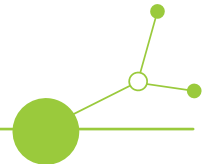


# D.2.1.1. - INNOVATIVE CIRCULAR AND DIGITAL SOLUTIONS FOR CONSTRUCTION SECTOR IN CE



POR  
Version 2.0  
23.03.2025





## Vsebina

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## Introduction

Activity 2.1 (Community-based innovation and co-creation for circular and digital construction) of the Interreg CE ReBuilt project aims to develop/upgrade new circular solutions for construction through open innovation events, including:

- innovation cafés,
- hackathons - called circathons in this activity, and
- community-based innovation events.

The activity aims to foster collaboration between students, early-stage experts, and innovators from across the construction sector to develop or improve circular solutions. These events address specific challenges related to eco-design, digital solutions, upcycled Secondary Raw Materials (SRM), reuse, and more.

This report focuses on the first part of activity 2.1 and is an overview of the three Innovation Cafés that were focusing on up-scaling and market penetration of already existing innovations (whereas circathons centered around guided processes where participants developed new ideas, transforming them from initial concepts into business opportunities). The events were held online, engaging a diverse audience from different countries in the programme area.

The Innovation Café events were following Methodology for Open Innovation Events: Innovation Cafés and Circathons (Methodology), prepared by the project partner POR in October 2024, and were organized by three country groups, where each group organised one event:

Group 1: Austria, Hungary, Poland - event on 06. 03. 2025.

Group 2: Germany, Slovenia, Croatia - event on 14. 03. 2025.

Group 3: Slovakia, Italy, Czech Republic - event on 04. 03. 2025.

The events dismantled traditional silos, fostering the co-creation of ideas to address critical challenges in the construction industry, particularly in sustainability and the circular economy. They focused on reducing waste, enhancing resource efficiency, and promoting sustainable construction practices. International collaboration enabled participants to exchange knowledge, identify best practices across borders, and accelerate the scaling of innovations.

The methodology also included reporting templates that country group leaders used to report about the Innovation café events in a structured manner and document the outcomes of each event. This structured documentation ensures that promising ideas will not be lost and can be supported in future Rebuilt project phases (i.e., through further activities of WP2).



Within this document, we will first briefly present the Methodology, then provide reports for each of the three Innovation Cafés that were prepared separately by country groups. Instead of a conclusion, we will briefly analyse the adherence to the methodology and provide final conclusions.

## 1. About Innovation Cafés Methodology

Below, we summarize the main steps from the Methodology for the Innovation Cafés, as prepared by project partner POR. Project partners were asked to adhere to it in the preparation, implementation, and post-implementation phases of organizing the Innovation cafés.

The Innovation Café is an interactive and engaging event that fosters collaboration and innovation among 16-24 participants. Its primary objective is to promote joint cooperation for scaling and market penetration of circular innovations in construction.

Key steps of organising the Innovation café:

### 1. Selection of Innovations

- All country groups together needed to identify at least ten promising innovations (3-4 per event) that address sustainability challenges in construction.

### 2. Curating Participants

- Engage a diverse mix of stakeholders, including industry professionals, innovators, researchers, policymakers, and other curious people.
- Provide pre-event briefing materials to participants for effective discussions.

### 3. Designing the Event Agenda

- Structure the event with clear goals, focusing on how each innovation can benefit from collaboration.
- Include presentations, discussions, and possibly breakout sessions to explore business development, technical improvements, and market strategies.

### 4. Preparing Presenters

- Guide innovators to effectively present their solutions, covering key aspects such as market potential, scalability challenges, and collaboration opportunities.

### 5. Setting Up the Platform

- Ensure technical readiness for smooth online event execution with tech support available.

### 6. Event Promotion

- Target relevant stakeholders and highlight networking and collaboration opportunities.



## 7. Post-Event Reporting

- Document discussions, key insights, and collaboration opportunities for further development.

The following event structure was proposed within the Methodology:

1. **Kick-Off & Introductions (15-20 min)** - Welcome participants, introduce objectives, and facilitate networking.
2. **Innovation Presentations (50-60 min)** - Innovators showcase their solutions, highlighting challenges and opportunities.
3. **Q&A & Discussions** - Open discussions or breakout sessions to explore market scaling, partnerships, and technical improvements.
4. **Wrap-Up & Conclusion (10-15 min)** - Summarize key insights and define next steps for collaboration.

