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EASI ZERo

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Deliverable

ENVELOPE MATERIAL SYSTEM WITH LOW IMPACT FOR ZERO ENERGY RENOVATION AND CONSTRUCTION

Deliverable ID	**D8.4**
Deliverable name	**Recordings & minutes of 4 stakeholder workshops**
Deliverable description	The report will provide the minutes of four online workshops with stakeholders to inform about the project's outcomes, organised in task 8.4. This gives the opportunities to learn from market intelligence and to discuss barriers and solutions, potential business opportunities. The report will hopefully provide ideas on sales pitches towards different target customers.

WP	WP8	**Dissemination, Communication and exploitation**
Task	T8.4	**Recordings and minutes of 4 stakeholder workshops**

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1. Executive summary

1.1 *Description of the deliverable content and objectives*

Over the course of the EASI ZERo project, the EASI ZERo Academy was established to bridge the gap between research, innovation and market uptake in the construction sector. While technological solutions for low-carbon and bio-based renovation already exist, their widespread adoption continues to face a range of barriers, from market acceptance and regulatory complexity to skills shortages and uncertainty around costs and performance.

The EASI ZERo Academy was designed to address these challenges by creating a space for dialogue between researchers, policymakers, industry representatives, building professionals and market actors. Through a series of thematic workshops, participants explored the practical, regulatory and economic conditions required to accelerate the uptake of innovative renovation solutions and support the transition towards a more sustainable built environment.

Across four workshops, discussions focused on the factors shaping the future of low-carbon construction materials and renovation practices. Topics ranged from market acceptance and consumer behaviour to European standards, energy performance and practical implementation tools. Each session combined expert presentations with interactive discussions, allowing participants to identify barriers and explore potential solutions.

The workshops were geared towards a diverse audience, including architects, engineers, researchers, product manufacturers, certification bodies, policymakers, construction professionals and representatives from European projects. This multidisciplinary approach ensured that discussions reflected perspectives from across all sectors, from technology developers and manufacturers to regulators and end-users.

A recurring theme throughout the Academy was the need to move beyond purely technical discussions. While innovation remains essential, participants consistently highlighted the importance of affordability, communication, skills development, market confidence and regulatory certainty. The conversations demonstrated that successful market uptake depends not only on the performance of new materials and technologies, but also on creating favourable conditions for adoption across the entire construction ecosystem.

The EASI ZERo final conference built on these discussions by bringing together project partners, industry representatives and experts to reflect on the project's achievements and examine the remaining challenges to large-scale deployment. Particular attention was given to the transition from research results to market uptake, including issues related to certification, industrial scalability, investor confidence and policy support.

Taken together, the Academy workshops and final conference provided insights into the opportunities and barriers facing innovative renovation solutions in Europe. The discussions reinforced the need for coordinated action across policy, industry and research communities to ensure that sustainable renovation technologies can move successfully from demonstration projects into mainstream practice.

1.2 *Impact of the results*

The EASI ZERo project has contributed to advancing the market readiness of innovative bio-based and circular renovation solutions by generating technical evidence, fostering collaboration between researchers, manufacturers, certification bodies and market actors, and identifying key barriers to deployment. Through product development, testing, demonstration activities, workshops and stakeholder engagement, the project has strengthened understanding of how sustainable renovation materials can be integrated into real-world construction practices.

The project's findings provide valuable insights for industry, policymakers and researchers. They highlight the importance of affordability, certification, demonstration projects and supportive policy frameworks in accelerating the uptake of innovative renovation solutions. These results can inform future research and innovation activities, support the implementation of European building and climate policies, and contribute to the transition towards a more circular and resource-efficient construction sector.

In addition, knowledge exchange established through the EASI ZERo Academy events have helped build connections between key stakeholders, creating opportunities for further collaboration, product development and market uptake beyond the lifetime of the project.

1.3 *Dissemination activities carried out, planned*

The EASI ZERo Academy was designed as a four-part workshop series in the final phase of the project. Its strategic purpose was to engage external stakeholders (e.g. construction companies, housing providers, ESCOs, manufacturers, architects, policymakers, investors) in interactive discussions. The EASI ZERo Academy sessions were also meant to gather targeted input to strengthen and validate project findings, as well as highlight and discuss topics of interest to market actors. From January to May 2026, BPIE organized 3 online workshops and one in-person event as part of the EASI ZERo Academy.

Recordings of all four sessions can be found here: https://studio.youtube.com/playlist/PLBoIy-X5N2Xo/videos

2. Summary of the workshops

2.1 *EASI ZERo Academy workshop #1*

The first EASI ZERo Academy workshop explored a critical challenge facing the construction sector: how to move innovative low-carbon and bio-based renovation solutions beyond demonstration projects and into the mainstream market.

While participants acknowledged growing interest in sustainable construction, discussions revealed that purchasing decisions continue to be driven primarily by cost. In a context of economic uncertainty, price remains the dominant factor for many building owners, often outweighing environmental considerations. This prompted a broader discussion about how the value of innovative materials should be communicated and assessed.

Participants emphasised that market uptake depends on more than sustainability credentials alone. Confidence in product performance remains essential, with fire safety, durability, regulatory compliance, and certification repeatedly identified as prerequisites for wider adoption. Demonstration projects and real-world references were also highlighted as critical tools for reducing perceived risks and building trust among specifiers, contractors and clients.

The workshop also explored the importance of communicating benefits that resonate with end users. Beyond carbon savings, participants pointed to improved indoor air quality, occupant health and comfort as compelling arguments that can help differentiate innovative materials in the marketplace. Examples included EASI ZERo solutions designed to improve indoor environmental quality while contributing to energy savings.

A further area of discussion focused on the role of policy and public authorities. Participants highlighted how the first EASI ZERo Academy workshop explored a critical challenge facing the construction sector: how to move innovative low-carbon and bio-based renovation solutions beyond demonstration projects and into the mainstream market.

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A further area of discussion focused on the role of policy and public authorities. Participants highlighted how public procurement, targeted incentives and financing mechanisms can accelerate market uptake by creating demand for higher performing, more sustainable solutions.

The workshop demonstrated that while technological innovation continues to advance, successful market deployment will depend on addressing economic concerns, strengthening market confidence and broadening the conversation beyond environmental performance alone. Public procurement, targeted incentives and financing mechanisms can accelerate market uptake by creating demand for higher performing, more sustainable solutions.

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2.2 *EASIZERo Academy workshop #2*

The second Academy workshop examined how European policy and certification frameworks are shaping the future of innovative construction materials and influencing their route to market.

Discussions focused on the rapidly evolving regulatory landscape, including the revised Construction Products Regulation (CPR), the Energy Performance of Buildings Directive (EPBD) and emerging initiatives such as the Carbon Removal Certification Framework. We explored how these frameworks create new opportunities for low-carbon and bio-based materials while simultaneously raising expectations around performance, transparency and accountability.

A key theme throughout the session was the growing importance of environmental performance data. Under the revised CPR, lifecycle assessments and Digital Product Passports are expected to play an increasingly significant role in product evaluation and market access. We discussed how these requirements could improve transparency and comparability while supporting more informed decision-making across the construction value chain.

The workshop also highlighted the role of the EPBD in driving demand for higher-performing building envelope solutions. However, participants noted that implementation remains uneven across Member States, creating varying market conditions and levels of preparedness.
Certification emerged as one of the central topics of debate. While certification provides assurance regarding technical performance and quality, speakers stressed that it also serves a broader function by building trust among investors, regulators and consumers. At the same time, concerns were raised about the complexity and resource requirements associated with certification processes, particularly for smaller companies introducing innovative products.

The discussion reinforced the importance of ensuring that regulatory frameworks support innovation while maintaining robust standards that can accelerate market confidence and adoption.

2.3 *EASI ZERo Academy workshop #3*

The third Academy workshop focused on the contribution that innovative low-carbon and bio-based materials can make to reducing energy demand and strengthening resilience in the face of rising energy costs and climate challenges.

