

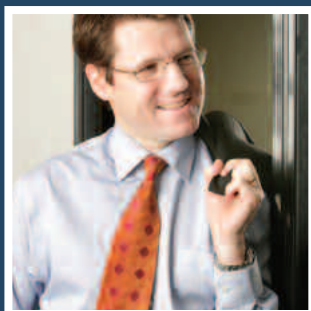
Learning from Progress

SECOND TURBINE INSTALLATION IN JULY 2007

During June 2007, we have been preparing the second turbine for load-out from Nigg and installation on site in the Beatrice Field in July.

With both turbines scheduled to be operational in autumn 2007, the Beatrice Wind Farm Demonstrator will begin to provide in-depth data. However, we have already learned a lot since the project commenced in 2003; we have pioneered the use of large turbines and jackets offshore; we have shown that large turbines can be pre-assembled onshore, transported to the site as a complete unit, and installed in a single operation; and we have set new standards in the environmental management of large scale developments in sensitive marine environments.

Now in this issue of *Windward*, as we look forward to learning more throughout the hook-up, commissioning and operational phase of the project, we can also look back at the lessons that have been learnt on one of Scotland's most exciting and ambitious renewable energy projects.



A MESSAGE FROM NICK WALKER Vice President, Talisman Energy (UK) Limited

*It's good to be back with a new issue of **Windward**. We had to endure a frustrating winter with the second turbine sitting onshore, but with its installation now imminent, we can look forward to fulfilling the full potential of the Demonstrator Project.*

While data gathering from the turbines themselves will be central to this, we will also take this opportunity to study

the feasibility of a full-scale development. Building on the experience we have gained installing the two demonstrator turbines, we will study how the jackets can best be adapted for mass fabrication and how the commissioning process can be focused onshore. We will also review the consenting and consultation processes to see how we can ensure the early involvement of all stakeholders in any future development.

*With the wind farm back in the public spotlight, we're always interested to hear your views and opinions. If you'd like to comment on the Demonstrator Project or on the potential for future developments, then please do get in touch. You will find all the contact details in *Windward* or on our website at www.beatricewind.co.uk.*



A WORLD FIRST IN 2006 & A SECOND THIS YEAR

THE INSTALLATION OF THE BEATRICE WIND TURBINE A IN THE SUMMER OF 2006 WAS A MAJOR LANDMARK IN RENEWABLE ENERGY IN SCOTLAND.

For Talisman and its partners, the project set a number of world firsts in engineering terms (see box). We also witnessed the successful development of a safe access and egress system and a comprehensive environmental research programme.

In 2007, the imminent installation of the second turbine – the Beatrice Wind Turbine B – moves the project into its operational phase. This will enable us to monitor performance and quantify a range of variables including the wind resource, energy potential, operating costs and turbine accessibility.

At the same time, we will be conducting further studies into a number of issues linked to mass fabrication and the onshore assembly and offshore installation processes required for a large scale development.

In particular, we will be considering how our designs will need to be adapted for mass production. We will look at how we can maximise onshore commissioning and reduce weather dependency during installation. In relation to the cable lay and hook-up phase, we will seek ways in which we can simplify connections.

By monitoring actual performance of the Demonstrator Project and looking at the practicalities of mass production, we will be able to fully assess the viability of large scale deepwater wind energy developments.

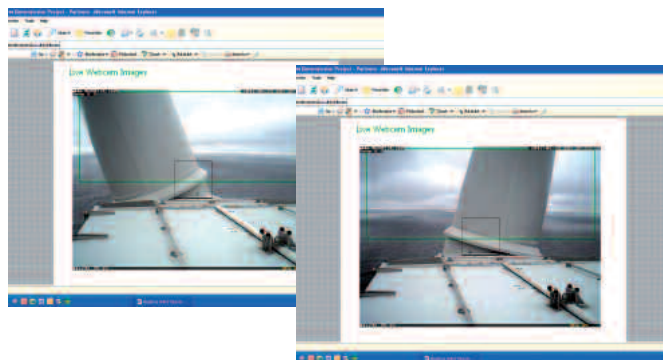
FIRST THINGS FIRST

- > First 5MW turbine deployed offshore – the world's largest turbine in the deepest water
- > First application of a jacket substructure for offshore wind
- > First onshore assembly of tower turbine and blades
- > First offshore installation in a single lift from a floating vessel

The view from the top

The website of the Beatrice Wind Farm Demonstrator now includes live webcam pictures from the nacelle on the Beatrice Wind Turbine A. You can check out the view between the turning blades today at www.beatricewind.co.uk/webcam.

The wind farm continues to generate a lot of international interest, and the website is regularly visited by people from all over the world, who take the opportunity to ask questions and express their support.



THE INSTALLATION TIMELINE > > > > > > > > > > > > > > > > > >

<p>AUGUST 2006 Turbine A assembly and installation completed.</p>	<p>7-18 JUNE 2007 Turbine B assembly at Nigg Fabrication Yard. Installation of blades to hub to form rotor assembly. Lift and install rotor assembly to nacelle.</p>	<p>26-27 JUNE 2007 Arrival and preparation of the installation barge Rambiz at Nigg Fabrication Yard.</p>	<p>30 JUNE – 1 JULY 2007 Turbine B assembly completed, loaded onto the Rambiz and sailed to Beatrice from Nigg Fabrication Yard.</p>

TESTING, TESTING, TESTING

In recent months, a Talisman team has been completing the commissioning of the first turbine in the Beatrice field. What does this involve?

