

**#EU
GREEN
WEEK**

Partner Event

FROM END-OF-LIFE TO LEASE-OF-LIFE: CIRCULARITY IN ACTION



**Funded by
the European Union**



Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Health and Digital Executive Agency (HADEA). Neither the European Union nor the granting authority can be held responsible for them.

BIO4EEB project

*BIO insulation materials
for Enhancing the Energy
performance of Buildings*



#EUGREENWEEK

The challenges

More sustainability in the EU construction sector

- **Buildings** = 40% energy consumption and 36% CO₂ emissions in the EU
- High **environmental impact** of traditional insulation materials
- **Low renovation** rate in the EU (1%/year of EU building stock)

Less waste in the EU construction sector

- Linear models: **waste** → **landfill/incineration** instead of reuse / circular thinking
- Underutilized **bio-waste** (e.g., Posidonia)

Why BIO4EEB?

BIO4EEB transforms waste into high-performance building materials.

- To contribute to the **renovation of the EU existing building stock**
- To support the transition towards **more sustainability** of construction
- To improve the **environmental impact of residential buildings**
- To **turn linear models** into more circular thinking in construction
- To **foment the bioeconomy** (building, component, material) in construction

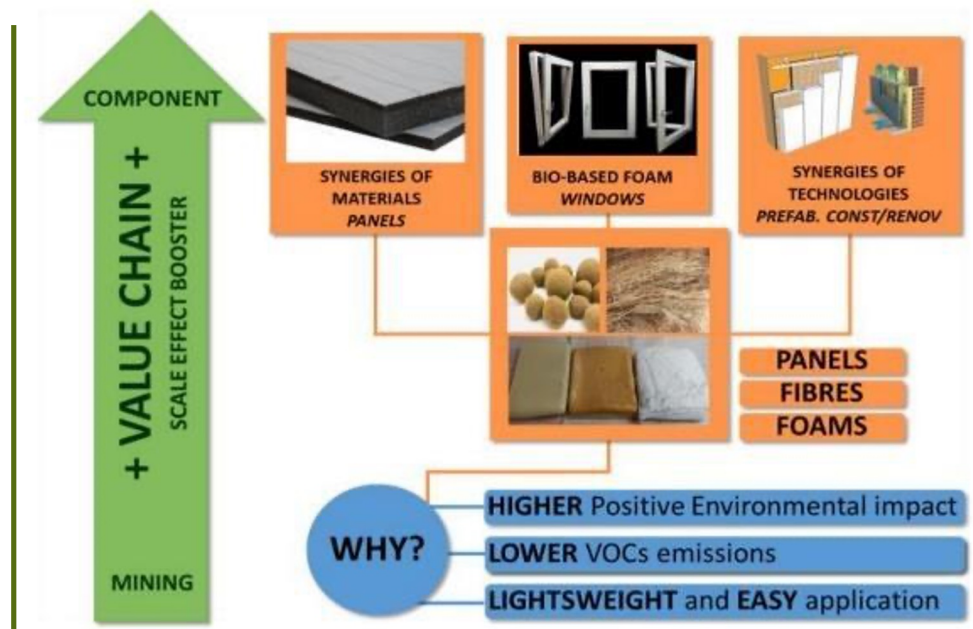


#EUGREENWEEK

BIO4EEB in a nutshell

BIO4EEB applies **non-hazardous bio-based materials** (e.g., Posidonia and various bio-based foams) to develop and proof the marketability of smart components **for external and internal use** as material application, pre-fab panels or windows.

- Objective 1: Affordable user centric **envelope solutions** applicable to different building typology.
- Objective 2: New environment friendly, lightweight and cost-effective bio-based insulation materials adaptable for improving ventilated facades for **building and renovation**
- Objective 3: Demonstrate the **circularity & adaptability** of BIO4EEB solutions for easy installation in real operational environment and replicability in virtual demo cases



#EUGREENWEEK

BIO4EEB technological solutions

Bio-based insulation materials

- Posidonia panels & fibres
- PLA bio-foams (fire-retardant)
- Bio-based PUR (insulation & window frames)
- Polyelectrolyte fire-resistant coatings



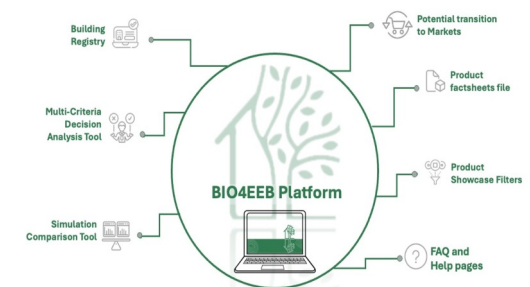
Prefabricated façade systems

- Integration of materials into modular elements
- Suitability for different building typologies
- Readiness for large-scale deployment



BIO4EEB digital platform

- Multi-criteria decision support (MCDA)
- Selection of optimal renovation strategies
- Integration of energy, cost & sustainability data



BIO4EEB offers a portfolio of bio-based materials integrated into prefabricated renovation systems, supported by digital tools for decision-making and scalability.