Using results from an EASI ZERo demonstration project in Norway, participants explored how innovative renovation solutions perform under real-life conditions. The case study demonstrated energy savings of up to 45%, providing valuable evidence of the potential contribution these materials can make to improving building performance in colder climates.

Beyond operational energy savings, discussions highlighted the importance of adopting a broader perspective when assessing environmental performance. Participants noted that lifecycle assessment results can vary significantly depending on factors such as geography, local energy mixes, weather conditions and building characteristics. This reinforced the need for context-sensitive approaches when evaluating renovation solutions.

The workshop also explored how better information and transparency can support decision-making. Material passports were identified as a promising tool for improving access to product data and helping stakeholders better understand the environmental and technical characteristics of innovative materials.

A recurring theme throughout the discussion was the need to shift the conversation beyond upfront costs. Participants argued that health, safety, comfort and long-term performance benefits should play a much greater role in investment decisions and policy discussions. While technological development continues to progress, speakers agreed that supportive policy frameworks will remain essential to enabling large-scale deployment.

The session concluded that innovation alone will not deliver transformation. Unlocking the full potential of low-carbon materials will require a combination of evidence, transparency, supportive regulation and a broader understanding of value.

2.4 *EASI ZERo Academy workshop #4*

The fourth EASI ZERo workshop took place during the final conference and marked the culmination of three and a half years of research, testing and collaboration dedicated to transforming how Europe renovates its buildings. Throughout the project, partners developed and demonstrated a range of innovative renovation solutions, including bio-based insulation, insulating renders, phase-change material bricks, VOC-removing paints and building-integrated photovoltaics.

Against a backdrop of growing climate and housing challenges, the final workshop session focused on a central question: how can innovative building solutions make their way from the research phase and onto the market?

Panel discussion overview

The discussion highlighted that technical performance is only one piece of the puzzle. Thaleia Konstantinou emphasised that scaling innovation requires addressing complex supply chains, overcoming behavioural barriers and creating incentives that motivate actors throughout the value chain. Adoption is ultimately shaped as much by people and market dynamics as by technology itself.

Drawing on industrial experience, Benedikt Schug and Dr Ashwinikumar Sharma reflected on the challenges of translating successful prototypes into commercially viable products. While some solutions performed well at scale, others encountered difficulties when moving from controlled testing environments to industrial production. Their contributions highlighted the iterative nature of innovation and the importance of learning from both successes and setbacks.

Dr Marina Stipetic focused on certification and regulatory frameworks, describing them as both necessary and challenging. While certification is essential for market confidence, innovative products often face additional hurdles when existing standards and testing methodologies have not yet adapted to new technologies. Collaboration, knowledge sharing and collective approaches were identified as important strategies for overcoming these barriers, especially for smaller market players (SMEs) involved in developing new products.

Initiatives such as the revised EPBD and emerging whole-life carbon approaches are creating new opportunities for innovative products. However, panellists agreed that regulation alone will not deliver transformation. Market readiness, consumer and investor confidence, workforce skills and

effective certification pathways will all play a critical role in determining how quickly innovative solutions can scale.

The conference concluded that the technologies required to support Europe's renovation ambitions are increasingly available. The challenge now lies in creating the market conditions, regulatory frameworks and investment environment necessary to support large-scale deployment.

3. Conclusions

3.1 *Affordability as a key driver of market uptake*

The discussions held throughout the EASI ZERo Academy and Final Conference revealed a common message: the technologies needed to support sustainable and low-carbon renovation already exist, but achieving large-scale market uptake remains a complex challenge. One of the strongest themes emerging across all workshops was the importance of affordability. While sustainability is increasingly recognised as a priority, price remains one of the most influential factors affecting purchasing decisions. Participants repeatedly highlighted that innovative materials cannot rely solely on their environmental credentials. Wider adoption will depend on demonstrating broader value, including improved comfort, health, indoor air quality, resilience and long-term performance.

Building trust through demonstration and evidence

Another recurring finding was the importance of trust. Market actors need confidence that innovative products will perform as expected over time. Demonstration projects, case studies and transparent documentation were repeatedly identified as essential tools for reducing uncertainty and building market acceptance. Real-world examples remain one of the most effective ways of bridging the gap between innovation and deployment.

3.2 *The role of policy and regulation*

The workshops also highlighted the growing influence of European policy frameworks. Legislation such as the EPBD and the revised CPR are helping to create demand for higher-performing renovation solutions and greater transparency regarding environmental performance. At the same time, it was regularly noted that implementation remains uneven and that regulatory complexity can create additional challenges for innovative products entering the market.

3.3 *Certification: Supporting quality while enabling innovation*

Certification emerged as both an opportunity and a challenge. Participants broadly agreed that certification is essential for ensuring quality, demonstrating performance and building confidence among investors, regulators and consumers. However, concerns were raised about the time, cost and administrative burden associated with certification processes, particularly for smaller

companies and novel products without established precedents. Future regulatory frameworks will need to strike a balance between maintaining robust standards and supporting innovation.

3.4 *Beyond technology: Creating the conditions for scale*

The discussions further outlined that successful market uptake depends on more than technological advancement. Supply chains, financing structures, skills development and consumer awareness all play a significant role in determining whether innovative solutions can move beyond pilot projects and reach scale. Technological innovation must therefore be accompanied by supportive market conditions and coordinated action across the value chain.

Overall, the EASI ZERo Academy demonstrated the value of bringing together stakeholders from across the construction ecosystem to exchange knowledge and identify practical solutions. The workshops and final conference provided evidence that innovation is progressing rapidly but also confirmed that coordinated action will be needed to ensure that sustainable renovation solutions can move successfully from laboratory research to large-scale implementation across Europe.

3.5 *Exchange knowledge and identify practical solutions*

The workshops and final conference provided evidence that innovation is progressing rapidly but also confirmed that coordinated action will be needed to ensure that sustainable renovation solutions can move successfully from laboratory research to large-scale implementation across Europe.

4. Annex: Detailed minutes of the workshops

4.1 *EASI ZERo Academy #1 – Market Pulse: How to Sell Sustainable Construction*

Date: 27 January 2026 (09:30 – 11:00)

Duration: 1h 25m

Number of participants: 29
Format: Product presentations, participant survey, breakout discussions, and plenary feedback session

Link: https://youtu.be/jo9EqDK0_5M?si=QK2pdIX8Qzwk7jUK

Meeting Summary

The EASI ZERo Academy workshop brought together project partners, industry representatives, researchers, and stakeholders to discuss innovative sustainable construction materials developed within the EASI ZERo project and explore the factors influencing their market adoption.

Participants were introduced to several low-carbon and bio-based building products, including PCM-filled bricks, bio-based spray foam insulation, mycelium-based panels, and indoor air-purifying paint. Through surveys and breakout discussions, participants examined market barriers, customer priorities, certification challenges, regulatory requirements, and opportunities to accelerate adoption.

The strongest themes emerging from the workshop were price sensitivity, product quality, regulatory compliance, fire safety, lifecycle costs, sustainability, and the importance of effectively communicating value to customers. Participants agreed that sustainability is increasingly important but remains secondary to safety, performance, certification, and affordability in most purchasing decisions.

Key Discussion Points

Project Overview

Arnaud JAY (CEA)

Presented the EASI ZERo project, a European Commission-funded initiative involving 16 partners from seven European countries.

Key points:

- The project aims to accelerate deep renovation of building stock through the development of low-carbon building envelope materials and components.
- Research activities focus on insulation materials, finishing materials, windows, photovoltaic integration, and construction components.
- Materials undergo laboratory testing, real-world experimental validation, and numerical simulation.

- The project seeks not only technical innovation but also commercialization readiness through standardization, market analysis, and sustainability assessment.
- The project is approaching completion, with six months remaining at the time of the workshop.

