PROJECT

CIRCWIND

Development of CIRCular optimised material solutions for WIND turbine blades and support structures

In a context where a growing number of Wind Turbines are reaching their End of Life, the CIRCWIND project aims to develop and validate groundbreaking technologies in materials and metamaterials for use in current and future wind turbines, to enhance reliability and lifetime, performance, operability and maintainability, as well as to find cost-efficient pathways towards complete circularity.

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101147517.

8	6	€4M	4
PARTNERS	COUNTRIES	TOTAL BUDGET	YEARS

Circwind

IN ONE CLICK

Coordinator	Programme	Period
SINTEF	Horizon Europe	2024 - 2028
Sector	**Web**	
Wind Energy	https://circwind.eu/	

01
Challenge

The rapid shift toward larger offshore wind turbines—now reaching capacities of 15 to 20 MW—aims to enhance efficiency and reduce the levelised cost of energy. However, this scale introduces complex challenges, including increased exposure to environmental stressors and extreme loads. Existing simulation tools often fall short in modelling these conditions, resulting in design flaws and premature component failures. Blades and concrete floaters, in particular, have become more vulnerable, revealing limitations in current materials and manufacturing processes. These issues underscore the urgent need for advanced materials, high-fidelity modelling, and robust simulation tools to improve performance, reliability, and sustainability.

02
Solution

Aligned with EU objectives, CIRCWIND focuses on enhancing the reliability and sustainability of blades and concrete floaters. Key outcomes include a new damage-tolerant fibre-reinforced polymer (FRP) for blades, a circular low-carbon concrete for floaters, and advanced digital tools for lifetime prediction and failure modelling. These innovations, organised across three technological pillars, aim to extend component lifespans, improve circularity and reduce carbon footprint, while enabling cost-effective production, maintenance, and environmentally responsible decommissioning.

03
Impacts

The project will deliver 14 key innovations, strengthening simulation capabilities and fostering high-performance materials for blades and floaters which will lower capital and operational costs, extend component lifespans, and position the EU as a leader in renewable energy. By reducing environmental impacts and import dependencies, the project contributes to the European Green Deal, driving a more resilient, inclusive, and sustainable energy future.