CMSWind - Advanced condition monitoring system for the assessment of wind turbines rotating parts

Current wind turbine condition monitoring methodologies can be time-consuming, costly and can fail to achieve the reliability and operational efficiency required by the industry. Despite public and government enthusiasm for renewable energy projects, the offshore wind industry's ability to meet ambitious targets is far from assured. Building as many turbines as possible in order to maximise power yield per turbine is dependent upon delivering projects of scale and scope and with clear prospects of strong return. Three obstacles need to be overcome in order to achieve the investment needed; supply constraints, logistical difficulties and technical challenges. The latter, technical challenges, currently present the biggest potential risk to the future of the wind industry. Technical failure rates in offshore wind can be high compared to onshore, reducing availability to 60%. Offshore failures are difficult and expensive to fix.

The CMSWind project will produce an advanced system for condition monitoring of wind turbine machinery components. Utilising three novel techniques, specifically designed for wind turbines and their components, it will improve wind turbine machinery reliability by up to 50%. This estimation is made from the fact that the need for maintenance and out of service wind turbines will be reduced or even eliminated leading to improved reliability and operation.

Project objective

The CMSWind project will show the applicability of a condition monitoring system enabling the prompt detection of defects. The concept is to deploy a system that:

- Allows early detection and identification of defects on components of the wind turbine such as slip-ring corrosion and shaft/bearing misalignment, thus helping to optimise the maintenance schedule
- Combine the use of several sensors in order to evaluate the overall operational condition of the turbine's generator, gearbox bearings and main shaft
- Uses a wireless sensor for rotating components monitoring using high performance powering and energy harvesting technologies
- Collate and analyse the data obtained through the different sensors using a single SCADA system

Motor current signature analysis, operational modal analysis and acoustic emission techniques will be used to monitor the condition of the generator, the gearbox and rotary components, respectively (accounting for 53% of wind turbine downtime). All systems will be tied together through supervisory control and data acquisition to provide supervisory control, data logging and analysis.

For further information, please visit the project website at **www.cmswind.eu**.

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