Product Presentations

PCM-Filled Bricks

Fabian Teubl (HeiQ RAS AG)

Presented innovative bricks incorporating phase change material (PCM) capsules.

Key points:

- Conventional filled bricks provide insulation but limited thermal storage.
- PCM capsules store and release heat through phase change processes.
- The design combines PCM for heat storage with mineral wool insulation.
- The system improves thermal comfort and reduces reliance on active heating and cooling systems.
- Thermal storage and insulation functions are strategically separated within the brick design.

Key Benefit

- Improved thermal energy storage while maintaining strong insulation performance.

Bio-Based Spray Foam Insulation

Ashwinikumar Sharma (INDRESMAT)

Presented a bio-based polyurethane spray foam insulation product.

Key points:

- Contains approximately 60–70% bio-based content.
- Compatible with existing spray foam equipment and installation methods.
- Suitable for roofs, walls, facades, and cavity insulation.
- Provides thermal performance comparable to conventional fossil-based alternatives.
- Raw materials comply with REACH requirements.
- Product supports circular economy principles through potential mechanical and chemical recycling pathways.

Key Benefit

- High-performance insulation with substantially reduced fossil-based content.

Mycelium-Based Panels

Annalisa Moro (SQIM)

Presented insulation and design panels manufactured from fungal mycelium grown on agricultural side streams.

Key points:

- Mycelium is cultivated on organic substrates and formed into moulded panels.
- Production allows flexibility in shape, thickness, texture, and design.
- Panels provide both acoustic and thermal insulation properties.
- Products are intended primarily for interior architecture and design applications.
- Manufacturing utilizes renewable biological resources.

Key Benefit

- Bio-based insulation panels combining sustainability, performance, and design flexibility.

Indoor Air-Purifying Paint

Angels Gordillo (MVIC)

Presented an interior paint designed to improve indoor air quality.

Key points:

- Developed in response to concerns about indoor air pollutants, particularly formaldehyde.
- Paint actively captures and neutralizes aldehyde compounds from indoor environments.
- Contains high levels of bio-based and recycled materials.
- Features low volatile organic compound (VOC) content.
- Suitable for DIY application.
- European Ecolabel certification is in progress.

Key Benefit

- Transforms painted surfaces into active contributors to improved indoor air quality.

Survey Results

Products Participants Would Consider Using

Participants expressed interest in all products presented.

Observations:

- Air-purifying paint received the highest level of interest.
- PCM-filled bricks also attracted significant interest.
- Mycelium panels and bio-based spray foam were viewed positively.
- One participant indicated they would not currently adopt any of the products.

Most Important Product Evaluation Criteria

Participants identified the following key purchasing considerations: price, quality, technical performance, scalability, ease of installation, carbon footprint, CO_2 emissions, environmental impact, health impact.

Ana Nanu

Observed that responses were relatively evenly distributed across multiple criteria, indicating that buyers evaluate products through several lenses rather than a single factor.

Arnaud JAY

Noted that environmental impact, CO_2 emissions, and global warming potential could be grouped as related sustainability considerations.

Sustainable Development Goals Discussion

Participants associated the products with several UN Sustainable Development Goals, including:

- Good Health and Well-Being
- Affordable and Clean Energy
- Industry, Innovation and Infrastructure
- Sustainable Cities and Communities
- Responsible Consumption and Production
- Climate Action

Breakout Session 1: Market Adoption Factors

Theme: Price as the Primary Driver

The group identified price as the most important factor affecting adoption.

Key observations:

- Consumers typically compare products based on upfront cost.

- Limited availability can discourage adoption.
- Products that are more difficult to source face additional barriers.
- Consumers may pay a premium if benefits are well understood.
- Sustainable construction products may follow a similar adoption pattern to organic foods, where increased awareness eventually drives broader acceptance.

Ana Nanu

Highlighted that awareness and demand can influence market growth and eventually improve affordability.

Theme: Communicating Value Beyond Price

Annalisa Moro

Emphasized that sustainable products must clearly communicate their value proposition.

Key points:

- Sustainability can differentiate products from competitors.
- Customers need to understand environmental and health benefits.
- The true cost of a product includes:
    - Environmental impacts
    - Health impacts
    - Durability
    - Energy savings
- Lifecycle value should be considered alongside purchase price.

Ana Nanu

Agreed that cost extends beyond the figure shown on a product label and includes broader social and environmental considerations.

Theme: Safety and Regulation

Angels Gordillo

Reported that his group considered safety and regulatory compliance critical factors.

Key observations:

- Fire safety requirements are particularly important for insulation products.

- Regulatory compliance often takes priority over sustainability.
- Customers need confidence that products meet established safety standards.

Arnaud JAY

Noted that the Spanish market discussion focused strongly on:

1. Price
2. Safety and regulatory compliance
3. Sustainability

Ana Nanu

Referenced the Grenfell Tower tragedy as an example of how safety concerns can fundamentally reshape attitudes toward building materials and regulation.

Theme: Upfront Cost Versus Lifecycle Cost

Fabian Teubl

Reported that participants focused primarily on purchase price rather than long-term value.

Key observations:

- Customers frequently evaluate products based on immediate cost.
- Energy savings and lifecycle benefits are often overlooked.
- Certification and official approval remain important prerequisites for adoption.
- Greater public awareness is required to increase acceptance of sustainable products.

Breakout Session 2: Regulation, Certification and Adoption Challenges

Theme: Regulatory Barriers

The group identified building regulations as a significant challenge for innovative materials.

Key observations:

- Regulatory systems have evolved around conventional materials.
- New products require extensive evidence before approval.
- Long-term performance remains difficult to demonstrate quickly.
- Safety considerations slow regulatory change but are necessary.

Ana Nanu

Observed that balancing innovation with public safety presents a significant challenge for regulators.

Theme: Standardization Challenges

Annalisa Moro

Discussed difficulties associated with certifying innovative products.

Key observations:

- Existing test methods were designed for conventional materials.
- New materials are frequently evaluated using standards not developed for them.
- This can create obstacles for innovation and commercialization.

Theme: Traceability Requirements

Annalisa Moro

Highlighted traceability as an emerging requirement.

Key observations:

- Traceability is becoming increasingly important throughout supply chains.
- Implementation can be complex and resource-intensive.
- Well-developed traceability systems may become a competitive advantage.

Theme: Sustainability as a Future Market Requirement

Annalisa Moro

Observed that sustainability is increasingly influencing:

- Public procurement
- Building financing
- Lending decisions
- Energy-efficiency programs

She noted that sustainability is not yet universally mandatory but is expected to **become increasingly influential.**

Theme: Workforce Acceptance

Arnaud JAY

Highlighted challenges associated with changing established construction practices.

Key observations:

- Workers often prefer familiar materials and processes.
- Product acceptance depends on practical experience.
- Factors such as handling, texture, smell, and ease of use influence adoption.
- Training and demonstrations are essential.

Ana Nanu

Emphasized that training alone is insufficient without practical field experience and confidence-building opportunities.

Theme: Need for Demonstration Projects

Arnaud JAY

Stressed the importance of pilot projects and real-world demonstrations.

Key benefits:

- Build trust among stakeholders.
- Demonstrate performance under real conditions.
- Support regulatory acceptance.
- Increase confidence among installers and customers.

Areas of Broad Consensus

Participants generally agreed that:

- Price remains the strongest determinant of purchasing decisions.
- Safety, quality, and regulatory compliance are non-negotiable requirements.
- Sustainability benefits alone are rarely sufficient to drive adoption.
- Lifecycle costs should be communicated more effectively.
- Demonstration projects are essential for building trust.
- Public procurement can accelerate market transformation.
- Regulatory frameworks must balance innovation and safety.

Education and awareness are critical for market uptake.

- Sustainable products must demonstrate both economic and environmental value.
- Certification and regulatory approval remain essential prerequisites for adoption.

