ROMEO

PRESS KIT

Romeo Project

Reducing the cost of offshore wind energy and boosting the renewables industry

ROMEO, a project that will contribute to accomplish Europe's climate change and energy transition commitments

ROMEO Project, launched on 2017, is seeking to reduce offshore O&M costs through the development of advanced monitoring systems and strategies

12 key players from the offshore wind industry benefit from €10m EU funding via this Horizon 2020 flagship project

The innovations developed within the R&D work packages will be tested in three pilot test: Teesside (United Kingdom), Wikinger (Germany) and East Anglia ONE (United Kingdom)

The ROMEO Project (Reliable OM decision tools and strategies for high LCoE reduction on offshore wind), is an initiative backed by the EU through its Horizon 2020 programme with a very ambitious goal: reduce the operation and maintenance costs at offshore wind farms through the use of advanced monitoring strategies and systems, as well as to analyse the performance of the wind farm turbines in real time.

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The main objective of the project, launched in June 2017, is to develop a platform for the analysis and management of the data obtained from the offshore wind power generation plants during their operation and use the data collected enabling the operation and maintenance of the wind farms to be improved.

Fully alligned with climate change EU strategies, ROMEO is Europe's most ambitious R&D initiative at the moment aiming to contribute to accomplish Europe's climate change and energy transition commitments.

The ROMEO Project has a total budget of 16.4 million euros, of which 10 million will be financed by the EU. SERI (Swiss State Secretariat for Education, Research and Innovation) contributes to ROMEO funding by financing the Swiss partners.

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Innovation and technological development

The project, due for completion in 2022, is supported by the latest advances in information and communication technologies, such as the Internet of Things (IoT).

The consortium of the project, leaded by Iberdrola and made up of European companies and entities covering the entire value chain of the sector, is working on the development of an analytical and management platform enabling the decision-making process to be improved and facilitating the transition from corrective based maintenance to condition based maintenance.

Furthermore, ROMEO will develop an Internet of Things and cloud-based platform which will accommodate models for diagnosing and predicting failures in the systems allowing early fault detection and reducing downtime. This platform will promote better understanding of the real-time performance of the main wind turbine components in operation and their current status. With this system, their useful life may be extended and their operation and maintenance costs reduced.

Specific objectives

ROMEO Project seeks with its technological development the fulfilment of the following objectives:

Greater Reliability

Increase wind farm reliability and decrease the number of failures leading to downtime. In addition, the Project aims to improve monitoring strategies enabling reliability centered maintenance on turbine and structure.

Lifecycle Enhancement

Increase the life time of key turbine components.

O&M Reduction in WT

Reduce the WT O&M costs through the reduction of the resources required for anual inspections of the turbine.

Foundation Costs

Reduce the O&M costs associated to foundation through reduction in jacket substructures inspections.

Expertirse and knowledge, ROMEO's value proposition

ROMEO is an industry based consortium made up of 12 recognised and experienced key players from 6 different EU member states and 1 associated country led by IBERDROLA RENOVABLES ENERGÍA.

The consortium includes large companies (Electricité De France, Adwen, Siemens Gamesa, RAMBOLL, IBM Research – Zurich, INDRA, BACHMANN Monitoring,), SMEs (LAULAGUN Bearings, UPTIME Engineering and ZABALA Innovation Consulting) and a prestigious university (University Strathclyde Glasgow)

Partners have been chosen to cover the whole value chain, constituting an interdisciplinary group of experienced partners, providing of its expertise to cover the different fields required.

Phases

ROMEO Project has designed a work plan to reach the goal.
All partners will collaborate contributing their knowledge, experience and innovation in three different phases:

1 FIRST PHASE:

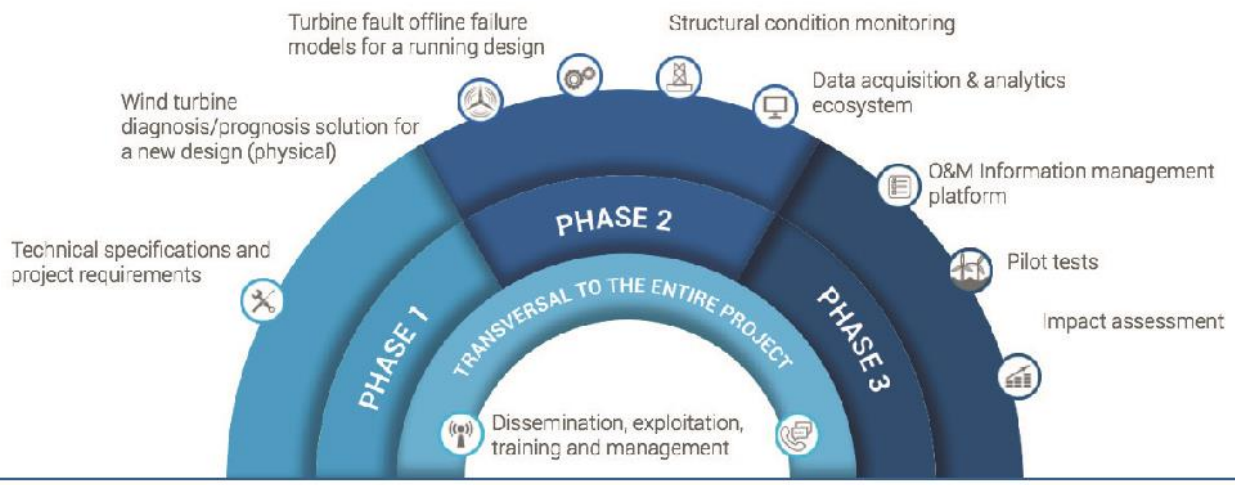
Dedicated to the definition of the technical specifications and the Project requirements.

