

A pure spot on the map of the world

Vattenfall's Ormonde Offshore
Wind Farm



2SEA

VATTENFALL

Ormonde Offshore Wind Farm

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Vattenfall's Ormonde Offshore Wind Farm has been constructed in the Irish Sea, 10km off Barrow-In-Furness, in the north west of the UK. The wind farm comprises 30 REpower 5M wind turbines and covers an area of 8.7km².

Ormonde Offshore Wind Farm is expected to produce around 500 gigawatt hours of electricity annually. This is sufficient to supply the equivalent of approximately 100,000 homes a year with electricity.

Vattenfall among the leaders

Vattenfall is one of Europe's largest generators of electricity and the largest of heat. Vattenfall's main products are electricity, heat and gas. In electricity and heat, Vattenfall works in all parts of the value chain: generation, distribution and sales. The parent company, Vattenfall AB, is 100 per cent owned by the Swedish state. Vattenfall's vision is to develop a sustainable, diversified European energy portfolio with long-term increased profits and significant growth opportunities. At the same time, Vattenfall will be among the leaders in developing environmentally sustainable energy production. Wind power is an important cornerstone.

Construction of the wind farm

For the benefit of the environment

Modern society relies on the supply of electricity to function properly. At the same time, however, we are affecting the environment, both when we produce electricity and when we use it. One way of reducing this impact is to produce electricity from renewable energy sources, such as wind power. It is an excellent complement to other forms of electricity production. Wind is a free fuel that produces no environmentally harmful emissions.

Wildlife in focus

Extensive research was carried out to examine the expected effect on animals and vegetation in connection with building the wind farm. This included studies on birds, seals, porpoise and fish in the area.

Results concluded that the development would not result in any significant adverse environmental impact on the Furness Peninsula, with only a few exceptions during the construction phase. They were subject to suitable mitigation.

Impact on the biological environment

The impact of the construction process on animals living on the seabed was assessed to be of low significance, due primarily to the small area affected by both turbine installation and cabling. Biological communities on the seabed were studied. It was confirmed that they were typical of the Furness Peninsula and, indeed, the wider Irish Sea and no effects on rare species or habitats would occur.





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Vattenfall will continue to monitor the effect of the wind farm on local habitats with a thorough approach to post construction surveys and assessment. Surveys will include monitoring the:

- Seabed
- Sea-floor organisms
- Fish
- Birds

Our surveys so far show no, or negligible, impact on the environment and the surroundings. However, we continue to monitor and take this assessment very seriously.

The installation of 30 turbines

Weather conditions in the Irish Sea required detailed planning of the project. The site is sheltered from the heavy wave conditions due to a network of sandbanks located further offshore.

The installation of foundations commenced in early May 2010. The grid connection required cables to be

buried underground from Halfmoon Bay, Heysham, near Lancaster, to the onshore substation and was completed on schedule. The erection of the turbines started in early 2011 and completed by autumn the same year.

Foundations

A fabricated steel sub-structure was designed to support each of the wind turbine generators (WTGs). Each sub-structure was located on to four piles which were driven into the seabed prior to the arrival of the sub-structures at the offshore site.

Access platforms, located on several sides of the sub-structures, allowed access to the WTGs during the wind farm's operation and maintenance phase.

During the installation of the foundations, Barrow Port was used to store the piles. Dedicated supply vessels carrying piles sailed from Barrow to the wind farm site to ensure a constant supply to the pre-piling vessel.

Due to their size, the sub-structures were shipped on barges directly from the fabricators on the east coast of Scotland to the wind farm site.



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Cabling

In order to connect the WTGs to the grid, a series of cables were installed between the WTGs, the offshore sub-station platform (SSP) and the shore.

Each WTG sub-structure has J-tubes mounted, which the submarine cables are pulled through. WTGs were arranged in four 'strings' with cables connecting each WTG on a string to the SSP.

From the SSP a single 'export cable' was installed, connecting the wind farm to Halfmoon Bay, at Heysham.

From the shore landing, onshore cabling was installed 2.5km through the town of Heysham. This part of the installation involved crossing the railway and main road up to the grid connection point at Heysham Power Station sub-station.

The cables not only hold the three main phases for high voltage transmission of power from the WTGs, but also vital fibre-optic cables for remote communication with the WTGs.

Pre-assembly of wind turbines

The wind turbines were stored and partially assembled at Harland and Wolff, in Belfast, prior to transportation to the wind farm site. Nacelles, hubs, blades, and towers from REpower's production facility arrived on a series of transportation vessels from early 2011.

Two WTGs' sub-assemblies were prepared, including the fully assembled 126m diameter rotors, and loaded on to a vessel for transportation to the wind farm site.

Wind turbine installation

The vessel transporting the two WTGs was used to install the WTGs on to the sub-structures utilising a specially designed crane and lifting tools.

Each tower, the nacelle and rotor assembly, which make-up the REpower 5M turbines, were installed in a series of 'lift' operations.

After the above procedure, installation teams of engineers were transported to the turbines by boat to perform final completion works, commissioning, and the final switching-on of the turbines.



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Navigational safety measures

The following navigational safety measures were installed at the wind farm:

- Navigation lights on the foundations during and after construction. In addition, four cardinal buoys marked the outer offshore perimeters during construction, two remain in place
- Fog horns at four positions
- Turbines painted yellow up to 12m above sea level
- A 50m safety zone around each turbine

Access arrangements

Wind turbines are accessed by engineers using specially designed crew transfer vessels. Transfers can take place with wave heights up to about 1.5m. When wave heights are above the safety limits, or adverse weather prevents safe access to the turbines, the day is registered as 'a weather day'.

Public relations

For further information visit our website
www.vattenfall.co.uk/en/ormonde.htm

Facts

Project Facts

Name	Ormonde Offshore Wind Farm
Number of turbines	30
Turbine capacity	5MW
Total installed capacity	150MW
Homes equivalent production	>100,000
Water depth – low tide	Around 17 to 21 metres
Water depth – high tide	Around 26 to 30 metres
Foundation type	Steel jacket
Area of wind farm	8.6km ²
Distance from shore	Around 10km from Barrow-in-Furness
Tip height (from sea level)	153m
Hub height	90m
Rotor diameter	126m
Total weight of turbine	661 tonnes
Weight of rotor and hub	125 tonnes
Weight of nacelle	315 tonnes
Weight of towers	221 tonnes
Cables to shore	One
Length of cable to shore	41,700m
Cable landfall	Half Moon Bay
Distance from cable landfall to substation	2,800m
Substation	Heysham



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