- Greater industry and consumer awareness is required.
- Pilot projects and practical demonstrations should play a central role in market introduction strategies.

Open Questions

- How can certification systems better accommodate innovative sustainable materials?
- How can long-term performance evidence be generated more efficiently?
- What communication approaches most effectively justify higher upfront costs?
- How can lifecycle costs be better incorporated into purchasing decisions?
- What incentives would most effectively accelerate adoption?
- How can traceability requirements be implemented without excessive administrative burden?
- What role should public procurement play in driving market transformation?
- How can installer training and confidence be improved for new materials?

Key Takeaways

1. Price remains the primary factor influencing adoption of sustainable construction materials.
2. Safety, fire performance, and regulatory compliance are viewed as prerequisites for market acceptance.
3. Sustainability is increasingly valued but generally ranks behind cost and performance considerations.
4. Air-purifying paint generated the strongest participant interest.
5. Customers often focus on upfront cost rather than total lifecycle value.
6. Existing standards and certification pathways can slow innovation.
7. Public procurement and financing mechanisms are emerging as important adoption drivers.
8. Pilot projects are critical for demonstrating performance and building trust.
9. Installer familiarity and practical usability significantly affect adoption.
10. Successful commercialization requires both technical excellence and effective communication of value.

4.2 *EASI ZERo Academy #2 – Standards in Motion: How Regulation Shapes Sustainable Construction*

Date: April 16 (11:00 – 12:00)
Topic: Standards, Certification, Regulation and Market Access for Bio-Based and Low-Carbon Construction Products
Number of participants: 29
Format: Expert presentations, moderated discussion, and audience Q&A
Link: https://youtu.be/G5mZwl6Gyx0?si=OJh9nIkKKaFiDx6U

Meeting Summary

The second EASI ZERo Academy workshop explored how European regulations, standards, certification systems, and lifecycle assessment frameworks influence the development and market uptake of sustainable construction products.

The session focused on the practical challenges of certifying innovative products such as PCM-filled bricks and mycelium-based insulation panels, as well as broader policy developments including the revised Construction Products Regulation (CPR), Environmental Product Declarations (EPDs), the Energy Performance of Buildings Directive (EPBD), and the Carbon Removal Certification Framework (CRCF).

Speakers emphasized that evolving regulations are creating new opportunities for bio-based and low-carbon materials by increasing transparency around carbon emissions, durability, circularity, and environmental performance. However, participants also highlighted significant implementation challenges, including slow regulatory adoption, the need for new testing methodologies, traceability requirements, and the complexity of building-level certification systems.

A key conclusion was that regulatory reform is moving in a direction that favors sustainable materials, but successful implementation will require coordination across the entire construction value chain, from manufacturers and certifiers to designers, contractors, and building owners.

Key Discussion Points

Certification Challenges for Innovative Construction Products
Marina Stipetic (MPA Stuttgart)
Presented practical examples of certification and assessment challenges for innovative EASI ZERo products.
PCM-Filled Brick Assessment
Key findings:

- Thermal simulations demonstrated that PCM-filled bricks provide enhanced thermal storage capacity compared to conventional filled bricks.
- Temperature fluctuations within PCM-filled bricks were significantly lower than in traditional brick systems.

- Simulations showed improved thermal comfort and energy efficiency under varying weather conditions.
- Temperature differences between conventional and PCM-filled bricks reached approximately:
    - 5 Kelvin during heating cycles.
    - 4 Kelvin during cooling cycles.

Marina Stipetic
Concluded that current standards do not adequately characterize thermal storage performance.
Recommendations:

- Develop new measurable characteristics specifically addressing thermal storage capacity.
- Introduce material-level metrics that can be incorporated into future product standards.

Fire Safety and System-Level Testing

Marina Stipetic
Highlighted the importance of assessing innovative products beyond individual component testing.
Key points:

- PCM materials must achieve at least European Fire Classification E.
- Smoke composition generated during fire events should be assessed.
- Testing should extend beyond individual products to complete systems.

Examples:

- Masonry walls should be tested as brick-and-mortar assemblies rather than individual bricks.
- Assessments should include:
    - Compressive strength
    - Fire resistance
    - Sound insulation performance
    - Structural behaviour

Key Observation

- Innovative products require system-level testing because their performance depends on how they function within complete building assemblies.

Mycelium-Based Insulation Panels

Marina Stipetic
Presented certification work undertaken for mycelium-based insulation panels.
Testing was based on a European standard originally developed for wood-fibre insulation products due to similarities in application.

Standard Performance Testing

The following properties were assessed:

- Thermal conductivity
- Reaction to fire
- Thickness
- Airflow resistance
- Water vapour diffusion resistance

Additional Testing Beyond Existing Standards

Recognizing that existing standards do not fully capture the characteristics of bio-based materials, additional assessments were conducted.
These included:
Acoustic Performance

- Sound absorption properties were evaluated because panels provide acoustic as well as thermal insulation.

Fixing and Installation Methods
Different installation approaches were tested:

- Velcro systems
- Mortar
- Traditional adhesives

Bond strength between panels and substrates was assessed for each method.
Internal Bond Strength Testing was performed to determine:

- Structural integrity
- Material cohesion
- Potential suitability for façade and ETICS applications

Manufacturing Challenges

Marina Stipetic
Reported deviations from flatness exceeding current standard limits.
Key observations:

- Standard maximum deviation is 6 mm.
- Tested panels exceeded this threshold.
- Issue was viewed as a manufacturing optimization challenge rather than a fundamental product limitation.

Indoor Environmental Quality and Bio-Based Materials

Marina Stipetic

Identified indoor environmental performance as a critical area for future certification.
Key considerations:

- Volatile Organic Compound (VOC) emissions.
- Indoor air quality impacts.
- Occupant comfort.

New Product Characteristic Proposed

During testing, mycelium panels exhibited a noticeable natural odour.
Marina suggested future certification systems could consider:

- Odour intensity.
- Duration of odour persistence.

Key Observation

- Traditional standards often overlook sensory characteristics that may influence customer acceptance of bio-based materials.

Durability and Long-Term Performance

Marina Stipetic

Identified durability assessment as one of the most important challenges for bio-based products.
Recommended testing includes: resistance to mould, resistance to rot, resistance to insects and termites, aging performance, long-term deformation, service-life performance.

Connection to New CPR Requirements

Marina noted that many of these considerations are already reflected in the revised Construction Products Regulation (CPR), which entered into force in 2024.
New regulatory focus areas include: durability, long-term performance, aging and degradation, moisture response, release of dangerous substances, system-level performance assessment.

The Revised Construction Products Regulation (CPR)

Marina Stipetic

Explained that the new CPR introduces a broader approach to product assessment.
Key implications:

- Certification increasingly extends beyond product-level testing.
- Building-level performance considerations are becoming more important.
- Manufacturers must consider intended use, installation conditions, exposure scenarios, and service life.

Challenges Identified

Questions arise regarding:

- Which component should be treated as the primary product within a system.
- How system-level performance should be assessed.
- How innovative products fit within existing certification frameworks.

Examples:

- In ETICS systems, should certification focus primarily on the insulation layer?
- In windows, should the primary product be the glazing or the frame?

Discussion: Will New Regulations Help Sustainable Products Reach the Market?

Moderator Question

Ana Nanu

Asked whether changing standards and regulations will help bio-based and low-carbon materials gain market access and whether important gaps remain in the regulatory framework.

Regulatory Progress and Remaining Gaps

Samy Porteron

Argued that recent policy developments send a strong signal in support of low-carbon construction.

Key developments include:

- Greater reporting requirements for embodied carbon emissions.
- Increased transparency regarding greenhouse gas impacts.
- Future building-level reporting requirements under the EPBD beginning in 2030.

Benefits for Sustainable Products

Samy noted that:

- Low-carbon materials can increasingly differentiate themselves through environmental performance.
- Carbon reporting requirements create greater visibility for sustainable products.