2 SECOND PHASE:

Consists of the development of monitoring systems as well as the diagnosis and prognosis models for the detection of faults in key components

3 THIRD PHASE:

Focuses on the final validation of the data management platform. This block includes testing, pilot tests and impact assessment reports



Technologies, scaled up and tested under demanding real conditions

ROMEO concepts/tools integrated in O&M information management system will be exhaustively tested in a real operation environment of three multi-scale offshore pilots:

Teesside (UK)

Photographs by © EDF

Wikinger (DE)

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East Anglia ONE (UK)

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A step-by-step demonstration and validation strategy will be implemented in order to validate the developments as a global Wind Farm Decision Supporting System:

- **General Specifications of Test Requirements**
- **Real Time Data Integration and Aggregation**
- **Verification of Modelling with Operational Data**
- **Long Term Test and Testing of Failure Modes Against Modelling**
- **Testing the O&M Tool in Operational Environment**
- **Testing of Analytics Tool witn O&M Tool**
- **Implementation and Validation of Business Process**
- **Audit and Review**

Work Packages

The Work Plan of ROMEO project has been created for providing a set of 10 ad-hoc "approaches" to reach the fulfilment of each key concept during the life time of the project. In this sense, the overall approach of ROMEO is broken down into 10 core WPs.

WP1 **Technical specifications & project requirements:**
Lead beneficiary: IBERDROLA RENOVABLES ENERGÍA

WP2 **WT Diagnosis/Prognosis solution for a new design (physical)**
Lead beneficiary: ADWEN OFFSHORE

WP3 **WT offline failure models for a running design**
Lead beneficiary: IBM

WP4 **Structural condition monitoring**
Lead beneficiary: RAMBOLL

WP5 **Data acquisition & Analytics Ecosystem**
Lead beneficiary: INDRA

WP6 **O&M Information Management Platform**
Lead beneficiary: UPTIME

WP7 **Pilot tests**
Lead beneficiary: IBERDROLA RENOVABLES ENERGÍA

WP8 **Impact assessment (LCoE & Replicability)**
Lead beneficiary: UNIVERSITY STRATHCLYDE GLASGOW

WP9 **Dissemination, Exploitation & Training**
Lead beneficiary: ZABALA INNOVATION CONSULTING

WP10 **Project Management**
Lead beneficiary: IBERDROLA RENOVABLES ENERGÍA

Expected results

ROMEO will contribute to the transition from corrective to condition based maintenance, which will allow to ensure an optimal O&M implementation onto current and future Offshore Wind Farms and will result in the following main impacts expected:

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- Reduction of unexpected major correctives through early fault identification, both in WTG and substructure
- Improved performance for new and operating off-shore wind power plants and therefore to the cost of energy
- Contribution to the strengthening the European industrial technology base, thereby creating growth and jobs in Europe
- Contribute to health and safety in the Wind industry
- Generating synergies in the field of O&M strategies with Onshore wind sector
- Laying the foundation to place on the market a set of new products and services

The importance of ROMEO project

Although in the last years there is a substantial increase of the power capacity growth of Wind Energy across the EU covering around 11.6% of the EU electricity consumption in 2017, there is still a long way to go in order to achieve the target in 2030 of at least 27% for the share of renewable energy consumed in the EU.

In particular, emerging technologies as Offshore Wind Energy, demand new advanced O&M solutions/tools for improving significantly their return of investment (RoI) and their Levelised Cost of Energy (LCoE) indicator, as well as for performing the reliability and extended life-time of WTs and farms over the years.

Despite the current O&M strategies to maximise the energy yield, there is a considerable need for the reduction of the O&M costs (one of the main contributors to the Renewable Energy Cost and Performance) to alleviate their impact in LCoE (e.g. it is estimated a contribution between 15-25% of O&M to the LCoE of an offshore wind farm2) and improve cost competitiveness of offshore wind energy.

This challenge can be overcome thanks to the implementation of Condition Monitoring Systems and Diagnosis and Prognosis Models to optimise the operation, maximise lifetime and adjust O&M to real performance of the Wind Turbines (WTG and structure). Nevertheless, these technologies must be scaled up and tested under demanding real conditions with the main aim of analysing the improvements achieved in the whole life cycle of the main components of a Wind Turbine (WT) at Wind Farm (WF) scale.

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For more information, you can visit the Romeo Project website at www.romeoproject.eu

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