

Learning from experience

The dismantling for repair of the 80 turbines at the Horns Reef offshore wind farm in Denmark is a major blow to this flagship project. What can the industry learn from this experience, asks Siân Green.

Following a series of problems with the operation of the Horns Reef offshore wind power project in Denmark, wind turbine manufacturer Vestas has decided to dismantle the nacelles installed at the site and transport them to land for testing and repair. Work on the units is now underway and they are scheduled to be re-installed by the beginning of November, according to Danish utility Elsam, owner of the 160 MW project.

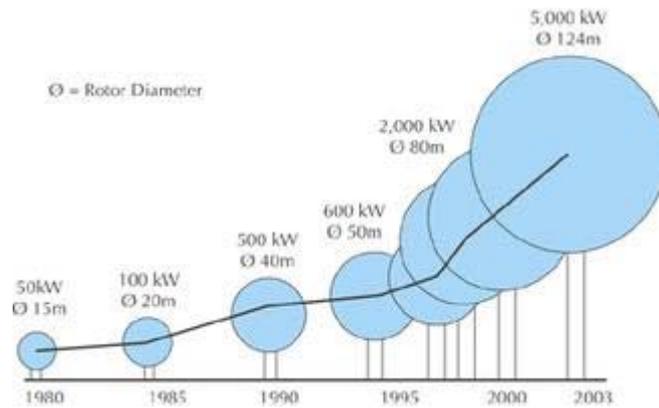
According to Elsam, the problems at Horns Reef were two-fold. Although the offshore environment at Horns Reef, 15 km off the Danish coast, were well documented and understood, it emerged during operation that the transformers used in the 80 Vestas V80-2.0 MW units could not cope with the conditions. Secondly, the generators in most of the 80 units had a wiring fault which has been traced back to the production facility.

Vestas and its partners investigated the problems and decided that the best way forward would be to dismantle the nacelles, which weigh 79 t each, and take them to shore for testing and repair. The units have been taken to Vestas' facilities in Ringkøping, Denmark. The generator wiring fault is being repaired while a new type of transformer is being retrofitted into the nacelles. Elsam hopes that the units will all be reinstalled by mid-October, although weather-related delays may mean that early November is a more realistic date for recommissioning.

The decision to dismantle the nacelles was a major blow for the Horns Reef project, but also signalled a potential setback for the offshore wind power industry. Even in general wind power industry terms, the offshore sector is a relative newcomer and the early projects are an important testing ground for the technology. Numerous offshore projects are planned – particularly in Europe – and there is pressure on projects such as Horns Reef, Scroby Sands in the UK and Arklow Bank in Ireland to prove that the challenges of the offshore environment can be overcome.

It is never easy to admit to and be open about project setbacks – particularly for manufacturers – but Vestas and its partners have recognised the significance of Horns Reef to the industry and their response has been rapid and responsible. "They were quick to recognise the problems and the fact that they are fixing them at their own expense creates confidence," said Christian Kjaer, policy director of the European Wind Energy Association (EWEA).

Vestas has not said how much the whole repair and recommissioning process will cost, but it is certain to be an expensive exercise. Nevertheless, it will help to ensure the company's continued success in the offshore sector, which promises strong growth prospects. "Experience is expensive, but also precious," said Svend Sigaard, president and CEO of Vestas. "Being the first large offshore project, Horns Reef must be a success ... [it] represents a token of supplier reliability."



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Growth in size of commercial wind turbine designs. Source: EWEA

According to Kjaer, out of a global installed wind capacity of nearly 39 294 MW at the end of 2003, offshore installations account for just 1.3 per cent (about 510 MW). The number of offshore installations is expected to rise rapidly, however, led by plans in the UK to install some

6 GW of capacity by 2010. Germany is also expecting to reach about 6 GW of offshore capacity by 2012, and Denmark is expected to come third in the European league table of offshore development.

While offshore developments promise to help overcome some of the negative aspects of onshore windfarms, such as visual impact, the offshore sector still has a number of challenges to overcome if it is to reach these forecast growth levels, says Kjaer. The main challenge is to bring the cost of offshore developments down in line with those of onshore projects.

Although the energy content of offshore winds is around 40 per cent higher than those onshore, the cost of installing foundations, operation and maintenance and transmitting power to the grid is significantly higher offshore than onshore. Electricity generated from offshore turbines is 30-50 per cent more expensive per unit than that generated from onshore wind turbines, says Kjaer. "The main goal of offshore development is to bring down costs, and we expect to see a similar drop in offshore costs as we have seen in the onshore industry, where costs dropped by 80 per cent over a 20-year period."

The costs of offshore development will be brought down by a number of factors, including the economies of scale gained through increased turbine size, and through growth in the equipment sub-supply sector. Unit sizes for offshore windfarms have exceeded 3 MW and are now approaching the 4 MW-plus size. Also important, says Kjaer, is operational experience, which will help to reduce the high costs of offshore operation and maintenance, which has to be carried out by boat and/or helicopter, and improve reliability.

Gaining experience offshore is therefore of great importance to the future of the industry, both in terms of bringing down costs and in proving the developing technology. While the problems at Horns Reef are a setback for Vestas, the company appears determined to turn the experience into a positive, and it is now in a unique position to gain a better understanding of how the offshore environment can affect equipment.

"The developers understood how harsh the conditions at Horns Reef are, but they are harsher than at any other offshore project," said Kjaer. "This is valuable experience for the industry, but Vestas will probably learn the most from it."

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