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Floating deep-sea wind turbine consortium aims to help UK meet its renewable energy targets

A consortium led by Netherland's-based **Blue H** Technologies has been selected to take part in a £1.1bn Energy Technology Institute (ETI) initiative to help the UK meet its ambitious renewable energy targets by 2020.

The Project Deepwater Turbine consortium, which includes BAE Systems, EDF Energy, the Centre for Environment, Fisheries and Aquaculture, Romax and SLP Energy, will design and assess the feasibility of a 5MW floating wind turbine that is cheaper and more efficient than existing models and able to operate in water depths of 30m to 300m.

It is one of four projects funded by the ETI, a UK-based company formed by the UK government, BP, Caterpillar, EDF Energy, E.ON, Rolls-Royce and Shell.

Most offshore wind farms are built in shallow water depths ranging from 15cm to 25m. Turbines are placed offshore to take advantage of high wind speeds, which increase the efficiency of energy conversion. This efficiency becomes even more pronounced at greater depths, where winds are stronger and less turbulent.

Until now, offshore wind turbines have been adapted from their land- based equivalent and fixed to the sea bed by a gravity base or a steel monopile.

However, due to the high cost and complexity of building such large structures in the sea, the offshore wind industry only accounts for 1.5 to 2 per cent of the total wind energy market worldwide.

Neal Bastick, **Blue H** chief executive, said: 'Today, to construct onshore it costs approximately E1.5m (£1.35m) per MW installed. Offshore shallow water costs between E3m and E3.5m per MW. Our objective in this ETI/**Blue H** consortium is to see what we can do to close the gap somewhat.'

Project Deepwater Turbine intends to use a floating platform to improve cost and efficiency. The technology has been proven in the oil and gas industry, where tension-leg platforms (TLPs) are used for deep-water drilling rigs. These structures are assembled onshore and placed on floating cylinders, which are ballasted with concrete and taken out to sea by tug. Once in location, the platform is anchored to the seafloor using steel cables.

Bastick explained: 'The basic concept behind our floating solution is that you place a very heavy counterweight on the seabed, so heavy that it can't move. Attached to that you have chains, which hold the platform in position and makes it rigid through tensioning. By using a floating platform we can exploit much deeper waters than the shallow water turbine industry. In addition, all our construction is done in the harbour and towed out into the sea with tug boats, which means it is a lot less expensive.'

Blue H has already deployed its first prototype using a TLP at a depth of 113m. Under the new consortium it will work with its partners to develop the existing model into a through-life design, which is expected to be ready in the second quarter of 2010.

Jon Mills, head of strategy development at BAE Systems Integrated System Technologies (Insyte), said: 'The view is with this radical design we can increase the economic benefits of generating offshore wind. This also means we don't have to use specialist support vessels as these are in relatively short supply. In addition to the use of a floating platform, **Blue H**'s design will use a two-bladed rotor system, which the company believes is easier to take to sea, easier to install and cheaper to maintain.'

As well as the design of the turbines, the project will assess its impact on other technologies such as aircraft radars.

Mills said: 'Currently in the UK, around 50 per cent of wind farm developments are being rejected on the basis that they potentially interfere with air traffic and air radar.

'There isn't a single magic bullet solution, but BAE Systems is working with **Blue H** to advise on how they might minimise the impact by using a suitable height or making modifications to radars.'

As part of the initiative, the ETI will fund three other projects to a total of about £20m. Two of the projects, Nova and Helm Wind, will also focus on developing wind turbine technology by assessing the feasibility of a new design of wind turbine and delivering a concept study on a new offshore-specific wind farm.

A further project, ReDAPT, will install and test a 1MW tidal turbine at the European Marine Energy Centre in Orkney.

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