Offshore Wind
Journal

Pilot projects will determine whether Romeo's promise will be fulfilled

Mon 28 Jan 2019 by David Foxwell

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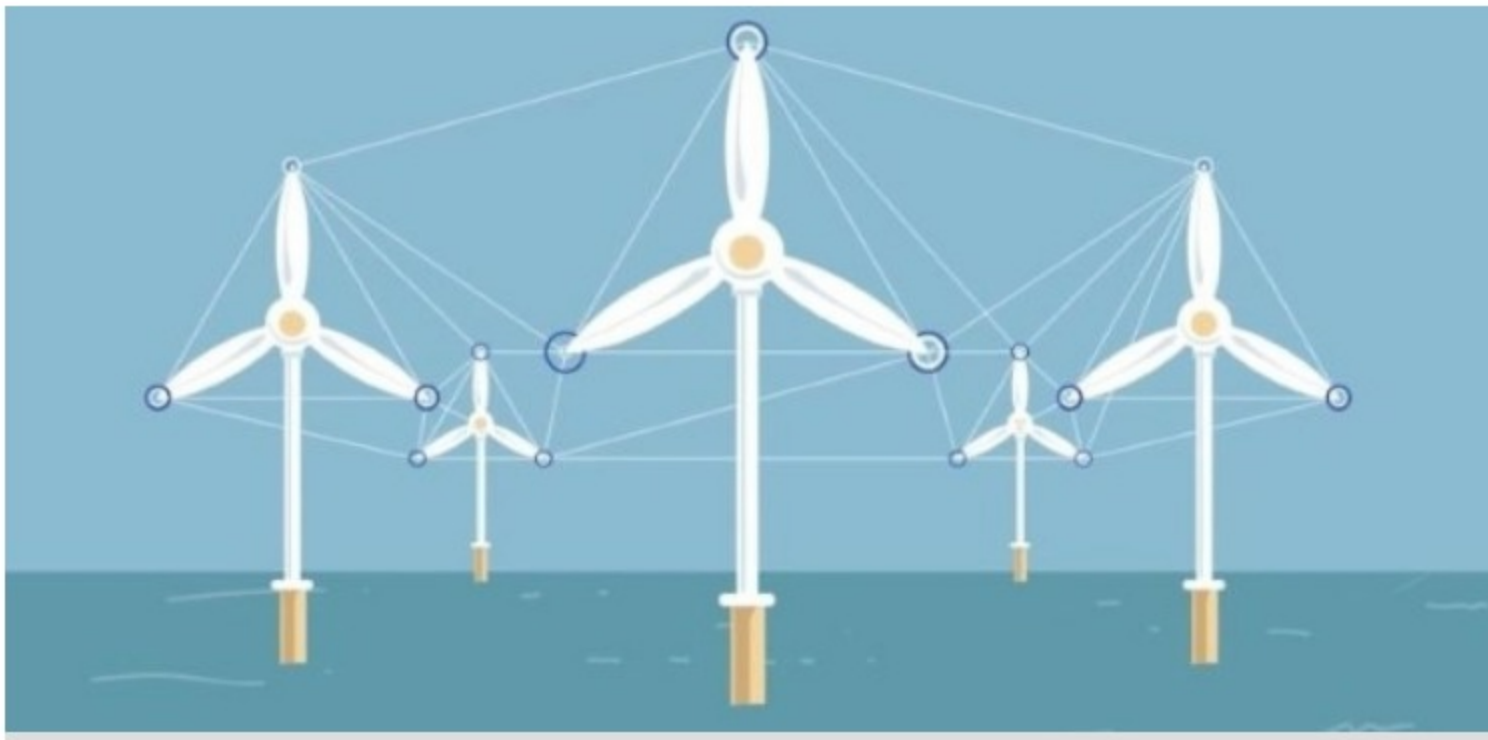
The Romeo project is using advanced monitoring technology, machine learning, big data and the internet of things to reduce O&M costs

2020 will see the owners of three offshore windfarms – one owned by EDF and two owned by Iberdrola – begin testing technology that could significantly reduce offshore wind's O&M costs

Technology developed as part of the EU-funded Reliable OM decision tools and strategies for high LCoE reduction on Offshore wind (Romeo) project, is to be put to the test at EDF's Teesside offshore windfarm in the UK, and at Iberdrola's East Anglia One (UK) and Wikinger (Germany) offshore windfarms next year.

