



Eolian

NEWSLETTER

Updates from EOLIAN February 2026



Successful infusion trials of vitrimer composites for blades

EOLIAN has achieved a key milestone in its mission to develop a new generation of wind turbine blades manufactured using novel bio-based vitrimer composites. Project partners Proplast and Politecnico di Milano have succeeded in manufacturing basalt fibre reinforced vitrimer composite laminates using the infusion process.

"The fibre reinforced composites currently used to manufacture wind turbine blades are not easy to recycle," explains EOLIAN project coordinator Marco Monti of Proplast. "In recent years, vitrimers have emerged as a potential breakthrough solution to this problem. The manufacture of bio-based vitrimer composites using the infusion process employed by blade manufacturers is extremely challenging and this achievement is an important first step towards our project's goal – the production of a 12 m long vitrimer composite demonstration blade."

Vitrimer composites – a more sustainable alternative

Driven by the need to reduce environmental impact, wind turbine blade manufacturers are actively seeking more sustainable, circular materials to substitute the glass fibre reinforced thermoset composites currently used. EOLIAN is addressing this demand by developing a new generation of composite materials combining a bio-based vitrimer matrix with natural basalt fibre reinforcement. The unique properties of vitrimers – including repairability, reprocessability, and recyclability – will contribute to enhanced sustainability throughout the blade's life cycle. Vitrimers also pave the way to different end-of-life strategies, from reuse through thermoforming, to chemical recycling enabling separation of fibre from matrix.

In order to realise these potential benefits EOLIAN must however develop vitrimer formulations that satisfy the wind industry's stringent standards for performance, manufacturing, and cost. A strategy for transitioning these innovative materials from laboratory to industrial application is also essential.

Promising progress

EOLIAN partner Tekniker is leading the synthesis of imine-based vitrimers using sustainable building blocks such as vanillin and epoxidised vegetable oils, which are available at industrial scale at reasonable price. As well as being compatible with the infusion process, the vitrimers must possess the thermo-mechanical properties required by the wind energy sector while maintaining their vitrimeric behaviour. The vitrimer matrices should also be reprocessability, repairable, and easily recyclable at 'soft' conditions (low temperature and pressure, without the use of sophisticated equipment).

EOLIAN has successfully developed vitrimers with a bio-based content of 60% which demonstrate key vitrimer properties such as reprocessability and repairability. Proplast and the Polymer Engineering Lab (PolyEngLab) at Politecnico di Milano have carried out infusion trials using the most promising formulations. The high viscosity and short pot-life of vitrimers typically make infusion challenging. However, in recent tests the EOLIAN team has successfully manufactured high-quality basalt fibre reinforced laminates at moderate temperatures. The composites exhibit optimised fibre volume fraction and low void content.

Research and testing are continuing to refine the vitrimer formulations and achieve the optimal balance between bio-based content, processability, and final performance to ensure their successful implementation in blade manufacturing.

[Read the press release](#)



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Research

Towards repairable composites

EOLIAN's research has been published in the article Towards repairable composites: healing of mode I and mode II delaminations in woven glass fibre and vitrimer matrix laminates in Composites Part B: Engineering, Volume 305, October 2025.

The authors are Alejandro Lopez-Olmedo, Roberto Frassine, and Marco L. Longana of Politecnico di Milano.

