

Offshore wind farm maintenance could soon be a breeze

October 17 2016



Credit: Andrea Piacquadio from Pexels



The EU-funded TOWERPOWER project is developing reliable new techniques to continuously monitor the structural condition of offshore wind turbines. Optimising maintenance and inspections is a key way to help the sector achieve cost efficiencies.

The project, which is entering its final year, is currently integrating cutting edge inspection techniques and preparing for final testing on <u>offshore wind turbines</u>. More accurate and cost effective monitoring will help wind turbine operators identify potential structural defects earlier, and enable better planning and scheduling of maintenance activities. Pioneering real-time wireless connectivity also means that the TOWERPOWER system can be used to monitor offshore conditions on land, saving time and money.

Tapping offshore opportunities

The project builds on growing market demand for tailored offshore solutions. To date, offshore wind farm operators have often struggled to optimise their maintenance and inspection interventions, losing a competitive edge to other sources of energy able to achieve greater cost efficiencies. Addressing growing demand for bespoke offshore solutions is therefore a significant market opportunity for high tech businesses, and is why the project consortium – led by the French business cluster Capenergies – brought together five SMEs, three SME associations and three research centres to investigate and develop new solutions.

'What made this project interesting is that it is focused solely on monitoring rotating wind turbine structures offshore,' says project coordinator Dr Céline Auger from Capenergies. 'While a lot of monitoring solutions already exist for the onshore market, these are often not applicable to offshore installations.'

In addition, the last decade has seen risk-based inspection approaches



applied in the oil and gas industry, and these have enabled operators to identify new strategies to inspect and control the deterioration in structures. The TOWERPOWER project also sought inspiration from some of these techniques in developing maintenance planning for offshore wind turbines.

Powerful practical solutions

'We decided to focus specifically on inspecting the transition piece of the wind turbine, the part that supports the nacelle (the section that houses all of the generating components in a wind turbine) and the tower itself,' explains Auger. 'This transition piece is made of a set of steel pieces some 40 mm thick, which are joined together by a 50 mm thick special concrete layer.'

Project partners next looked at ways of evaluating defects and tested two ultrasound-based techniques: acoustic emission and guided waves. These techniques enabled researchers to evaluate large surface areas and volumes of material, while at the same time detecting the precise location of any defect.

'We are talking about 40 to 50 sensors per tower, with the data then aggregated and transmitted from the nacelle to a shore supervisor,' says Auger. 'We have already carried out a number of experiments on models and simulations in order to fine tune the equipment. By the time the project is completed in 2017, we will have also taken into account environmental and weather conditions.'

A number of tests in water have been scheduled. These will help to monitor the impact of waves and the robustness of the processing unit, before the entire system is ready for testing on an offshore wind turbine. The finalised tool, says Auger, will be economically accessible and competitive, and will provide wind farm owners, operators and insurers



with extremely valuable data to extend the life of turbines.

'In addition, we will produce a best practice and standardisation approach for test methods and implement a programme of information and training for inspection personnel,' she says. 'This will add great value to the wind sector as there are at present no standards for the inspection of these structural components.'

More information: For further information please visit the project website: <u>www.towerpower.eu/</u>

Provided by CORDIS

Citation: Offshore wind farm maintenance could soon be a breeze (2016, October 17) retrieved 27 April 2024 from <u>https://phys.org/news/2016-10-offshore-farm-maintenance-breeze.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.