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Programme Area: Offshore Wind

Project: Deep Water

Title: Final Feasibility Study

Abstract:

Offshore Wind has huge potential to reduce carbon emissions and create economic prosperity, as well as increasing energy security of supply. For this potential to be unlocked, significant challenges that need to be overcome: a) Electricity costs need to be competitive with current (2010) onshore wind costs by 2020 and with conventional generation by 2050, b) Increased yields: annual offshore farm availability to be increased to 97%-98% or better, c) Reduce technical uncertainties to allow farms to be financed in a manner, and at costs, equivalent to onshore wind today. Deep Water was one of three ETI Offshore Wind projects looking at new turbine design concepts, which were commissioned in support of the aims outlined above. The other two were Helm Wind and NOVA. The focus of all projects was on enabling technologies that would have a significant impact on offshore wind cost of energy from 2020 onwards.

Context:

This project was led by Blue H Technologies. The consortium also included BAE Systems, Romax, Centre for Environment, Fisheries and Agricultural Science, EDF, PAFA Consulting Engineers and Sea & Land Power and Energy Ltd. It delivered an economic and technical feasibility study for a novel floating TLP 5MW offshore wind turbine having a hybrid concrete/steel floater and a concrete counter weight.

ETI Programme: Offshore Wind
Project Name: Deep Water
Deliverable Reference: Final Feasibility Study
Contractor/Consortium: Led by Blue H Technologies BV

Context

Offshore Wind has huge potential to reduce carbon emissions and create economic prosperity, as well as increasing energy security of supply. For this potential to be unlocked, significant challenges that need to be overcome:

- Electricity costs need to be competitive with current (2010) onshore wind costs by 2020 and with conventional generation by 2050
- Increased yields: annual offshore farm availability to be increased to 97%-98% or better,
- Reduce technical uncertainties to allow farms to be financed in a manner, and at costs, equivalent to onshore wind today.

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Project

The Deep Water project has delivered an economic and technical feasibility study for a novel floating Tension Leg Platform (TLP) offshore 5MW offshore wind turbine having a hybrid concrete/steel floater and a concrete counter weight. It is suitable for depths of 30 – 300 m for Round 3 and later round implementation. The project had two aspects:

1. A TLP design based on a concrete / steel hybrid.
2. A novel, fixed-pitch, yaw-controlled, teetering 2-bladed, 120m diameter, downwind 5MW turbine.

Led by Blue H Technologies BV, the consortium also included the following participants: BAE Systems, Romax, CEFAS, EDF, PAFA Consulting Engineers, Sea & Land Power and Energy Ltd.

Key Project Findings

This project has provided the ETI with valuable data on TLP floating foundation design and cost. This information has helped shape the next stage of the ETI Offshore Wind programme.

Our analysis has concluded that the cost of energy from the deep water high wind sites is competitive with that of the typical Round 3 sites. Further optimisation of the TLP floating foundation design could further improve energy costs.

Further Information

Full information on the results of the project is available to ETI Members in the confidential technical report.