



The EOLIAN blade

EOLIAN Webinar: A new generation of sustainable wind turbine blades

11th December, 10:00-11:15 CET

www.eolian-project.eu

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The EOLIAN Blade

Norvento's general objective within EOLIAN project?

Design and manufacture a recyclable wind turbine blade.

Validation from two perspectives:



Design validation.



Manufacturing validation.

How?

Through a **technical comparison** regarding the overall performance of:

Traditional blade:

- Glass + Epoxy – based composite blade

Recyclable blade:

- Biobased and vitrimer-based composite.
- Natural (basalt) fibres.

Both of them with same external / aerodynamic geometry.



Norvento wind turbine blades manufacturing facilities

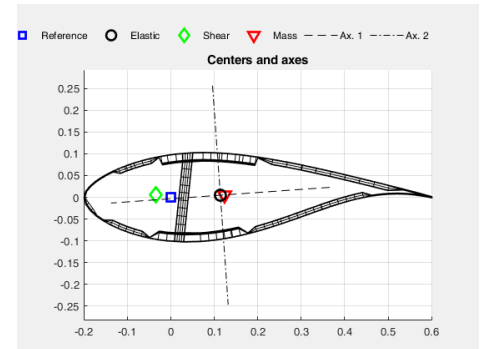
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Traditional blade vs. recyclable blade: **Challenges?**

Design:

External geometry: influences aerodynamic and structural efficiency, as well as mould design.

Loads calculation: impact in the rotor, nacelle and tower of the real design.



Cross sectional laminates of wind turbine blade

Manufacturing:

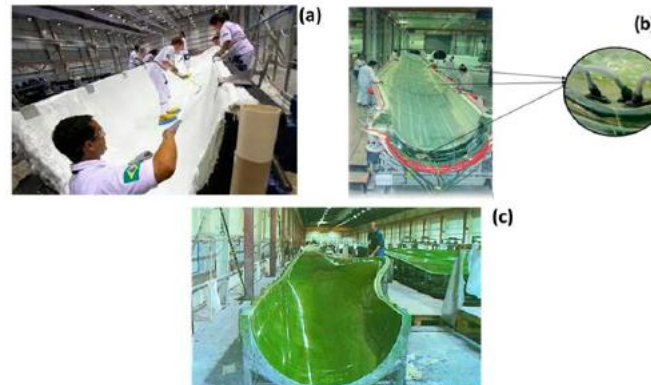
Resin workability: viscosity, Tg, pot life, ... according to wind turbine standards and process.

Impregnation of natural fibres: impact in the properties and in- service life of final blade.

Maximum mould temperature, to avoid thermal deformations of the mould.

Manufacturing processes of a wind turbine blade:

- (a) hand lay-up,
- (b) vacuum infusion or prepregging,
- (c) vacuum-assisted resin transfer molding

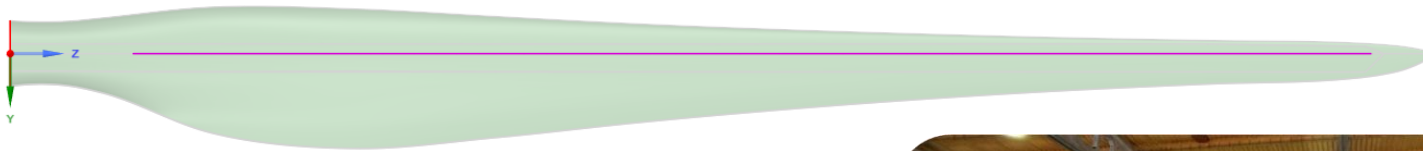


Source: Dimitrova, M., et al. (2022). Applied Mechanics, 3(4), 1299-1326

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Status update:

- ✓ The **design specifications for EOLIAN blade** were defined based on Norvento's background.
- ✓ **Fluid and frequent communication** with **partners** who research and develop the vitrimer resins to **adjust the properties of the resin** for the design and manufacture of the EOLIAN blade.
- ✓ An **advanced aerodynamic design** is ready. Few design iterations happening in other set final configuration.
- ✓ A preliminary **laminates design** is ready. Design iterations happening.
- ✓ Working together with **mould manufacturer**.



3D CAD geometry and
one of Norvento's wind turbine blade
moulds.



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Why is the EOLIAN project important for Norvento?

Competitive advantage:



Sustainability:

- The society, the governments and the Earth, warn to us to do a conscious use of resources. So, It is an urgency to look for a solution to produce/reuse/recycle/ traditional materials and look for alternative ones to push circular economy.
- EOLIAN project will overcome these main problems: non-repairable blades, lack of repurposing, zero circular recycling. These claims are aligned with Norvento vision.
- Norvento's participation allows the company to remain at the forefront of the sector, **studying and validating sustainable and viable solutions that will need to be implemented in the near future.**



An innovative and distinctive product:

- Norvento works with small – mid size wind turbines, where it is committed to the quality and innovation in its products to differentiate itself from its competitors.
- The EOLIAN blade will allow Norvento to be at the **forefront of the latest developments**, to **distinguish itself and stand out among other companies in the sector**.
- Market driven: Norvento considers the **EOLIAN blade a potential product for wind turbine sector, and for its costumers.**

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Thank you for your attention!

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