



**FORGING THE BLADES OF THE FUTURE WITH COMPOSITE
MATERIALS WITH CIRCULAR, SAFE AND SUSTAINABLE DESIGN.**

BLADE2CIRC

Eolian workshop

11th of December 2025

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**Funded by
the European Union**

The Blade2Circ project is funded by the European Union under the Horizon Europe Programme, grant agreement number 101147451 as part of the HORIZON-CL5-2023-D3-O2 call.

Administrative data

- **Full title:** “BLADE2CIRC: forging the blades of the future with composite materials with circular, safe and sustainable design”
- **Topic:** “HORIZON-CL5-2023-D3-02-15”
- **Type of Action:** HORIZON-RIA
- **GA number:** 101147451
- **Start Date:** 1st Apr 2024
- **Duration:** 42 months
- **Requested EU Contribution:** €3,969,228
- **Project Officer:** Baris ADILOGLU
- **Project Coordinator:** AITIIP



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Problem and Solution

SCENARIO



Wind-based power generation is foreseen to increase in the next years due to the aim of becoming climate-neutral by 2050 of the European Commission

PROBLEM



However, wind turbines present environmental challenges mainly related to their end of life.

Currently, WTB are made out of composites reinforced with glass or carbon fibre and epoxy resin or polyester

SOLUTION



Develop a circular and greener alternative to traditional WTB designs increasing the share of **high-performance bio-based composite** materials with **enhanced recyclability**, towards a new scenario of circular wind energy farms



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Methodology: Technology Blocks

Alternative Sustainable Materials

Biobased carbon fibre design

Biobased thermoset and dynamic materials

Technology
Block 1



Novel biobased
Carbon Fibres



Biobased thermoset and
dynamic resins



Biocomposite materials



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Novel Recycling Routes

Chemical and enzymatic degradation processes

Debondable adhesives formulation for enhanced recycling and maintenance

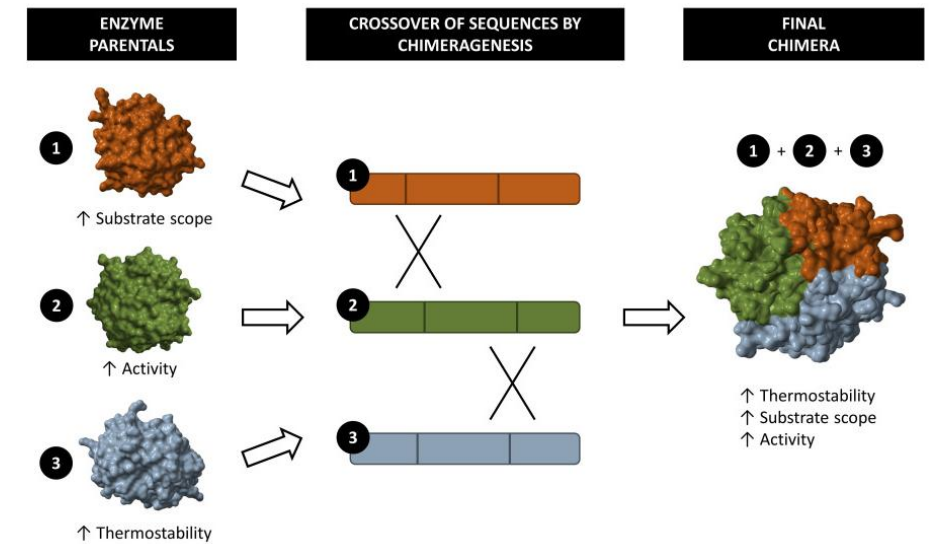
Technology
Block 2



Chemical and enzymatic routes to
recycle WTB



Debonding-on-demand strategies
of structural joints



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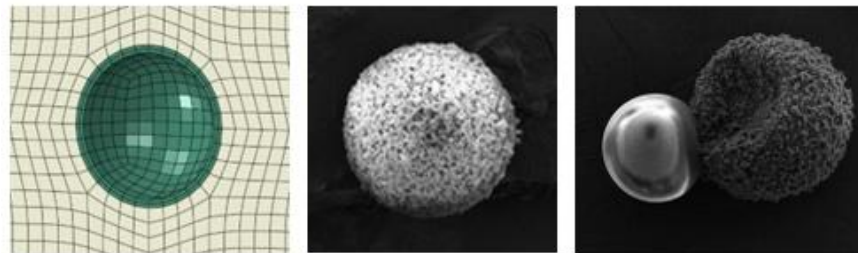
Chemical and enzymatic degradation processes
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Technology
Block 2

Functionalization

Coatings with self-healing and omniphobic properties

Technology
Block 3



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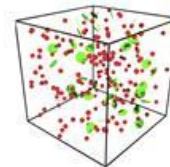
Technology
Block 3

