

# ROMEEO

Reliable O&M decision tools and strategies for high LCoE reduction on Offshore wind

## What is ROMEEO?

It is an initiative backed by Horizon 2020 programme (call topic LCE-13-2016) which aims to develop advanced technological solutions that enable the Operation and Maintenance (O&M) costs of offshore wind power to be reduced.

ROMEEO will provide efficient and reliable condition-based maintenance and monitoring as well as decision support systems by early fault detection, diagnosis and prognosis models of components failures

## Main objectives

01

Increase wind farm reliability and decrease the number of failures leading to downtime

02

Increase the life time of key turbine components

03

Reduce the WT O&M costs

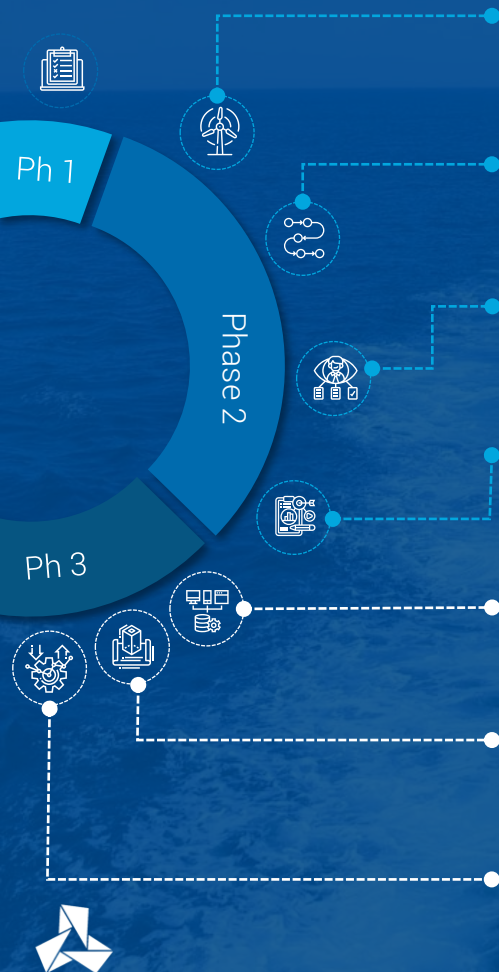
04

Reduce the O&M costs associated to foundation



## Results

(first 36 months)



**Diagnostic solutions for:** New mechanical drive trains and blade bearings. **Algorithms for increasing CMS capabilities** of gearbox and main bearing WT diagnosis. **Blade bearing algorithms** for rolling **contact fatigue & structural health** monitoring. **Failure modes** of permanent magnet generators, converter and transformers. Scale model test bench set up ongoing.

**Physical modules** for the diagnosis and prognosis of critical failure modes. **Datasets from the demonstration sites**, from prototypes and from simulated synthetic environments. **Module integration** within the cloud and ML modules.

**Benchmarking of hardware solutions and optimal sensor placement study.** **Fatigue life reassessment using updated FE models or based on NDT.** **Demonstration of fatigue monitoring and damage detection via innovative monitoring methods such as modal expansion, modal properties tracking and machine learning.**

**Data framework definition** of the information model for WF O&M strategy. **Interfaces validation tests** on the 3 demonstrators' components. **PCP** (Power Curve Productible) Alert algorithm identification for edge computing capabilities. **IBM Cloud platform** components and **updated ICT** architectures.

**O&M platform** set up, allocation of **IT infrastructure.** **Maintenance process and implementation** in O&M platform. **Monitoring requirements for O&M platform** and concept development. Establishment of **automated data transfer.** **Functionalities: Harvest advisory** generation, **user requirements** for reporting and communication.

Specification of **requirements** & planning for **effective testing** of each component. **Testing** of most of **the connections for real time data aggregation** and integration. Model testing ongoing.

Framework of **integrated cost/revenue** numerical model. **Simulations to validate the O&M module** of the developed tool against published data. Integration of **environmental impact assessment numerical module.** -Modelling the concept of P-F intervals into the maintenance analysis module to introduce the additional operational capacity after a fault occurs to the availability calculation.