Additionally to the Methodology, as some project partners had issues assuring the innovators, and innovators had multiple questions before they committed to the process to present and co-create at the innovation event, separate Instructions for Innovators were prepared, also by project partner POR (see below).

### ■ Innovation Cafés – Instructions for Innovators

As part of the Interreg CE ReBuilt Project, titled *Circular and Digital Renewal of Central Europe's Construction and Building Sector*, ReBuilt project partners aim to enhance and scale up circular solutions within the construction sector. This will be achieved through collaborative co-creation processes using the **Innovation Café methodology**.

#### Why Participate in the Innovation Café?

By presenting your product, service, or idea at an Innovation Café, you will:

- Receive valuable guidance, advice, and insights from industry experts, decision-makers, and researchers.
- Learn from lessons shared by seasoned professionals.
- Gain the opportunity for further support in value chain creation and business modeling for selected innovations in 2025.
- Be invited to a 2025 event where ReBuilt consortium partners will assist innovators in securing crowdsourcing and funding opportunities (for selected innovations).

There is no cost to participate—only your time.

#### What to Expect at the Innovation Café

The event will be held online in February or March 2024. During the event:

1. 3-4 innovators will present their innovations in a **10-15 minute pitch** (in English) to a panel of transnational experts.
2. A Q&A and discussion session will follow, providing opportunities for feedback and dialogue.
3. The event will conclude with a **Wrap-Up and Conclusion**.



### Key Components of Your Pitch

Your pitch should cover the following aspects:

1. **Introduction**
2. **Problem Being Addressed**
3. **Proposed Solution**
4. **Technology/Process/Services Involved**
5. **Business Model and/or Sustainability Impact**

Additionally, please emphasize:

- The readiness of your innovation for scaling.
- The barriers or challenges you are currently facing.
- How Innovation Café participants can contribute to the development of your innovation (please specify areas where collaboration would be most beneficial).

### Preparing Your Presentation

We ask you to prepare a **PowerPoint presentation** to support your pitch. A PowerPoint template is attached, covering the key components outlined above. Your presentation will be shared with the expert participants prior to the event, ensuring they are well-prepared to provide meaningful feedback.

Let's collaborate to develop stronger, more impactful ideas.



## 2. Innovation Café Group 1: Austria, Hungary, Poland

### 2.1. Event overview

The event, a workshop on Innovative circular and digital solutions for construction in Central Europe, took place on Thursday, 06. 03. 2025, 10:00 - 12:00, and was implemented online via Zoom.

The countries involved in the organisation were Austria, Hungary, and Poland, and the partners were the Technical University of Vienna, BURST, Vas County Government Office, and the Institute for Ecology of Industrial Areas.

The event was attended by a total of 20 participants, including 3 innovators, 8 project partners and 9 guests.

Krisztina Rimányi from Vas County Government Office welcomed the participants of the first Innovation Café, which is part of the Interreg CE ReBuilt project, which she briefly characterized. Then she introduced the innovators and the topics of their presentations - Alexander Ebert presenting fire resistance of hemp-based insulation materials, Krisztián Méhes presenting concrete additive to replace gravel/sand with mixed shredded waste and Leszek Majewski presenting the product RecykloFiber - insulation board from waste materials. Krisztina Rimányi encouraged the participants to engage in the discussion and share their observations throughout the event.

### 2.2. Innovation Presentations

During the event, 3 innovations were presented, 1 from each country.

These innovations are:

#### 2.2.1. Hempstatic GmbH (Austria); Fire resistance in hemp-based insulation materials

Hempstatic has developed bio-based acoustic panels that aim to improve sustainability in the construction industry: hempcrete acoustic panels that absorb CO<sub>2</sub>, are free of harmful substances, and promote a healthy indoor environment. Fire protection was a key topic of the workshop, showing how sustainable materials can meet modern safety standards while contributing to healthier and more environmentally friendly building solutions.

**Key Focus Area:** reusability, repairability, remanufacturability, and regeneration

**Presenter:** Alexander Ebert; R&D Associate

**Key Discussion Points:** Hempstatic's main activity is to develop a biodegradable hemp insulation for soundproofing. Their new product, a facade element with thermal insulation properties and improved fire



resistance, aims to create new bio-based materials segments and accelerate the construction industry's decarbonization. The presenter sought expert input on performance parameters for fire-rated facade panels and testing methods for risk assessment and mitigation during the product development stage. Enhancing the fire resistance of their panels is a crucial component in the construction industry. The project focuses on using waste residues from thermal waste treatment and construction industries to pre-treat hemp shives, which are then formed into panels to increase fire resistance. The current panel thickness is 4 cm, with plans to conduct fire testing to see how they react to fire. Leszek Majewski, (Warsaw Institute of Technology) suggested sharing experiences on fire protection of materials, specifically regarding the dilemma of maintaining good thermal insulation with improved fire resistance.