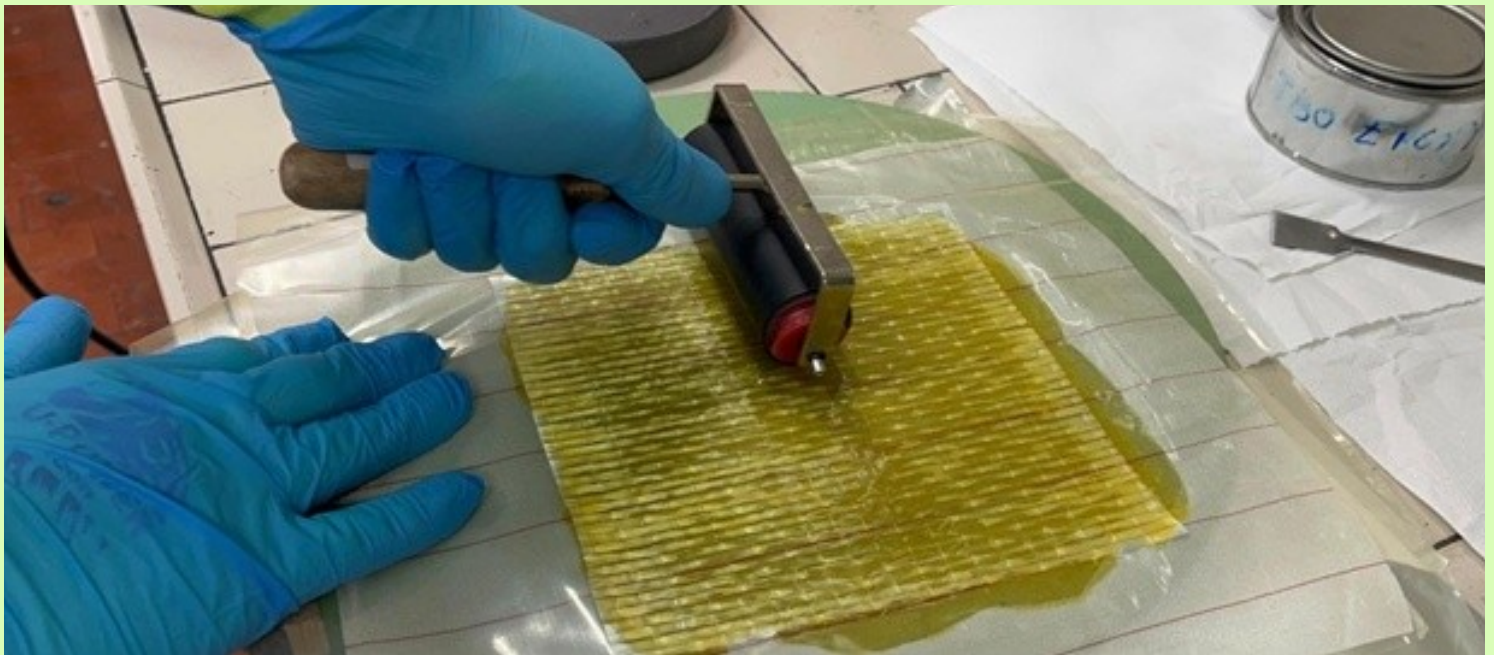
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Highlights

- A healing process for the delamination was designed, performed, and evaluated.
- Imine-based vitrimer composites have potential for healing delamination cracks.
- A recovery of mode I and II interlaminar fracture toughness was observed during repairing.
- Repairing efficiencies of 91% and 98% were measured with Double Cantilever Beam (DCB) and Three-Point End-Notched (3-ENF) tests.
- The fracture surface showed that the preferred path for delamination persisted after healing.

Meet our partners

POLITECNICO DI MILANO



Politecnico di Milano (PoliMi), founded in 1863, is an Italian university specialising in engineering, architecture, and design. It is known for its academic rigour and research contributions in these fields. The university encourages collaboration with industry and international entities, enhancing its educational and research programmes.

The Polymer Engineering Lab, part of the Department of Chemistry, Materials, and Chemical Engineering 'Giulio Natta,' focuses on the study of structural properties of polymers and composites for highly demanding applications, particularly in terms of reliability, durability, and sustainability. In EOLIAN, the PolyEngLab will be responsible for producing the next generation of sustainable vitrimer composite materials for wind turbine blades, and also for optimising their recycling.

By participating in EOLIAN, PolyEngLab is pushing the boundaries of sustainable polymer composites, ensuring that future wind turbine blades are more durable, repairable, and recyclable. This project strengthens its position as a leader in advanced materials research while supporting EU sustainability goals.

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EVENTS

JEC WORLD 2026

March 10-12, 2026 | PARIS NORD
VILLEPINTE

**JEC
WORLD
2026** The Leading
International
Composites
Show

The European Composites Industry Association (EuCIA), leader of EOLIAN's communications and dissemination work package, is exhibiting at JEC World 2026 in Paris on 10-12 March.

JEC World is the world's leading trade show dedicated to composite materials and sustainability and circularity are key themes again this year. Visitors will be able to obtain information about EOLIAN from EuCIA's booth 6M119.

EOLIAN partners Politecnico di Milano and Brunel University London / Brunel Composites Centre (6T62) are also exhibiting.

EUROPEAN CIRCULAR COMPOSITES ALLIANCE GENERAL ASSEMBLY

December 4, 2025 | BRUSSELS
BELGIUM

EOLIAN was promoted during the first General Assembly of the European Circular Composites Alliance (ECCA) in Brussels on 4th December. ECCA is a sectorial alliance of EOLIAN partner EuCIA. It was launched in March 2025 with the aim of establishing a circular economy for composite materials in Europe. More than 200 organisations from across Europe have joined the alliance so far. Around 100 participants were present at the event in Brussels.

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About EOLIAN



Funded by
the European Union

EOLIAN – Bio-based, repairable and recyclable vitrimer composites and advanced sensors for highly reliable, sustainable wind blades – has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement no. 101147532.

Our partners: Proplast (project coordinator), AEP Polymers, Brunel Composites Centre (Brunel University London), Entelea, European Composites Industry Association (EuCIA), IRES, Norvento Enerxía, Politecnico di Milano, Tekniker, Zorlu Enerji.

Further information www.eolian-project.eu

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