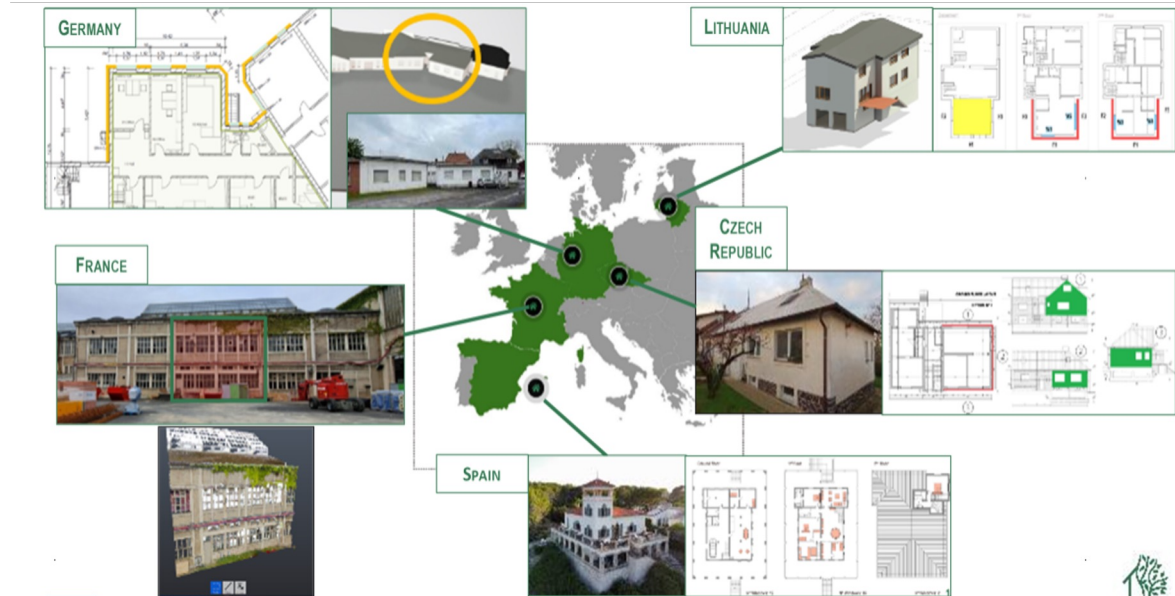


#EUGREENWEEK

BIO4EEB demo-cases

Validation and performance assessment

- Deployment in **5 real buildings across EU**
- **3 virtual demos** used to assess replicability and scalability in different climates
- Monitoring of **energy, cost, and user comfort**



#EUGREENWEEK

BIO4EEB demo-cases

Mallorca, Spain
Historical and
protected residential
complex
refurbishment



**Vitry-sur-Seine,
France**
Refurbishment of
former train
maintenance into
offices



Lithuania
Refurbishment of residential unit

Menden, Germany
Refurbishment of
an office building
now used for
housing



Czech Republic
Refurbishment of
suburban semi-
detached house



Virtual demo cases

The virtual demo-cases will serve as a test-bed of assessing several different technological solutions and their potential environmental, economical and social impact. The selected virtual demo cases are representing parts of the European residential building stock with high replicability potential. Together with the real demo cases they cover the main residential building types (by size, historical protected status, age etc.) from the dominant climates (Middle European Continental, Oceanic, Mediterranean Climate). The demo cases were selected by relying on the TABULA-Episcopo building typology.

3 VIRTUAL DEMO CASES



#EUGREENWEEK

BIO4EEB impacts

The BIO4EEB solutions are expected to deliver:

- 30% less embodied energy & CO2 at component level
- 20% improvement of insulation properties
- 15% reduction in total costs compared to existing solutions
- 5% reduction of the energy consumption over the building life cycle



#EUGREENWEEK

Transferability of results

Scalable across building types & regions

- Applicable to different climates (Mediterranean, Continental & Oceanic), regulations & building typologies
- Demonstrated through real & virtual pilot cases

Modular material & system approach

- Solutions can be reconfigured into different renovation packages
- Easy integration into existing construction processes

International transferability

- Adaptation & validation for Latin American markets through CAMACOL in Colombia



#EUGREENWEEK

Roadblocks: the case of Posidonia

Posidonia insulation faces some challenges before wider adoption. These include:

- Higher initial **costs**
- Limited **availability** & Supply chain issues
- **Ownership** of waste bias
- **Performance** & durability concerns
- Regulatory and **certification** hurdles
- Lack of **awareness** & education
- Cultural & industry **resistance**
- **Technical** challenges, notably LCA & overall Environmental impact assessment



Tips for peers:

- Collaboration with **local municipalities**
- The **combination of Posidonia with selected materials** shows great promise
 - Mixed with rice straw in panel production: thermal insulation properties improve significantly

BIO4EEB applies a multifaceted approach (policy support, industry collaboration, focused R&D, awareness raising and education/training) to promote the potential of bio-based building materials.



#EUGREENWEEK

Policy Needs: From Waste to Wonder

- **Align** the Circular Economy Act, the Bioeconomy strategy and the RESourceEU Action plan for mutual reinforcement
- **Unlock markets** for secondary raw materials and circular materials
- Ensure **legal certainty** through improved by-product recognition and clear EoW criteria
- **Set incentives** for circular construction and bio-based products
- **Improve collection systems** through clear EU guidance on sorting practices
- Support for **scaling** bio-based supply chains
- Prioritise **research on renovation** and the existing building stock renovation
- **Streamline** EU certification for bio-based materials
- Set **public procurement** criteria for sustainable materials and local added-value
- Raise **awareness** on circular construction methods and bio-based products among researchers, practitioners and potential clients



#EUGREENWEEK

THANK YOU!



BIO4EEB



BIO4EEB

WWW.BIO4EEB.EU



#EUGREENWEEK