Remaining Challenges

He identified several areas where policy development remains incomplete:

Whole-Life Carbon Limits

Member States should establish:

- Building-level carbon limits.
- Enforcement mechanisms.

Without limits, reporting alone may not significantly influence material selection.

Circularity Measures

Recommended measures include:

- Mandatory pre-demolition audits.

- Stronger circular economy requirements.
- Greater focus on material reuse.

Sustainable Resource Management

Samy stressed the importance of:

- Sustainable forestry management.
- Climate resilience of biomass resources.
- Understanding broader environmental impacts of material sourcing.

Traceability and Supply Chains

Ana Nanu

Highlighted traceability as an emerging challenge across biomass supply chains.

Samy Porteron

Agreed that improved understanding and verification of resource origins will become increasingly important for sustainable material markets.

Regulatory Optimism and Practical Constraints

Marina Stipetic

Expressed optimism about the overall direction of regulatory change.

Key observations:

- New regulations support environmental protection, circularity, durability, and reduced use of hazardous substances.
- Sustainable products are well positioned to meet these emerging requirements.
- Traditional products are also being pushed toward improved environmental performance.

Marina cautioned that implementation will likely be slow because:

- Requirements operate at both product and building levels.
- Regulatory systems require coordination among many actors.
- Data must flow from product-level assessments into building-level evaluations.

Public Availability of Project Data

Audience Question

A participant asked whether Life Cycle Assessment (LCA) results and cost analyses from the EASI ZERo project would be publicly available.

Marina Stipetic

Responded that:

- Environmental Product Declarations (EPDs) are planned.
- Public availability had not yet been confirmed.

- Cost analysis was not a primary focus of the EASI ZERo project.

Discussion: Private Certification vs Harmonized Standards

Moderator Question

Ana Nanu

Asked whether private certification schemes could support market adoption of innovative products and how they compare with harmonized European standards.

Role of Voluntary Certification

Marina Stipetic

Explained that private certification:

- Is voluntary.
- Provides market recognition beyond mandatory CE marking.
- Can communicate additional product characteristics not currently covered by standards.

Examples include:

- Aging resistance.
- Durability.
- Odour performance.
- Other innovative product attributes.

Benefits

Private certification can:

- Demonstrate third-party validation.
- Highlight innovation.
- Provide early market credibility while standards evolve.

Future Outlook

Marina expressed hope that:

- Standardization processes will become more flexible.
- Standard revisions will occur more rapidly.
- Reliance on voluntary certification may decrease as official standards adapt more quickly.

Discussion: Carbon Storage, LCA and the CRCF

Moderator Question

Ana Nanu

Asked how lifecycle assessment methodologies align with emerging carbon storage certification frameworks and how consistency can be maintained across different certification systems.

Alignment Between LCA and Carbon Storage Certification

Samy Porteron

Explained that:

- EN 15804 remains the primary LCA methodology for construction products.
- The methodology already accounts for biogenic carbon stored in bio-based products.

Current LCA Approach

The standard:

- Counts carbon stored during product use.
- Assumes carbon is eventually released at end of life.
- Uses a conservative accounting methodology.

Role of the Carbon Removal Certification Framework (CRCF)

Samy explained that the CRCF adds:

- Monitoring requirements.
- Verification mechanisms.
- Certification processes.

Its purpose is to verify that carbon remains stored over time rather than simply assuming eventual release.

Additional Requirements

To participate in CRCF mechanisms:

- Carbon storage must be quantified.
- Building performance must be monitored.
- Long-term storage must be demonstrated.

Responsibility for Carbon Storage Certification

Ana Nanu

Asked whether responsibility falls primarily on building owners.

Samy Porteron

Confirmed that:

- Building owners are the primary actors within the CRCF framework.
- Owners ultimately determine material choices.
- Certification systems are therefore structured around building-level decision-making.

Expected Outcome

Providing financial incentives to building owners could increase demand for bio-based products and stimulate market growth.

Areas of Broad Consensus

Participants generally agreed that:

- Regulatory change is moving in a direction favorable to sustainable construction products.
- Existing standards do not fully address the characteristics of innovative bio-based materials.
- New testing methods and product characteristics will be required.
- Durability and long-term performance will become increasingly important regulatory requirements.
- Building-level assessment is becoming as important as product-level certification.
- Traceability and transparency will play a growing role in future certification systems.
- Private certification can serve as a valuable interim mechanism while standards evolve.
- Carbon accounting frameworks must balance scientific rigor with practical implementation.
- Current standards need to evolve to better accommodate innovative sustainable materials.
- Durability, long-term performance, and system-level assessment should receive greater attention.
- Building-level carbon accounting will become increasingly influential.
- Faster adaptation of standards could accelerate market uptake of sustainable products.
- Voluntary certification currently provides valuable support for innovative products entering the market.

Open Questions

- How quickly can harmonized standards adapt to emerging sustainable materials?
- Should odour intensity become a standardized product characteristic for bio-based materials?
- How can system-level testing be integrated efficiently into certification pathways?
- What is the most effective balance between voluntary certification and harmonized standards?
- How can Member States accelerate implementation of embodied carbon requirements?
- What mechanisms will ensure long-term monitoring of stored carbon in buildings?
- How can traceability requirements be implemented without creating excessive administrative burdens?
- Will future regulatory frameworks adequately recognize the unique characteristics of bio-based materials?

Key Takeaways

1. Regulatory frameworks are increasingly supportive of low-carbon and bio-based construction products.
2. Existing standards often fail to capture important characteristics of innovative materials.

3. New metrics may be needed for thermal storage, durability, odour, and long-term performance.
4. System-level assessment is becoming increasingly important in certification processes.
5. The revised Construction Products Regulation significantly expands sustainability-related requirements.
6. Whole-life carbon accounting will play a growing role in construction decision-making.
7. Private certification can help innovative products gain market credibility while standards evolve.
8. Building owners are becoming central actors in carbon certification frameworks.
9. Traceability and transparency are emerging as critical regulatory requirements.
10. Faster and more flexible standardization processes could significantly accelerate sustainable construction innovation.

4.3 *EASI ZERo Academy #3 – Energy Savings in Times of Crisis: The Impact of Low-Carbon, Bio-Based Materials*

Date: May 7 (10:00 – 11:30)
Topic: Energy Efficiency, Lifecycle Assessment, Material Passports, and Market Adoption of Bio-Based Construction Materials
Number of participants: 34
Format: Expert Presentations, Case Studies, Audience Q&A, and Panel Discussion
Link: https://youtu.be/fL_CE34uTlQ?si=HNbNettVrtCoSLVm

Meeting Summary

The third EASI ZERo Academy workshop explored the relationship between energy savings, low-carbon construction materials, and sustainable renovation strategies. The session focused on how bio-based materials contribute to reducing operational energy consumption, improving building performance, and supporting climate objectives.

Speakers presented energy modelling and lifecycle assessment (LCA) results from three EASI ZERo demonstration buildings in Norway, Germany, and France. Results showed that energy savings and carbon reductions vary significantly depending on building type, renovation strategy, and local electricity mix.
Discussions also explored how environmental benefits can be communicated more effectively to the market, the role of lifecycle assessment in purchasing decisions, the value of material passports, and the barriers preventing bio-based materials from becoming mainstream construction solutions.

A recurring theme throughout the workshop was that technical solutions already exist, but wider adoption depends on supportive policy frameworks, better communication of benefits, market incentives, public

procurement, certification systems, and the ability to quantify benefits beyond simple purchase price comparisons.

Key Discussion Points

Energy Renovation and Lifecycle Assessment Results

Meritxell Rovira Antonell (Leitat Technological Center)

Presented lifecycle assessment results from three EASI ZERo demonstration buildings using EN 15804 methodology and a 50-year reference study period.