Modelling, Simulation and Testing

Simulation and modelling of the materials
Demonstration and validation

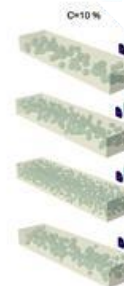
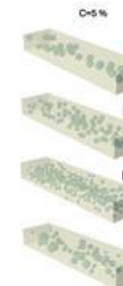
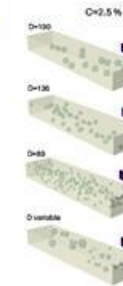
Technology
Block 4

Analytic models*
Determination of concentration
to ensure healing performance

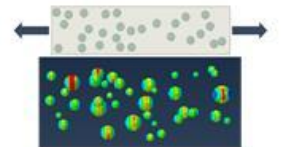


* <https://doi.org/10.1016/j.commatsci.2012.09.032>

Material modelling



FE simulations
Sensitivity analysis - effect of:
microcapsules diameter
shell thickness
shell properties
concentration



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Sustainability and Circularity assessment

Integration of the environmental sustainability and circularity criteria along the entire value chain

Technology
Block 5



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Consortium

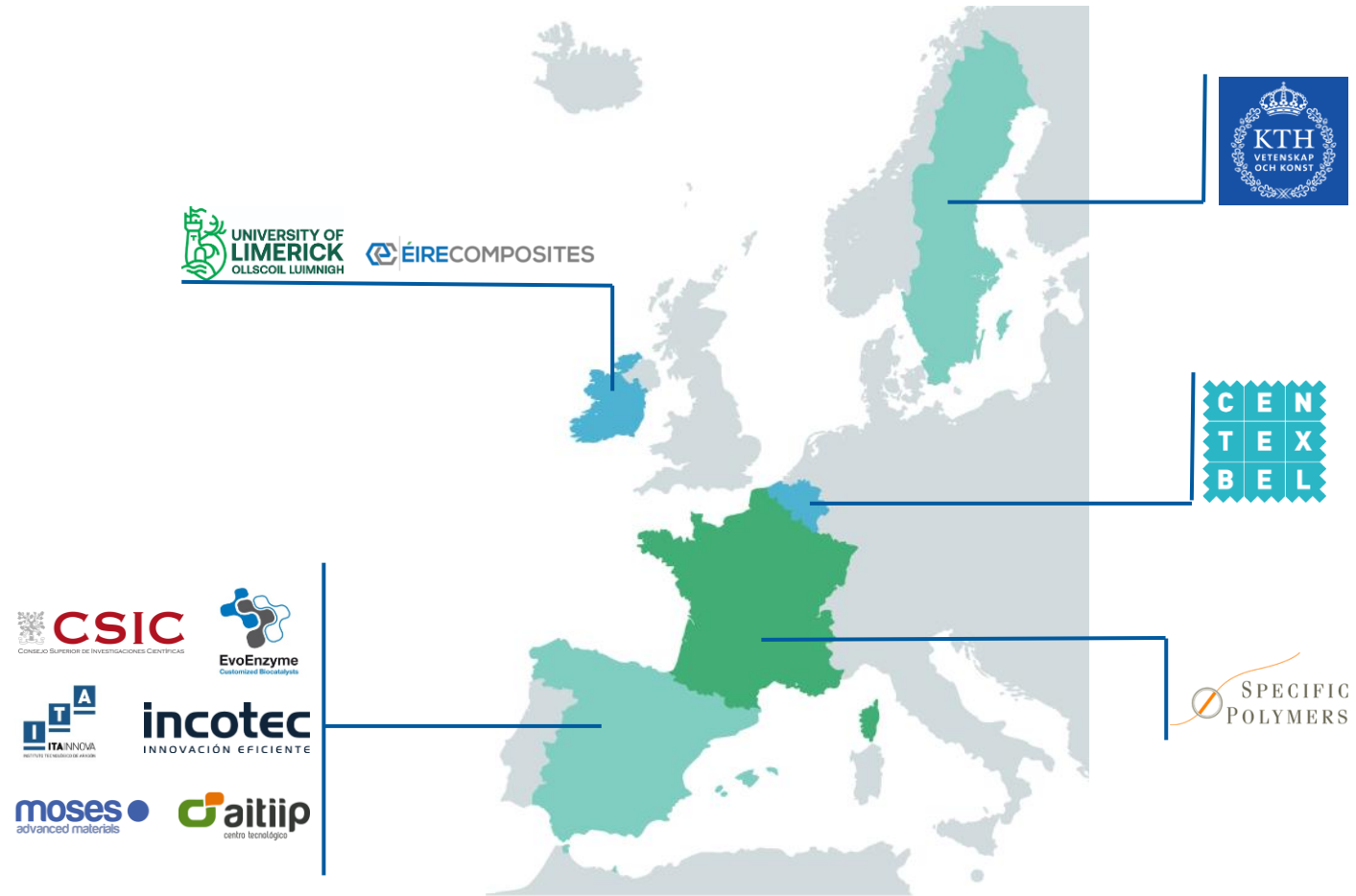
11 PARTNERS
5 COUNTRIES

6 RTOs:

AIT, UL, CSIC,
CTB, ITA, KTH

5 SMEs:

MOS, EVO, SP,
EIRE, INCO



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