



MAterials solutions for cost **Reduction** and **Extended** service life on **WIND** off-shore facilities

**EU H2020 PROJECT:
GENERAL PRESENTATION**



The project has received funding from the European Union's Horizon 2020 research and innovation program under Grant Agreement N° 952960



Project overview

Grant agreement N: 952960

Coordinator: L'Urederra Fundación para el Desarrollo Tecnológico y Social (LUR), Spain

Participants: 16 partners from 7 countries (Belgium, Ireland, Italy, France, Portugal, Spain, United Kingdom)

Duration: 1 December 2020 – 30 November 2024 (48 months)

Project budget: € 7,953,783.75 (€ 6,706,969.38 EU contribution)



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Partners



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Importance and challenges of offshore wind energy

European wind energy sector:

- 2020-scenario: Installed capacity 220 GW (onshore + offshore), 16% electricity demand.
- 2025-scenario: +105 GW installations.
- **Offshore** wind energy:
 - Only 11% of the installed power capacity meeting only 3% of electricity demand;
 - Challenges: Damage on materials and coatings due to wetness, UV-radiation, abrasion, erosion and corrosion, and lack on efficient predictive modelling and monitoring system;
 - Consequences: 4-20% reduction in energy production, O&M costs up to 25% of total.
- **End-of-life stage:** Expected 800 kt/year of waste wind turbine blades by 2050.



The MAREWIND concept

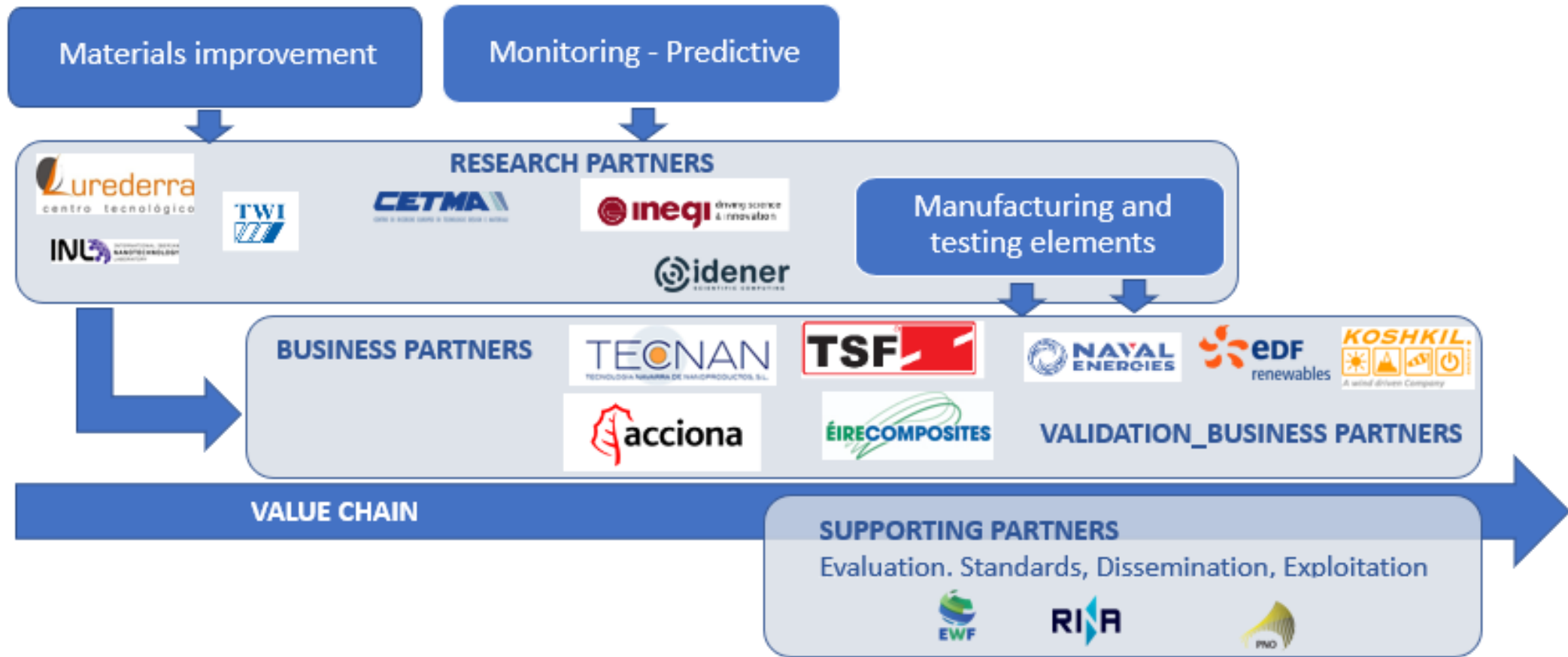
Goal: Provide vital solutions to help building a next generation of large offshore wind energy- and tidal power generators by solving the current challenges related to materials, coatings and multi-material architectural performance.

How will MAREWIND work?

- By enhancing the materials' durability, recyclability, and reduce maintenance in offshore structures, the project will contribute to a more economic and sustainable model of the offshore wind sector.
- Develop durable materials and recyclable solutions for the offshore wind industry, while extending the service life of the wind facilities.
- Contribute to meeting the EU climate targets and create new job opportunities within the wind industry.



Concept





The objectives

MAREWIND targets the main aspects related to materials durability and maintenance in offshore wind energy structures. Such issues imply failures, malfunctioning, loss of efficiency in energy generation as well as a major repercussion on CAPEX and O&M costs. The combined forces of key-players in the current value chain of wind energy; and offshore structures will cover a set of ambitious specific objectives.

