Funded by
the European Union
REWIND
Efficient decommissioning, repurposing and recycling to
increase the circularity of end-of-life wind energy systems
Project introduction
@mc._hb – Teruel, Spain

ABOUT REWIND

REWIND is a European Union research project under the topic of Critical technologies to improve the lifetime, efficient decommissioning and increase the circularity of offshore and onshore wind energy systems. Funded by the European Union's. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them. Grant Agreement N°101147226 - REWIND - HORIZON-CL5-2023-D3-02

The REWIND project will contribute to increase the recyclability of wind turbine blades developing critical technologies for dismantling and new methodologies for repurposing and recycling. The goal will be achieved by combining three key drivers of the 7R Model: Reuse, Recycle and Rethink.

START – May 2024

END – May 2028

DURATION – 48 months

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GOALS

REWIND

1

Demonstrate efficient technologies for decommissioning EoL wind turbines and sorting.

2

Repurpose of EoL composite in industrial applications (automotive, construction)

3

Develope cost-effective composites recycling technologies to improve properties and performance of retrieved materials.

4

Produce good quality yarns and fabrics from the recycled fibres coated with the appropriate sizing.

5

Demonstrate efficient technologies for decommissioning EoL wind turbines and sorting.

6

Improve environmental & economic sustainability of processes and products.

7

Maximize socio-economic impact of REWIND, including stakeholder engagement and social acceptance.

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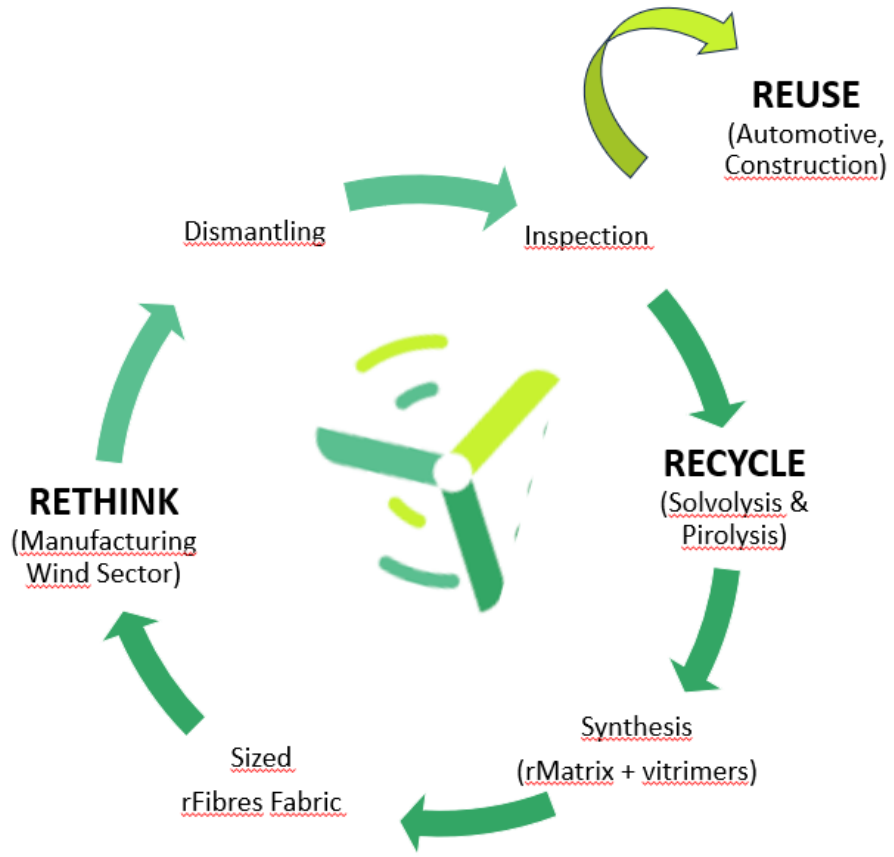
CONCEPT



REWIND will develop suitable disassembly, quality inspection and characterisation of the composite waste, to decide if composite parts from EoL products should be **reused** or recycled depending on their value. **REWIND** will show potential high-value applications for composite end-of-life: repurposing for construction and automotive sector.

