more than 1,000 units a year will have to be installed by 2020. Monopiles are likely to partly be replaced by jacket structures between 2015 – 2020 as they are more cost effective for 5MW+ turbines in deeper waters, he says. "This trend will of course, reflect on present and future vessel design."

Demofloat FP7

And currently, floating turbines such as the Siemens/Statoil Hywind project are still experimental but it is expected that these foundation types will be used for deeper water sites, he adds. Damen is involved in the Demofloat FP7 funded EU programme, looking at the industrialization of this floating structure. "Damen believes that this might be the solution to reducing the total installation

cost and thus finally contributing to the targeted LCOE."

Twin Axe High Speed Support Vessel (HSSV) 2610

The most recent Damen vessel to "make a splash" in the offshore wind sector has been its revolutionary Twin Axe 2601, which although only launched in 2011, is being heralded as the best boat in the market in terms of price level and performance.

Marineco UK became the first customer of the Twin Axe 2610, also known as the High Speed Support Vessel (HSSV) 2610, and deployed it on the Sheringham Shoal Offshore Wind Farm.

"I truly believe that this vessel will become the mainstay of the wind farm industry in the years to come," Managing Director of Marineco UK, Mike Conafray, said at the time of the launch. The company was so delighted that it has taken delivery of a second vessel and two more are on order.

At the last total a further 12 have been sold and 24 built, with 12 built for stock, exemplifying the vessel's runaway success. Mr Robert adds: "The 2610 has been out in 2.6 m significant wave height safely transferring crew and this was absolutely no problem for the vessel. She doesn't lose any of her performance and can readily handle higher waves."

TALKING POINT



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The quality, accessibility and sea keeping behaviour makes the Twin Axe truly fit for purpose and greatly extends the operating window, he says. "There is so much more comfort for the crew, she can keep going at full speed even in choppy waters," he emphasises. Additionally, the 2610 is ideal as a support vessel able to carry two 20ft containers. "It is not just to transfer the crew but great for diving and support operations." The vessels in service can stay out in the field for up to four days at a time.

Damen's R&D Department is currently conducting a design review of the 2610 seeing if there are things that can be even further improved. For instance, it is examining where there could be enhanced operational performance if the fender is adjusted slightly and it is considering an additional access system.

New, shorter HSSV

There are several versions already in the pipeline including the FCS 4612 and the FCS 2008, a shorter version of the 2610. Mr Robert says Damen decided to develop a smaller version after extensive market

research and requests from customers. This vessel, which will launch in around a year's time, is more focused on the offshore maintenance market and for wind farms closer to shore.

The 2610 is likely to continue to be the mainstay as farm's go further out from the shore, he adds, because ultimately, time matters and operators want to travel under full speed in tough conditions. But even larger vessels are in development that will be suitable for those farms that are eventually 100 km plus offshore. The 4612 is a large catamaran meant for the oil and gas market for fields 100-200 miles offshore but Damen is looking at whether this can work in the North Sea at 35 knots, considering perhaps a shorter version.

Damen is addressing every aspect of the offshore wind industry. "We are starting to see fit-for-purpose equipment being developed, but in the offshore wind industry we still need strive to get the costs of energy down."

Damen has the capability to develop a total

offshore solution and currently not many other companies are taking on this challenge, he stresses. "We are speculatively going on with new developments in order to help our customers and the industry to realise its goals.

"We already have an integrated range of dedicated wind farm vessels that can support at every stage of an offshore wind farm's lifecycle: from development, to installation and maintenance."

And although 2020 is a European ambition, Damen is also poised to take up offshore wind opportunities in China, the US and Korea.

For more information, please visit: www.damen.nl