

# ECOXY



Bio-based recyclable, reshapable and repairable (3R) fibre-reinforced EpOXY composites for automotive and construction sectors.

## Summary

The lightweight and excellent mechanical properties of thermoset fibre-reinforced composites (FRCs) make them attractive materials for demanding sectors, such as automotive or construction. However, they are challenging to reprocess and difficult to repair and recycle increases the overall material cost and environmental concerns. In addition, the vast majority of existing polymer matrices and fibres used in their manufacture rely on fossil-derived materials or use large amounts of energy.

ECOXY sets out to overcome these issues by involving the European bio-based industry in developing innovative bio-based epoxy resins and fibre reinforcements in developing innovative bio-based epoxy resins and fibre reinforcements. This will lead to sustainable and techno-economically competitive FRTCs, targeting advanced functionalities: reparability, reprocessability and recyclability (3R) using new resin formulations.

<http://www.ecoxy.eu>

**Type of Action:**

Research & Innovation Action

**Value Chain:** Across VCs

**Start date:** 01 June 2017

**End date:** 30 November 2020

**BBI JU contribution:** €

4,850,960.00

## Objectives

ECOxy has a series of technical, industrial, and economic objectives.

The technical objectives include analysing and defining the raw materials and technologies for composite manufacturing, repairing and recycling and demonstrator parts for the automotive and construction sectors. These include developing flax-reinforcements and polylactic acid (PLA) yarns; synthesising bio-based epoxy (macro)monomers; developing bio-based epoxy thermoset matrix with advanced functionalities and fibre-reinforced 3R composites at lab scale suitable for semi-structural and structural applications and optimising processing parameters to novel materials.

The industrial and include producing demonstrators. These include demo parts for the construction and automotive sectors will be manufactured. A window profile for construction will be manufactured by pultrusion, while a dashboard fascia and the rear seat back panel for automotive sector will be manufactured by resin transfer moulding (RTM) and/or wet compression moulding. These will be validated by end users.

## Expected impacts

The ECOXY project expects to deliver the following impacts:

- Improve the sustainability of FRCs by using bio-based raw materials for manufacturing of fibres and resins.
- Create advanced functionalities that existing traditional thermoset composites do not offer, overcoming existing limitations.
- Increase innovation capacity within project partners as well as gaining new knowledge and producing new products.
- Improve the competitiveness and sustainability of multiple European industrial sectors; initially the automotive and construction sectors.
- Allow the remanufacture of parts with significantly less energy thus reducing CO2 emissions.
- Prevent and/or reduce negative effects on the environment via natural and bio-based components that minimise landfill via 3R.



Key economic objectives include reducing costs along the life cycle of ECOXY components,

### Developing reusable and recyclable bio-composites

These savings will be realised by reducing GHG emissions and energy use, reducing labour and waste costs, more efficient raw material costs in terms of the costs of reinforcement fibres, lower energy costs for manufacturing the target thermoset fibre-reinforced composites that are repairable, reprocessible and recyclable. [Read more](#)

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## Project coordination

- Fundación CIDETEC (Spain)
- University of Nice Sophia Antipolis (France)
- Specific Polymers (France)
- Weverij Flipts & Dobbels NV (Belgium)
- Avantium Chemicals BV (The Netherlands)
- Centre Scientifique et Technique de l'Industrie Textile Belge (Belgium)
- Fundación AITIIP (Spain)
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Germany)
- Centro Ricerche FIAT (Italy)
- AIMPLAS (Spain)
- Bergamo Technologie (Poland)
- European Composite Recycling Technology (Denmark)
- Vertech Group (France)

**Organisation name:** Fundación CIDETEC (Spain)