Methodology

Key elements included:

- Assessment performed at building level.
- Functional unit defined per square meter of useful floor area.
- Lifecycle stages included:
    - Use phase
    - Maintenance
    - Repair
    - Replacement
    - Refurbishment
    - End-of-life treatment
- Operational energy use incorporated into assessments.
- Analysis conducted using the ecoinvent database and EN 15804 methodology.

Norway Demonstration Building

Meritxell Rovira Antonell

Presented results from the Norwegian case study.

Baseline Scenario

Key findings:

- Operational energy use represented approximately 43% of total environmental impacts.
- Operational energy contributed approximately 30% of climate-change impacts.
- Window replacement contributed significantly to lifecycle impacts.

EASI ZERo Renovation Scenario

Renovation measures included:

- Building-integrated photovoltaics (BIPV).
- Wood-fibre insulation panels.
- Mycelium panels.

- High-performance windows.

Results:

- Operational energy demand reduced from approximately 71 kWh/m²/year to 34 kWh/m²/year.
- Contribution of operational energy impacts decreased from 43% to approximately 22%.
- Contribution to climate-change impacts fell to approximately 6%.

Key Observation

- Despite significant energy savings, overall climate-change impacts changed only marginally because Norway's electricity mix is already predominantly renewable and has a relatively low carbon intensity.

Germany Demonstration Building

Meritxell Rovira Antonell

Presented results from an office building renovation in Germany.
Renovation measures included:

- EASI ZERo windows.
- Bio-based window frames.
- Wood-fibre insulation panels.
- Mycelium insulation panels.
- Bio-based spray foam.
- Lighting improvements.

Results:

- Operational energy use reduced by approximately 71%.
- Operational energy represented 98% of baseline climate-change impacts.
- Total climate-change impacts decreased by approximately 65%.

Key Observation

- In regions with higher-carbon electricity systems, operational energy reductions have a substantially greater effect on overall environmental performance.

France Demonstration Building

Meritxell Rovira Antonell

Presented results from a French apartment building.
Renovation measures included:

- Bio-based polyurethane window frames.
- Wood-fibre insulation panels.

- Bio-based spray foam.
- Heat pump installation.

Results:

- Operational energy demand reduced by approximately 52%.
- Total climate-change impacts reduced by approximately 60%.
- Operational energy contribution fell from approximately 93% to 61% of total impacts.

Key Conclusion

- Building location and energy mix strongly influence environmental outcomes.
- The same renovation strategy can produce significantly different climate benefits depending on local conditions.

Lifecycle Assessment and Durability

Audience Question (Alberto)
Asked how lifecycle assessments account for materials with service lives shorter than the 50-year assessment period.
Meritxell Rovira Antonell
Explained that:

- Products are replaced according to their reference service life (RSL).
- Replacement cycles are fully included within the LCA.
- Additional production impacts and end-of-life impacts are also included.

Example:

- Mycelium panels with a 10-year service life were assumed to be replaced four times during the 50-year assessment period.
- Associated manufacturing, replacement, and disposal impacts were included in calculations.

Key Observation

- Durability has a significant influence on environmental assessment outcomes and must be explicitly accounted for in lifecycle calculations.

Fire Safety Considerations

Audience Question
Asked whether lifecycle assessments account for additional fire-safety barriers required by some materials.
Davide Cerra (Leitat Technological Center)
Noted that fire-safety assessment was addressed elsewhere within the EASI ZERo project and was not part of the specific work package being presented.
Meritxell Rovira Antonell
Confirmed that fire testing had been performed within the project but indicated that other project teams were better placed to provide detailed technical answers.

Discussion: Communicating Energy Savings and Environmental Benefits

Moderator Question

Ana Nanu

Asked how energy-saving benefits and lifecycle performance can be communicated more effectively to support market uptake of low-carbon materials.

Energy Efficiency as the Primary Message

Davide Cerra

Argued that the most efficient energy is the one we do not use.

Key points:

- Energy efficiency and renewable energy generation must work together.
- Reducing consumption is as important as improving energy production.
- Bio-based products should no longer be viewed as experimental technologies.
- Many solutions are already commercially available and market-ready.
- Decision-makers should evaluate products based on long-term performance rather than upfront price alone.

Key Observation

- The market conversation should move from questioning whether bio-based products work to determining which sustainable solutions perform best.

Expanding the Value Conversation Beyond Price

Ana Nanu

Reflected on findings from previous EASI ZERo Academy workshops.

Key observations:

- Initial discussions focused heavily on purchase price.
- Stakeholders increasingly recognize additional considerations such as:
    - Safety
    - Long-term savings
    - Climate resilience
    - Lifecycle costs
    - Health impacts
- Economic conditions still make upfront cost an important consideration.
- The market conversation is gradually becoming more sophisticated.

Discussion: Making Lifecycle Assessment More Relevant

Moderator Question

Ana Nanu

Asked how lifecycle assessment could become more central to purchasing decisions and market conversations.

Meritxell Rovira Antonell

Argued that environmental and economic considerations should be linked more closely.

Recommendations:

- Incentivize low-impact materials.
- Incorporate carbon-footprint criteria into public procurement.
- Increase attention to lifecycle assessment results.
- Use environmental declarations as market differentiators.

Key Observation

Lifecycle assessment should not be viewed only as a compliance burden but as a tool for demonstrating competitive advantage.

Meritxell Rovira Antonell

Added that:

- Environmental Product Declarations (EPDs) provide transparent comparisons.
- Better product comparisons can improve competitiveness and potentially increase revenue.
- Environmental performance should become part of mainstream product evaluation.

Discussion: Material Passports

Moderator Question

Ana Nanu

Asked how material passports could support decision-making and which stakeholders would benefit most.

Dina Gualandi

Explained that material passports can provide value to multiple stakeholder groups.

Benefits for Building Owners and Clients

- Greater transparency regarding material composition.
- Easier comparison between products.
- Better understanding of performance characteristics.

Benefits for Architects and Designers

- Improved information for design decisions.
- Support for future disassembly and circular construction strategies.

Benefits for Investors

- Better visibility of material-related risks.

- Improved understanding of long-term performance and liabilities.

Benefits for Occupants

- Increased transparency about products used in buildings.
- Better understanding of maintenance and replacement requirements.

Key Conclusion

- Material passports can benefit all stakeholders, although the specific information required varies by user group.

Discussion: The Future of Bio-Based Materials

Moderator Question

Ana Nanu

Asked whether bio-based materials will become increasingly important given energy, climate, and renovation challenges.

Davide Cerra

Expressed optimism but emphasized that adoption will not occur automatically.

Key observations:

- Technology readiness levels are already high.
- Many products are commercially available today.
- Market growth depends on:
  - Supportive policies
  - Incentives
  - Subsidies
  - Market-development measures

Key Message

- The challenge is no longer developing the products but creating the conditions for widespread adoption.

Discussion: Industry Responsibility and Market Transformation

Moderator Question

Ana Nanu

Asked whether the construction industry itself can accelerate adoption beyond government policy interventions.

Davide Cerra

Suggested that building certification systems can encourage uptake.

Examples:

- LEED certification.
- High-performance building standards.

- Sustainability rating schemes.

Key Observation

- Certification systems can create market incentives that encourage sustainable material choices.

Procurement and Demonstration Projects

Ana Nanu

Observed that adoption requires a combination of:

- Research and innovation.
- Policy support.
- Industry engagement.
- End-user awareness.
- Demonstration projects.

She emphasized that market transformation depends on action across multiple levels simultaneously.

Discussion: Paying More for Sustainable Products

Moderator Question

Ana Nanu

Asked whether consumers would be willing to pay more for products with lower environmental impacts.

Meritxell Rovira Antonell

Shared a personal example.

Key points:

- Chose certified low-emission paint despite higher cost.
- Health considerations influenced purchasing decisions.
- Environmental and health benefits can justify moderate price premiums.