The technology developed in the project could significantly reduce operations and maintenance costs, Romeo project co-ordinator Cesar Yanes told *OWJ*.

The main objective of the Romeo project is to reduce O&M costs by developing models and tools for early fault detection and diagnosis and to demonstrate an O&M information management system and an analytics platform capable of improving decision-making processes, allowing for a transition from corrective, calendar-based maintenance to lower cost condition-based maintenance strategies.

The project foresees using a cloud-based and internet of things (IoT) platform and big data to provide an in-depth understanding of the real-time behaviour of the main components in an offshore turbine under operational conditions.

It will use machine learning technology that has been pioneered in other spheres and wind-specific monitoring technology. Romeo will develop what the consortium carrying out the project described as 'third-generation' condition monitoring systems for components and low-cost structural condition monitoring systems. The output of the project will be new technology ready for commercialisation that can be rolled-out throughout the offshore wind sector.

"The models and tools that we are developing will be tested by EDF and Iberdrola on their windfarms from mid-2020," Mr Yanes told *OWJ*. "The pilot projects will show us how successful we have been and will enable us to test technology that will monitor turbine components such as the gearbox, main bearing and transformer, and the substructure of a turbine.

"By rolling the system out on different windfarms with different turbines and environmental conditions we will be able to prove portability between projects, both offshore and onshore, where applicable, which will be required if our overall goal of reducing the cost of wind energy is to be met. "Our aim is to reduce the incidence of component failure and unplanned maintenance while increasing reliability."

Mr Yanes said the pilot project phase of Romeo is expected to run until the end of the project in 2022.

At the most recent project meeting, which took place in Austria in December 2018, the participants in the project consortium – which in addition to Iberdrola includes EDF, Siemens Gamesa, Ramboll, IBM Research Zurich, Indra, Bachmann, Laulagun Bearings, Uptime Engineering, Zabala Innovation Consulting and the University of Strathclyde – heard that the work packages undertaken to-date are progressing well.

The main objective of the meeting was to follow-up on progress and define the next steps. The meeting was hosted by Uptime Engineering, leader of one of the Romeo work packages. During the meeting, the consortium partners and work package leaders demonstrated the progress they had made with individual work packages and co-ordinated work that will take place in 2019.

A total of 21 technical reports have been submitted to the European Commission to evaluate progress made to-date, among them an architecture and data framework that brought together the ICT architectures for pilot projects. Also among the deliverables submitted to the Commission was a review of existing cost and O&M models and a high fidelity cost/revenue model for impact assessment. Apart from proving the technology works, the consortium needs to demonstrate it is cost-effective compared with existing O&M strategies.

Early work undertaken by the consortium in Phase 1 of the project focused on developing the information management system for Romeo, which will handle and process data streams from a variety of sources, both human and machine-based. Early stage work also focused on developing the physical models that will be used in the project and specifying monitoring systems.

The project was awarded a Horizon 2020 grant of €10M (US$11.4M) and has a budget of approximately €16M. It is due to be completed in 2022.
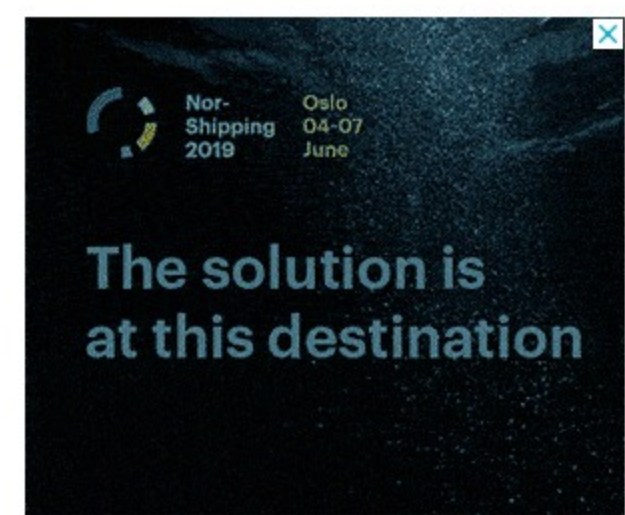
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