The discussion point was the use of gypsum to enhance fire resistance, considering it for the hemp products. The participants also explored small-scale testing methods for fire resistance, noting the high costs associated with large-scale testing. Bojan Poletanovic (TUW) suggested possibly focusing on the treatment of shives rather than material addition, and Alexander Ebert confirmed they are considering building a small testing box. The potential for future cooperation with other institutes, including the TUW, was also discussed.

#### ***Potential for Market Scaling:***

- Growing demand for eco-friendly building materials presents a strong market opportunity;
- Potential to collaborate with green building certification bodies (e.g., LEED, BREEAM) to gain industry acceptance;
- Expansion possibilities into European markets with high sustainability standards, such as Germany and Scandinavia;
- Fire safety regulations need to be addressed through continued testing and adaptation to local building codes.

#### **2.2.2. MAKrópa Kft. (Hungary); Concrete additive to replace up to 100% gravel/sand with mixed shredded waste**

WLC is an additive used to build concrete from mixed solid waste, such as plastic, glass, polystyrene, and mixed waste. Because of its porous structure, WLC concrete can be fire—and heat-transfer proof. It is also effective at absorbing sound waves, resisting shocks, and being recyclable.

***Key Focus Area:*** SRM

***Presenter:*** Krisztián Méhes; Director

***Key Discussion Points:*** WLC (Waste Light Concrete), is a technology that converts waste into an ingredient for concrete, replacing up to 100% of the gravel and sand with shredded waste materials. The process can use various types of waste, including plastics, glass, car tires, and agricultural waste, with an ideal particle



size of 5-10 mm. WLC is not structural but can be used for filling, building walls, sub-layers of roads, and other non-load-bearing applications. The company is seeking partners to identify local waste problems and implement the technology to help eliminate landfill waste and create more sustainable construction materials.

Krisztián Méhes discussed the challenges in the Hungarian waste management sector, including the centralization of waste management and the takeover by the National Oil Company of Hungary (MOL). He highlighted the need for a small project to demonstrate the potential of recycling waste into concrete products and the legal hurdles faced in handling waste. Eszter Kun (BURST) and Bojan Poletanovic contributed to the discussion, with Bojan Poletanovic questioning whether the patent covering waste treatment was broad enough to prevent copying.

Saša Fluher (POR) asked if the company is looking for municipalities or governments to use their waste to build public buildings. Krisztián Méhes confirmed this, adding that they were also open to projects in other countries. The company is open to both local or international projects, they currently have projects in Mexico and Hungary. The main benefits for the end user are that the product could potentially be cheaper and have lower CO<sub>2</sub> emissions. They have a pilot project ready, a sample road in Hungary that has withstood heavy use.

***Potential for Market Scaling:***

- Municipal interest in reducing landfill waste provides a strong entry point for pilot projects;
- Potential applications in non-load-bearing structures and road infrastructure create diverse market opportunities;
- Expansion into international markets where waste reduction policies are driving demand for innovative construction materials;
- Requires overcoming regulatory barriers in different countries to streamline material approval processes.

### 2.2.3. Warsaw Institute of Technology (Poland); Insulation board from textile waste

RecykloFiber is an innovative insulation board, created for thermal and acoustic insulation for construction. It uses fibers from the processing of textile waste, waste paper and biomass, combined with a special structural binder.

***Key Focus Area:*** SRM

***Presenter:*** Leszek Majewski; researcher

***Key Discussion Points:*** The Warsaw Institute of Technology successfully uses recycled fibres from textile waste and industrial by-products in the building industry. These fibres offer an innovative alternative to common insulation materials like mineral wool and Styrofoam. They encounter challenges and potential



solutions while developing this recycled material, particularly in achieving fire resistance without compromising its insulation properties. The next steps involve further refining the processing technology and scaling up production.

Textile waste for insulation can be used in smaller buildings, driven by the growing demand for environmentally friendly materials.