Audience Contribution (Manish)

Reported that their company positions:

- Lower operating costs.
- Better occupant health.
- Long-term benefits.

as ways of offsetting higher upfront costs.

Key Observation

- Successful adoption depends on communicating total value rather than focusing solely on purchase price.

Discussion: Biggest Barriers to Adoption

Moderator Question

Ana Nanu

Asked participants to identify the single most important barrier preventing bio-based materials from becoming mainstream.

Davide Cerra

Identified the following primary barriers:

- Policy frameworks.
- Market conditions.
- Lack of incentives.

Arnaud JAY (CEA)

Highlighted a different challenge.

Key observations:

- Energy savings and carbon reductions can be quantified.
- Health benefits are much harder to measure.
- Many advantages of bio-based materials are difficult to express numerically.
- Lack of measurable evidence makes communication challenging.

Audience Contribution

Participants identified additional barriers:

- Lack of scale.
- Insufficient production capacity.
- Limited funding for industrial expansion.

Key Conclusion

- The challenge is not only reducing costs but also quantifying and communicating benefits that extend beyond energy and carbon savings.

Areas of Broad Consensus

Participants generally agreed that:

- Bio-based construction products are technically mature and increasingly market-ready.
- Energy savings vary significantly depending on building type and local energy systems.
- Lifecycle assessment provides valuable evidence but remains underutilized in purchasing decisions.
- Public procurement could play a major role in accelerating adoption.
- Material passports offer significant value across the construction value chain.
- Policy support remains essential for large-scale market transformation.

- Long-term benefits must be communicated more effectively.
- Cost remains important, but health, safety, environmental performance, and lifecycle value are increasingly influential.

However, there was broad agreement that:

- Lifecycle assessment should play a larger role in construction decision-making.
- Public procurement can be an effective mechanism for encouraging sustainable material use.
- Material passports can improve transparency and support informed decision-making.
- Market adoption depends on creating supportive policy and economic conditions.
- Communicating health, environmental, and long-term economic benefits is critical.

Open Questions

- How can lifecycle assessment become a more influential purchasing criterion?
- What is the most effective way to communicate environmental benefits alongside economic value?
- How can health benefits of bio-based materials be quantified more effectively?
- What incentives are most likely to accelerate market adoption?
- How should material passports be standardized across Europe?
- What role should procurement policies play in market transformation?
- How can production scale be increased while maintaining sustainability goals?
- Which certification systems are most effective at driving adoption?

Key Takeaways

1. Energy savings from sustainable renovations depend heavily on local energy systems and building characteristics.
2. Bio-based products can significantly reduce operational energy consumption and carbon emissions.
3. Lifecycle assessment demonstrates value beyond energy savings alone.
4. Durability and replacement cycles have major impacts on environmental performance calculations.
5. Material passports can improve transparency for clients, designers, investors, and occupants.
6. Public procurement is a powerful but underutilized tool for accelerating adoption.
7. Bio-based products are increasingly market-ready and no longer experimental technologies.
8. Market transformation requires supportive policy, certification, incentives, and awareness.

9. Many benefits of bio-based materials remain difficult to quantify, particularly health-related benefits.

10. The primary challenge is no longer technology development but creating the conditions for widespread market uptake.

4.4 *EASI ZERo Academy #4: Panel Discussion – From Project Outcomes to Market Uptake*

Date: May 28 (11:30 – 12:00)
Topic: Commercialisation, Certification, Market Adoption, and Scaling of Sustainable Construction Products
Format: Moderated Panel Discussion and Audience Q&A
Number of participants: 36
Moderator: Ana Nanu (BPIE)
Link: https://youtu.be/BNBXuElKdq4?si=9cwKppQS7QNYTQW5

Meeting Summary

The panel discussion focused on the transition from research and innovation to market adoption of sustainable construction products developed within the EASI ZERo project. Panelists reflected on the technical development journey of the project's products, the challenges of scaling innovations beyond laboratory environments, certification requirements, market barriers, policy needs, and future commercialization opportunities.

Participants agreed that technical innovation alone is insufficient to ensure market success. While the EASI ZERo products demonstrated strong technical performance and reached high levels of technological readiness, significant barriers remain around funding, certification costs, market acceptance, supply chains, regulatory frameworks, and stakeholder awareness.

A recurring theme throughout the discussion was that market uptake requires coordinated action across the entire value chain, including researchers, manufacturers, policymakers, certifiers, contractors, and end users. Participants emphasized that collaboration, knowledge sharing, supportive policies, financing mechanisms, and better communication of value will be critical to accelerating adoption of bio-based and circular construction materials.

Key Discussion Points

Why Market Uptake Matters
Ana Nanu (Moderator)
Opened the discussion by highlighting the urgency of transforming the construction sector.
Key observations:

- Buildings account for approximately 40% of European energy consumption.
- Buildings account for approximately 36% of greenhouse gas emissions.

- The buildings and construction sector is responsible for a significant share of global material extraction.
- The construction sector must become more circular and resource-efficient.
- Large-scale renovation targets cannot be achieved using traditional approaches alone.
- The EASI ZERo project provides an opportunity to evaluate how innovative materials can contribute to this transition.

Key Message

The challenge is no longer simply developing sustainable products but ensuring they reach widespread market adoption.

Product Development Experiences

Fraunhofer Product Development

Benedict Schug (Fraunhofer)

Outlined the three material developments led by Fraunhofer within EASI ZERo:

- Water-glass insulation foam.
- Phase Change Material (PCM) capsules.
- Bonding-on-demand adhesive additive.

Water-Glass Foam Development

Benedict Schug

Reported significant challenges during scale-up.

Key observations:

- Initial laboratory-scale results were highly promising.
- Product performance changed substantially during industrial scaling.
- Scaling difficulties prevented direct transfer of laboratory results into production.
- Alternative technical solutions had to be identified by project partners.

Key Lesson

- Successful laboratory performance does not guarantee successful industrial-scale production.

PCM Capsule Development

Benedict Schug

Described a more positive development pathway.

Key observations:

- Initial challenges related to supercooling effects.
- Product performance improved steadily over time.
- Technical issues were successfully resolved.

- Development resulted in a promising basis for future commercial products.

Key Lesson

Iterative development and continuous refinement can transform early technical challenges into successful outcomes.

Bonding-on-Demand Technology

Benedict Schug

Reported that material development itself was relatively straightforward.
However:

- Commercial deployment revealed new challenges.
- Workforce skills and training became major barriers.
- New disassembly techniques require specialized knowledge.
- Market readiness depends not only on products but also on installer capabilities.

Key Lesson

- Adoption barriers often emerge after technical development is complete.

INDRESMAT Product Development

Ashwinikumar Sharma (INDRESMAT)

Presented INDRESMAT's two main EASI ZERo innovations:

- Bio-based polyurethane spray foam insulation.
- Bio-based window frame systems.

Bio-Based Spray Foam Development

Ashwinikumar Sharma

Identified spray foam development as the project's most challenging product-development effort.

Key observations:

- Conventional fossil-based spray foams already perform well.
- Replacing fossil-derived ingredients with bio-based alternatives required extensive reformulation.
- Laboratory-scale success did not immediately translate to real-world manufacturing conditions.
- Equipment compatibility became a major challenge.
- Multiple rounds of reformulation and testing were required.
- Large material quantities were needed for each industrial-scale trial.

Key Lesson

- Scaling sustainable materials requires substantial iterative testing under real manufacturing conditions.

Bio-Based Window Frames

Ashwinikumar Sharma

Reported a smoother development process.

Key observations:

- Existing market experience with conventional window frames provided valuable knowledge.
- Prior certification frameworks simplified development.
- Existing technical know-how reduced uncertainty.

Key Lesson

- Innovation pathways are easier when comparable products already exist in the market.

Overall Reflection

Ashwinikumar Sharma

Expressed confidence that the final spray foam product:

- Has been thoroughly tested.
- Performs successfully in practical applications.
- Is capable of competing with fossil-based alternatives.