New innovative pyrolysis and solvolysis methods for **recycling** will be developed to reduce the processing temperature and time. The secondary raw materials obtained (sized recycled fiber fabrics and recycled vitrimer matrix from polymerized monomers) will be used to **rethink** and manufacture a small wind blade root section and composites patches for blades repairing.

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CONCEPT

REWIND

REUSE

Suitable disassembly, quality inspection and characterisation of the composite waste. To decide if parts of blades are repurposed (construction and automotive sector) or recycled.

RECYCLE

New innovative pyrolysis and solvolysis methods will be developed, reducing the processing Tª and t. Saving energy and improving the quality of materials with post-treatments.

RETHINK

Secondary raw materials obtained (recycled vitrimer matrix & sized rFibre fabrics) will be used to manufacture a wind blade root section & composites patches for blades repairing

REPAIR

REDUCE

RECOVER

REFURBISH

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OUTCOMES

REWIND

1

Improved overall lifetime, reliability, recyclability, sustainability of onshore and offshore wind turbines.

2

Potential new markets in wind turbines recycling and/or re-purposing

3

Enhanced overall sustainability of wind energy systems based on mainstreamed LCA addressing social, economic and environmental aspects, as well as improved circularity.

4

More efficient decommissioning, and improved circularity of wind turbine concepts. Circularity by design

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STARTING TRL3

Dismantling using ultrasounds.

3D Nestling

HVF (High Voltage Fragmentation)

LFD (Long fibre delamination)

Pyrolysis with catalysts

Catalyst assisted solvolysis in super/sub-critical conditions

Synthesis of recycled resins and vitrimer epoxy resins (TRL4)

Sizing of recycled fibres

Spinning continuous yarns with recycled fibres

Vacuum infusion

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FINAL TRL5

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MILESTONES

REWIND

M1.1 & M1.2 – WP1

Non-damaged and dismantled EoL Blades

Robustness of Material Model to predict residual mechanical properties of damaged EoL parts

M2.1 – WP3

New repurposed demonstrators of composite

M3.1 & M3.2 – WP3

Demonstration of pyrolysis at pilot level

Yarn, fabric/mat samples from recycled fibres and recycled resins availability

M4.1 & M4.2 – WP4

Selection of secondary raw materials for WP4 demonstrators.

New demonstrators of recycled composites.

M5.1, M5.2, M5.3– WP5

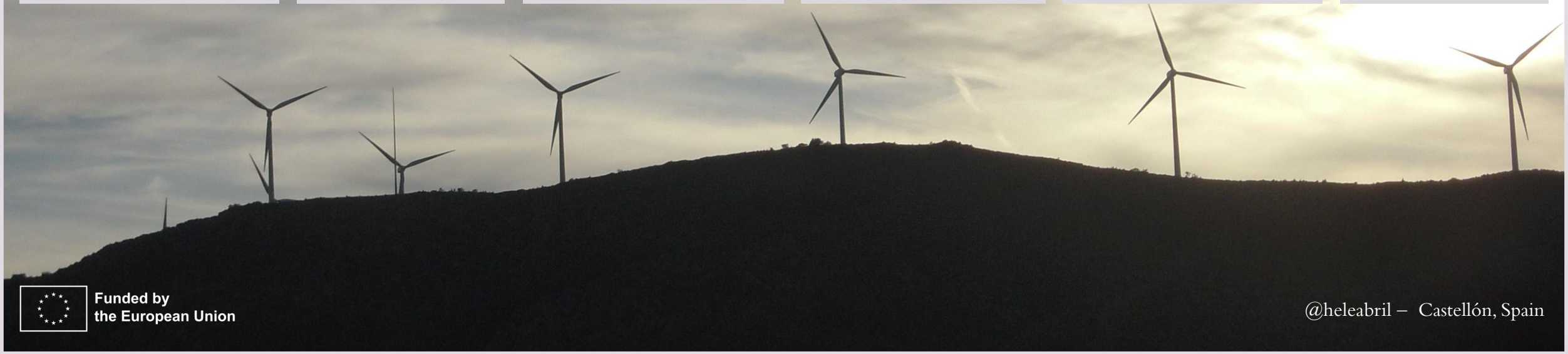
Definition of indicators in the ecodesing tool.