They need resource management and legalisation in the Polish market. Challenges that it includes a wide variety of raw materials and the need for a universal process to use mixed materials. The Institute is open to partnerships and further discussions on potential cooperation. Daniella Mehanni (TUW) added that the Waste Framework Directive could influence textile waste collection and the resulting waste streams.

The challenges of processing textile waste were discussed, including the difficulty of identifying the type of material and the need for technology that can handle various types of waste. They have an ongoing collaboration with a Polish company that processes recycled materials for thermal installations. The importance of cost and sustainability in their approach was also highlighted, including the use of water as a binder in the product. Alexander Ebert (Hempstatic) suggested the potential for integrating pre-treatment steps in the production process to enhance fire resistance. Daniella Mehanni (TUW) agreed on it, noting the importance of balancing various parameters in product design.

#### ***Potential for Market Scaling:***

- Growing market demand for sustainable insulation materials presents a significant opportunity;
- Need to establish supply chain partnerships for sourcing consistent textile waste streams;
- Interest from small-scale builders and green construction firms could drive early adoption;
- Potential collaborations with industry partners to scale production and meet large-scale commercial needs.

The formal presentations were followed by a discussion and analysis of common challenges.

The Innovation Café **concluded** with Saša Fluher (POR) asking participants about gender balance and digitalization in their projects for evaluation purposes. Alexander Ebert (Hempstatic) reported a balanced gender representation in his start-up, while Krisztián Méhes (MAKrópa) and Leszek Majewski (Warsaw Institute of Technology) acknowledge less diversity in their teams. Regarding digitalization, responses vary from basic digital tools to more advanced technological aspirations.

As **closure**, Krisztina Rimányi (Vas County) emphasized the value of diverse insights from different countries and generations, and expresses hope for continued collaboration among the innovators.



## 2.3. Collaborative Outcomes

### Key synergies identified:

- a) **Cross-sector collaboration:** The event facilitated knowledge exchange between academia, start-ups, and government entities, promoting innovative solutions in sustainable construction.
- b) **Material innovation:** Common themes across innovations included the use of secondary raw materials (SRM) such as hemp, textile fibres, and mixed waste to improve sustainability.
- c) **Fire resistance and safety considerations:** All three innovations faced challenges related to fire safety, highlighting the need for shared testing methodologies and knowledge-sharing in fire resistance improvements.
- d) **Legal and regulatory challenges:** Innovators from Hungary and Poland noted significant hurdles in waste material classification and regulatory approval processes, underscoring the need for policy advocacy.

### Suggestions for upscaling or market entry:

- a) **Hempstatic GmbH (Austria):**
  - Collaborate with fire safety institutions to refine fire-resistant treatment methods;
  - Establish partnerships with architectural firms and construction companies to integrate hemp-based panels into sustainable building projects;
  - Explore EU funding opportunities for pilot testing and certification.
- b) **MAKrópa Kft. (Hungary):**
  - Initiate pilot projects with municipalities to showcase the benefits of WLC technology in public infrastructure;
  - Develop partnerships with waste management firms to ensure a consistent supply of shredded waste materials;
  - Address regulatory challenges by engaging with policymakers to push for SRM-friendly legislation.
- c) **Warsaw Institute of Technology (Poland):**
  - Scale up production by collaborating with textile and recycling industries;
  - Conduct further testing to improve fire resistance while maintaining insulation properties;
  - Seek partnerships with Polish and EU-level policy makers to facilitate market entry.



#### Next steps for each innovation:

**a) *Hempstatic GmbH:***

- Conduct small-scale fire resistance tests;
- Explore gypsum integration;
- Pursue research collaborations with Warsaw Institute of Technology.

**b) *MAKrópa Kft.:***

- Develop a demonstration project in Hungary;
- Seek partnerships with municipalities;
- Work on patent protection against competition.

**c) *Warsaw Institute of Technology:***

- Refine processing technology for textile-based insulation;
- Collaborate with potential manufacturers;
- Advocate for clearer waste processing regulations.

These collaborative outcomes set the foundation for further research, market validation, and eventual commercialization of innovative sustainable construction materials.

## 2.4. Conclusion

The Innovation Café successfully facilitated the exchange of ideas and expertise among participants, highlighting key challenges and opportunities in sustainable construction.