The offshore hook-up and commissioning process involves the final checks and preparation for operation of every piece of equipment.

In the first instance, protective materials used in transit are removed from the equipment. All alignments are checked prior to start-up and all wires are connected between the turbine and the platform – this is the hook-up element.

Permission is then sought from the National Grid prior to start-up and the turbine is initially operated at low output for 100 hours. The turbine is then stopped and everything is rechecked. Once these checks are complete, the turbine is restarted and the output is slowly increased to its maximum capacity and is monitored closely.

The final stage of the commissioning process is the acceptance testing – which is a contractual requirement designed to confirm that all the equipment meets its design capacities. When acceptance testing is complete, the turbine is officially operational.



The view from the shore

Despite their offshore location, the Beatrice Wind Turbine structures are visible from various locations on the Moray Firth coast in good weather conditions. However, the careful choice of colours and reflectivity of surfaces has helped to mitigate visual impacts.

The picture to the right shows the Beatrice Wind Turbine A being installed as seen by the naked eye from the shore at Dunbeath.



1-2 JULY 2007
Installation of Turbine B onto existing jacket installed in July 2006.

6-7 JULY 2007
Installation of additional boat landing access structures to both turbine jackets.

8-11 JULY 2007
Rambiz demobilisation.

7-17 JULY 2007
Offshore hook-up and commissioning.

Note: Installation is weather dependent. For updates, please check www.beatricewind.co.uk

Planning key to protecting marine mammals

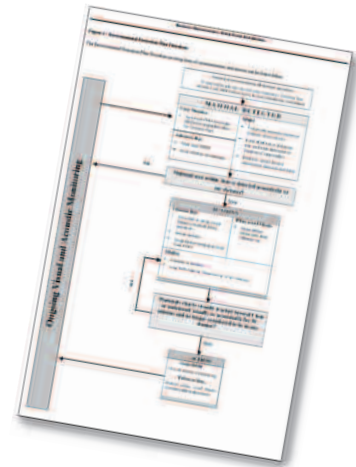
THE ENVIRONMENTAL FOCUS FOR THE JUNE 2006 INSTALLATION PHASE WAS PILING OPERATIONS – DURING WHICH THE TWO JACKETS WERE TO BE PILED INTO THE SEAFLOOR. MODELLING FROM THE ENVIRONMENTAL STATEMENT MEANT WE WERE CONFIDENT THAT WE UNDERSTOOD THE RISKS TO MARINE MAMMALS AND COULD PLAN TO MITIGATE THEM EFFECTIVELY. WE ALSO KNEW THAT DIRECT PHYSICAL IMPACTS WOULD BE LIKELY TO OCCUR ONLY VERY CLOSE TO THE PILING OPERATION.

Even so, we implemented an Environmental Protection Plan that involved using a team of trained marine mammal observers onboard a dedicated mitigation vessel to monitor for the presence of marine mammals prior to the start of pile driving operations. The team not only looked for visible signs of dolphins, porpoises and other marine mammals, but also used hydrophones to listen for their presence. Any visual detection within a 1 km radius or an acoustic detection at any distance led to the postponement of the operation.

When given the green light to commence, the piling operations began slowly, and built up blow force

over a 20 minute period to give any animals in the area a chance to move away before full power was reached.

We wanted to test the sound modelling presented in the Environmental Statement and used for the Environmental Protection Plan to see if our noise estimates were accurate. To do this we measured pile driving noise both at source and at distance. Overall the results were broadly similar to our modelling. A summary will soon be published – providing a valuable reference for marine experts, and other developers.



Our environmental protection plan flowchart

Research provides valuable public data



Kate Brookes, University of Aberdeen, and the bird tracking radar on Beatrice.

During the design, development and implementation of the project, our research has been focussed on the area around the Beatrice platform.

After discussion with stakeholders we agreed to install an experimental bird radar on the platform to test this technique as a tool for remote sensing of birds at an offshore wind farm. The radar project has been running for more than 18 months and has presented us with many technical challenges. The findings will be published as a PhD thesis by Kate Brookes, a research student at the University of Aberdeen and will give valuable insight in to the application of radar as an ornithological tool for offshore wind farms. Two years of monthly platform-based bird surveys will supplement Kate's data and we hope Kate's work will be accepted in due course by a scientific journal.

Researchers working for the University of Aberdeen with funding from the DOWNViND consortium and support from Talisman have used Timed Porpoise Detectors (TPODS), acoustic devices suspended in the water column to record the vocalisations of porpoises and dolphins. The TPODS have been used almost continuously in the Beatrice area since August 2005 and have provided us with an exciting insight into the relative abundance of porpoises and dolphins over a long period of time.

Of particular interest are data that support the idea that the area does not play host to high numbers of dolphins compared to other locations such as the Sutors. Unfortunately, the TPODS cannot tell us if the dolphins we did detect are bottlenose dolphins or another species such as common dolphins but we do know there are harbour porpoises at the site and the area is probably well used by this species. The expectation is that a publicly available scientific paper will report these findings.

TALK TO US

For more information on the Beatrice Wind Farm Demonstrator Project please send an email to: environment@talisman.co.uk

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