Barriers to Market Adoption

Moderator Question

Ana Nanu

Asked what factors create the largest gap between successful technical development and actual market adoption.

Cost as the Primary Barrier

Thelia Konstantinou

Identified cost as the most significant market barrier.

Key observations:

- Sustainable products often face higher upfront costs.
- Adoption frequently depends on personal environmental motivation.
- Environmentally conscious customers remain a minority market segment.
- Larger markets and increased production volumes could reduce prices over time.

Key Conclusion

- Price remains one of the strongest determinants of adoption decisions.

Availability and Supply Constraints

Thelia Konstantinou

Highlighted potential supply-chain limitations.

Key observations:

- Some sustainable products rely on finite waste streams.
- Future market growth may create resource constraints.
- Sustainable scaling requires careful resource management.
- Circular solutions must avoid creating new environmental pressures.

Key Conclusion

- Scaling must be achieved without compromising sustainability objectives.

Psychological and Cultural Barriers

Thelia Konstantinou

Observed that unfamiliarity creates resistance among both professionals and end users.

Examples:

- Concerns about mycelium-based products.
- Misconceptions regarding biological materials.
- Uncertainty about durability and safety.

Key Observation

- Market acceptance requires trust, familiarity, and real-world examples.

Regulatory Challenges

Thelia Konstantinou

Noted that regulatory drivers remain stronger for new buildings than for renovation projects.

Key observations:

- New construction increasingly faces carbon-performance requirements.
- Renovation projects often face fewer environmental obligations.
- Lack of regulatory pressure reduces demand for sustainable renovation materials.

Key Conclusion

- Policy frameworks have not yet created equivalent incentives for renovation markets.

Certification and Standardization

Do Standards Help or Hinder Innovation?

Ana Nanu

Asked whether standards facilitate or obstruct market entry for innovative products.

Marina Stipetic

Responded that standards can act as both enablers and barriers.

Benefits include:

- Providing market confidence.
- Defining product requirements.
- Establishing performance benchmarks.
- Creating pathways toward certification.

Challenges include:

- Existing standards may not fully accommodate innovative materials.
- New products often require additional testing and validation.
- Certification can be costly and time-consuming.

Key Observation

- Standards are essential but must evolve alongside innovation.

Learning from Comparable Products

Marina Stipetic

Suggested that developers should study existing standards and similar products.

Benefits include:

- Understanding certification requirements.
- Identifying missing performance characteristics.
- Reducing development risks.
- Accelerating market entry.

Key Conclusion

- Knowledge sharing can significantly improve commercialization pathways.

Regulatory Improvements

Marina Stipetic

Highlighted positive developments within the revised Construction Products Regulation (CPR).

Key observations:

- Standardization processes are expected to become more flexible.
- Updates to standards should occur more rapidly.
- Innovation may reach certification pathways more quickly than under previous systems.

Key Conclusion

- Recent regulatory reforms may reduce historical delays in standardization.

EASI ZERo Product Certification Outlook

Marina Stipetic

Explained that certification complexity depends on product maturity.
Products with:

- Existing testing experience.
- Similarity to established products.
- Existing market precedents.

will generally face easier certification pathways.
More novel products may require:

- Additional testing.
- New performance metrics.
- Greater market familiarization.

Key Conclusion

- Higher innovation often requires more extensive certification efforts but may also create stronger market differentiation.

What Needs to Change?

Funding and Scale-Up Support

Ashwinikumar Sharma

Identified funding as the single most important factor for future market uptake.

Key observations:

- Products have reached advanced technology readiness levels.
- Additional investment is needed for industrial scaling.
- Small and medium-sized enterprises often lack resources for commercialization.
- Scale-up activities require substantial financial support.

Key Message

- Innovation funding should extend beyond research into commercialization and industrial deployment.

Research–Industry Cooperation

Benedict Schug

Highlighted institutional challenges faced by research organizations.

Key observations:

- Research institutes cannot directly commercialize products.
- Successful market uptake depends on industrial partnerships.

- Legal and administrative processes can complicate technology transfer.

Key Message

- More effective mechanisms are needed to connect research outputs with commercial deployment.

Creating Circular Economic Incentives

Thelia Konstantinou

Argued that economic systems should better reward circular practices.

Suggestions included:

- Waste reduction targets.
- Circularity incentives.
- Resource-efficiency requirements.
- Economic mechanisms that increase the value of waste reuse.

Key Observation

- Current market structures often fail to reward circular business models adequately.

Collaboration Among SMEs

Marina Stipetic

Highlighted challenges faced by small and medium-sized enterprises.

Key observations:

- Certification costs are often burdensome.
- New regulatory requirements continue to increase complexity.
- Individual SMEs frequently lack sufficient resources.

Recommendations:

- Establish testing and certification clusters.
- Create collaborative working groups.
- Share expertise and resources.
- Develop collective responses to new regulations.

Key Conclusion

- Collaboration can reduce costs and accelerate certification and market access.

Audience Q&A

Industry Collaboration and Certification

Audience Member

Referenced discussions at the European Construction Technology Platform (ECTP) conference and asked about examples where industries collaborate to achieve certification.

Marina Stipetic
Provided the example of the brick industry.
Key observations:

- Similar manufacturers often face identical certification challenges.
- Collaboration can support:
    - Standardization efforts.
    - Testing activities.
    - Compliance with new regulatory requirements.
    - Insurance validation.
- Joint action can reduce costs and accelerate certification processes.

Key Message

- Collective industry action can significantly improve market access for innovative products.

Communication and Market Education

Ana Nanu
Highlighted the importance of communication and education in supporting adoption.
She introduced an upcoming **EASI ZERo guidebook** intended to address common misconceptions regarding bio-based products, explain product value beyond upfront cost, present key performance characteristics and provide accessible information for non-research audiences.

Areas of Broad Consensus

Participants generally agreed that:

- Technical readiness alone does not guarantee market uptake.
- Cost remains one of the largest barriers to adoption.
- Certification and standardization remain essential for market acceptance.
- Supply-chain availability and scalability must be considered early.
- Greater collaboration is needed among SMEs, researchers, and industry actors.
- Market education and communication are critical for adoption.
- Circular economy incentives could strengthen demand for sustainable products.
- Policy frameworks can significantly influence commercialization success.
- Additional funding is needed to bridge the gap between research and commercialization.
- Collaboration among SMEs could reduce certification and compliance burdens.
- Improved communication is needed to increase market confidence in bio-based products.

- Standardization systems should become faster and more responsive to innovation.
- Circular economy incentives and supportive policies could accelerate adoption.

Open Questions

- How can commercialization funding be expanded beyond research and development stages?
- What mechanisms can accelerate technology transfer from research institutes to industry?
- How can certification costs be reduced for SMEs?
- What policy measures would most effectively stimulate demand for sustainable renovation materials?
- How can misconceptions around bio-based materials be addressed?
- What circular economy incentives would most effectively support market growth?
- How can supply-chain resilience be maintained as demand for sustainable products increases?
- What forms of industry collaboration could accelerate certification and standardization?

Key Takeaways

1. The EASI ZERo products have reached strong levels of technical maturity but still face commercialization challenges.
2. Scaling from laboratory success to industrial production remains a major hurdle.
3. Cost continues to be the most significant market barrier for sustainable materials.
4. Certification is essential but can be expensive and time-consuming, particularly for SMEs.
5. Regulatory reforms may help accelerate future standardization processes.
6. Market adoption depends on trust, familiarity, and real-world examples.
7. Funding is needed not only for research but also for industrial scale-up and commercialization.
8. Collaboration between industry, researchers, and certifiers can reduce barriers and accelerate uptake.
9. Circular economy incentives could improve the competitiveness of sustainable materials.
10. Communication, education, and accessible information are crucial for increasing market confidence and adoption.