Combined LCSA & tecnnical assesments of the technologies.

Data inventoriy for LCA of final demonstrators

M6.1 – WP6

Advanced Exploitation and innovation strategy defined



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CONSORTIUM

The consortium includes 14 partners from 7 different countries: Spain, France, Denmark, Italy, Germany, Turkey, Greece. The project is coordinated by AIMPLAS.

6 RTDs – 2 Universities

4 SMEs

3 Large Companies

1 Association

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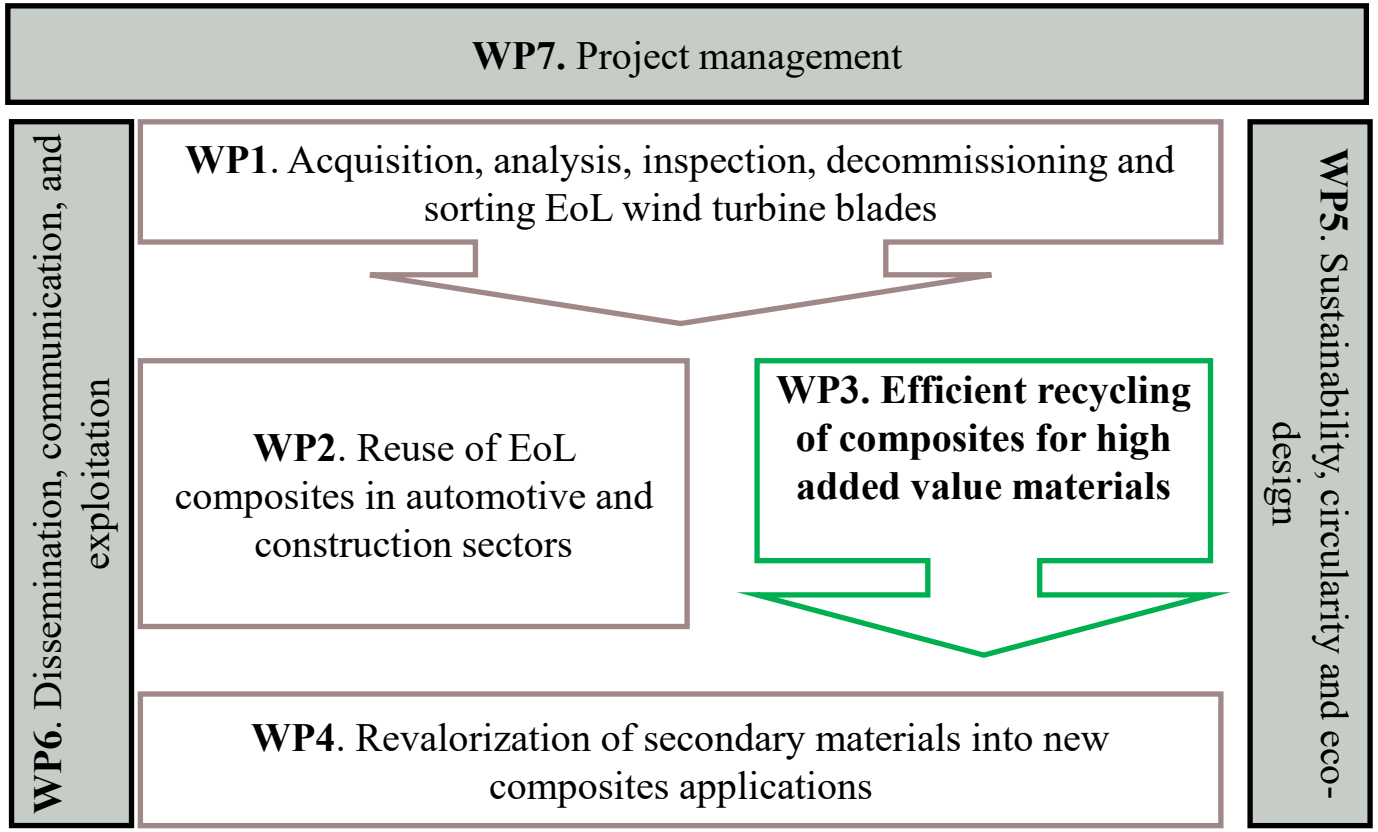
WORK DISTRIBUTION