1. Increasing durability and anticorrosion protection of metallic materials exposed to harsh environments;
2. Increasing durability of concrete for structural components;
3. Long-term durability of antifouling coatings without biocides;
4. Increasing stiffness and strength while reducing the weight of wind turbine blades;
5. Improving Leading-edge protection systems with increased erosion resistance;



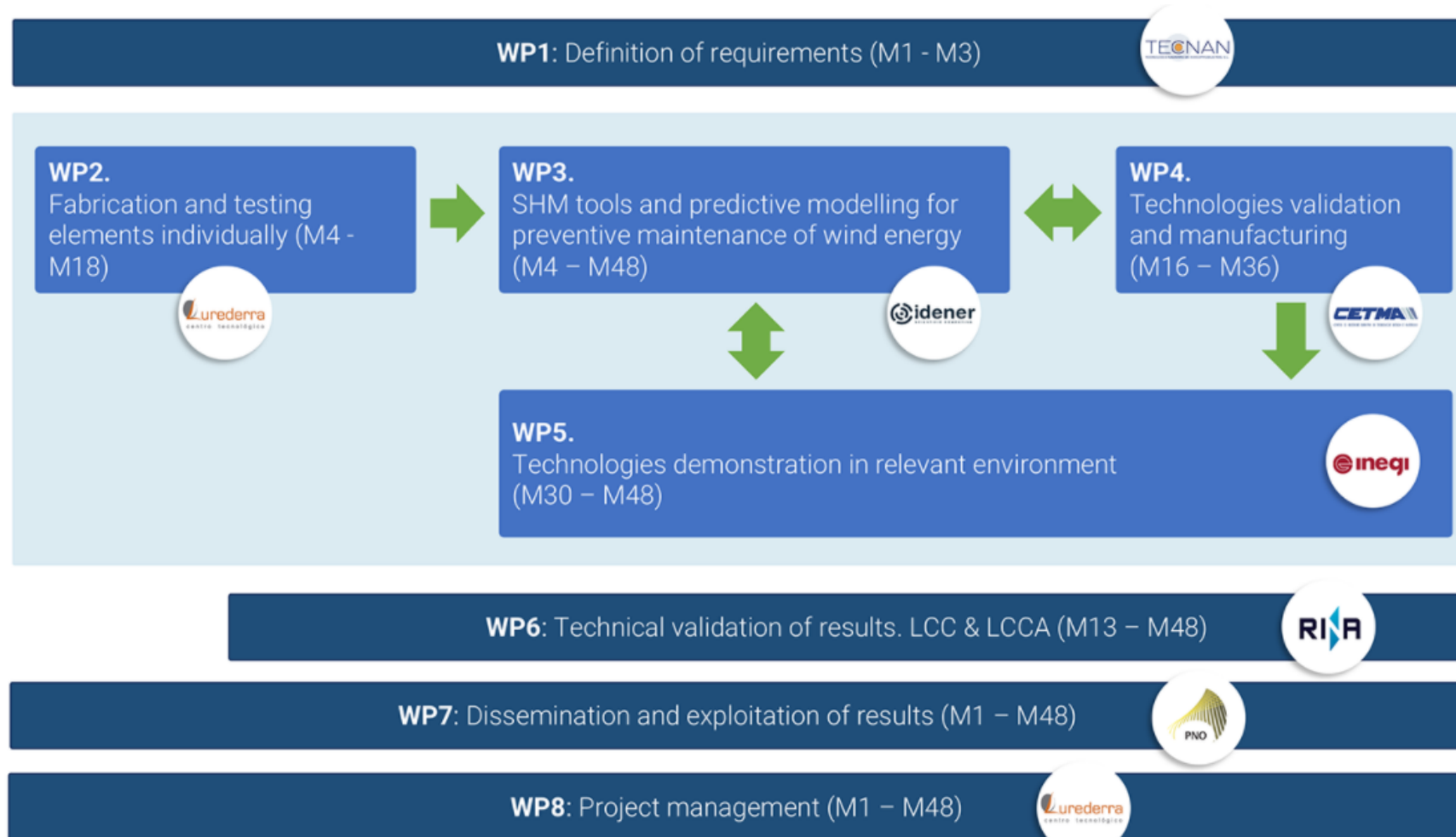


The objectives

6. Developing Structural Health Monitoring techniques for offshore wind turbines;
7. Developing predictive corrosion models for offshore infrastructures considering changing climatic conditions;
8. Developing *recyclable-by-design* materials for wind turbine blades;
9. Demonstrating scalable manufacturing technologies for the innovations in wind turbine blades, concrete and coatings;
10. Applying existing and upcoming standards in terms of performance of materials, safety and environmental impacts;
11. Assessing the economic viability, environmental and societal impact of the proposed innovations.



Workplan



Expected Impact

The MAREWIND results will have industrial, economic, ecological, energy and social benefits:

- maintaining/improving performance;
- improved durability of materials at optimized costs:
 - improved durability of corrosion protective coatings (> 25 years);
 - improved durability of reinforced structural concrete; (> 50% durability increase);
 - improved durability of antifouling coatings (> 5 years);
 - improved durability of antierosion blade paints (>10 years);
- significant reduction of life cycle costs;
- cost reduction for offshore energy production of about 40% of the *levelized cost of energy*, with cost values produced by wind energy systems below 10 ct€/kWh;
- reduction of environmental impact by 35%;
- reducing CO₂ emissions and fuel dependency: 3,5 ktoe in short term and 13,6 ktoe at mid/long term;
- creating growth and jobs in Europe by strengthening the European industrial technology base.

Get in touch with us for more information!



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A photograph of an offshore wind farm at sunset. The sun is low on the horizon, casting a warm glow over the sea and the white towers of the wind turbines. The water is dark blue with white foam from the waves. The sky is a mix of orange, yellow, and blue.

Thank you!

MAREWIND CONSORTIUM



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