



Abstract

Energy from offshore wind turbines must be less expensive than energy from oil and coal so that consumers have access to electricity that is renewable, sustainable and cheap.

i4Offshore, one of the largest wind energy projects ever, will over a five year period deliver innovative, reliable and robust solutions to reducing LCoE (levelized cost of energy) by at least 43%, to below 80€/MWh, at highly challenging sites before 2025.

This new offshore solution will consist of new, modularized components which allow leaner, faster, more reliable and much more cost-efficient logistics in the transportation, handling, installation and O&M (Operations & Maintenance) phases of future commercial project development.

Objectives

The goal is to deliver a solution that makes consumers' electricity bills both lower and greener compared to fossil energy or other renewable energy sources, by

- reducing LCoE
- ensuring a minimal environmental footprint
- validating commercial viability of GW-sized offshore wind farm



Results

Cost reduction is the paramount concern across all stages of the offshore wind manufacturing, construction, installation, operation, maintenance and decommissioning process, whilst safeguarding the highest standards of health, safety and environment.

The new offshore solution will consist of new, modularized components which allow leaner, faster, more reliable and much more cost-efficient logistics in the transportation, handling, installation and O&M phases of future commercial project development. i4Offshore will deliver innovative, reliable and robust solutions to reducing LCoE

Conclusions

Project size: €27.1m
 Funding: €19.9m
 15 Partners
 Start: Nov. 2018
 Duration: 60 months

With the grant from the EU, the partners aim to bring the technology a step further so that it will be able to provide a basis for the creation of future offshore wind farms around the world. In addition to being able to reduce LCoE, the target solution will leave a minimal environmental footprint.

Methods

Based on state-of-the-art research and classical engineering disciplines like structural analysis, geotechnical engineering, production and risk analysis, i4Offshore will

- demonstrate a full scale installation of a SGRE 10MW wind turbine on a new foundation consisting of new buckets, a steel jacket, a concrete transition piece, and with a new cable connection
- demonstrate cost-effective techniques to manufacture, install and operate large turbines on gravity jacket foundations
- develop models for virtual GW-scale offshore farms to industrialize and optimize with respect to logistics, handling, installation and O&M



Demonstration project

- Installation with SG 10.0-193 DD direct drive wind turbine

Transition Piece

- Optimized Concrete TP

Jacket

- Lower cost and weight
- Higher degree of automation
- Robot welded nodes; bolted joints in full scale

Corrosion protection Innovations

- New type of surface treatment

Suction buckets

- Modular design
- Automated manufacturing
- Lightweight

Cable in Pipe

- Multicore cable for cable-in-pipe solution
- Significant cost reduction



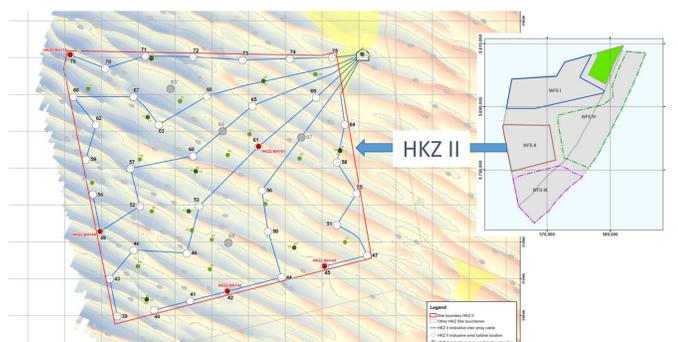
Virtual project

- Virtual 1,500MW site with 10MW turbines

Full scale +1500 MW wind farm

- Simulated upscaling of the demo project into future GW-scale wind farm developments with respect to Logistics, Handling, Installation and O&M

Test site: Hollandse Kust Zuid (HKZ II)



- Water depth: ≈ 24m
- Harsh environment on wind and waves and suitable soil conditions for bucket installation

References

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