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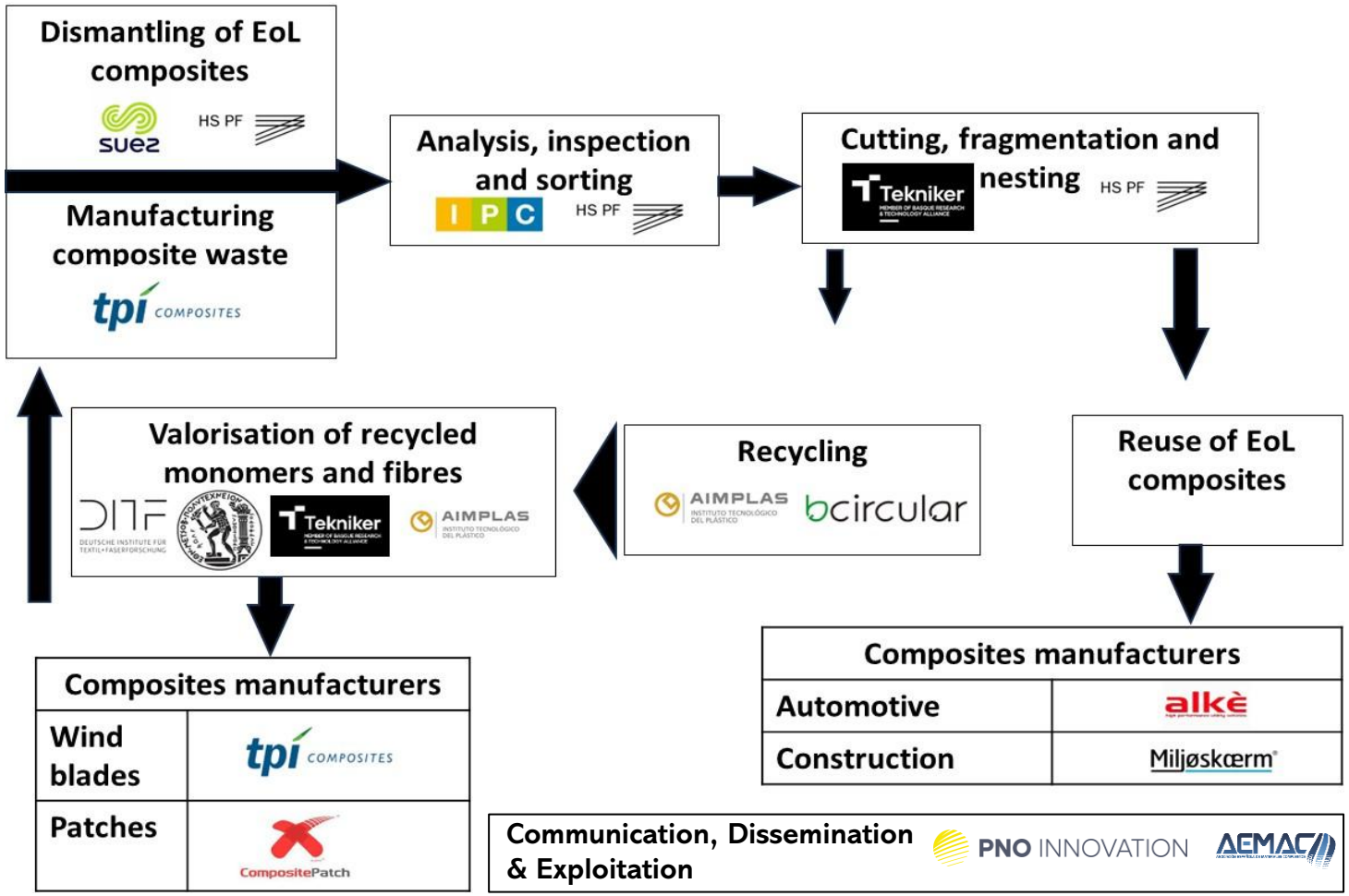
VALUE CHAIN



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THANKS

FOR YOUR ATTENTION

Starting Decommissioning
SUEZ, France

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