#### Key Takeaways:

- Material innovation is a priority: The use of secondary raw materials in insulation and concrete solutions showcased the industry's move toward circularity.
- Regulatory barriers need to be addressed: Each innovation faces distinct but significant legal and market-entry challenges, requiring policy engagement and strategic partnerships.
- Fire safety remains a common challenge: Ensuring compliance with fire resistance standards is a key issue that all innovators must address to achieve market scalability.
- Collaborative efforts are essential: Cross-border cooperation between research institutions, businesses, and policymakers will be critical in driving these innovations toward commercial success.



- By leveraging the synergies identified in this event, the innovators and stakeholders can take concrete steps toward implementing these sustainable construction solutions on a larger scale.

## 2.5. Annexes

### Annex 1: Invitation and agenda



Co-funded by  
the European Union





### INVITATION

to the online workshop

**Innovative circular and digital solutions for construction in Central Europe**

**WHEN: Thursday, 06. 03. 2025, 10:00 - 12:00**

Online implementation via [ZOOM](#).

Dear innovators, industry professionals, decision - makers, researchers, policy expert and other curious people.

All ReBuilt stakeholders are cordially invited to join the workshop Innovative circular and digital solutions for construction in Central Europe, which will present selected innovations covering the broad framework of the circular economy, with a focus on different materials, technologies and approaches to sustainable construction.

The purpose of the Innovation Cafe (iCafe) is to encourage and empower people to innovate and collaborate to scale innovations and support market penetration of presented circular solutions in the construction sector.

With us will be:

- ➔ **Hempstatic GmbH**; Fire resistance in hemp-based insulation materials.  
"Hempstatic is revolutionizing the construction industry with their bio-based innovation: hempcrete acoustic panels that absorb CO<sub>2</sub>, are free of harmful substances, and promote a healthy indoor environment. Fire protection will be a key focus in the upcoming workshop, showcasing how sustainable materials can meet modern safety standards while contributing to healthier and more eco-friendly building solutions."
- ➔ **MAKrópa Kft.**; Concrete additive to replace up to 100% gravel/sand with mixed shredded waste.  
"WLC is an additive to build concrete from mixed solid waste like mixed plastic, glass, polystyrene, mixed waste. WLC concrete can be fire- and heat-transfer proof, because of the porous structure, it's good at absorbing sound waves, resists shocks and is recyclable."
- ➔ **Warsaw Institute of Technology; RecykloFiber** - Insulation Board from Waste Materials  
"RecykloFiber is an innovative insulation board, created for thermal and acoustic insulation for construction. It uses fibers from the processing of textile waste, waste paper and biomass, combined with a special structural binder."

## AGENDA



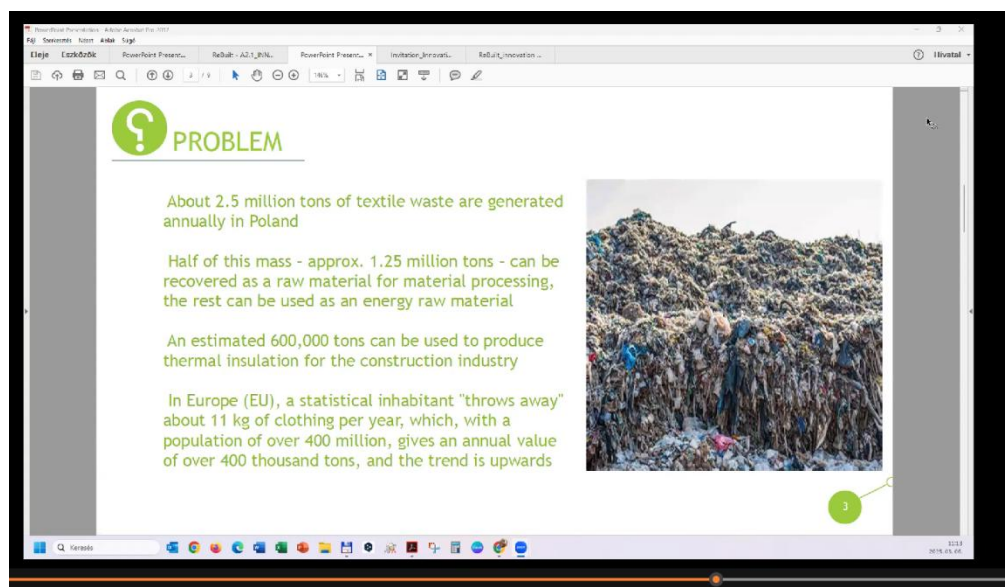
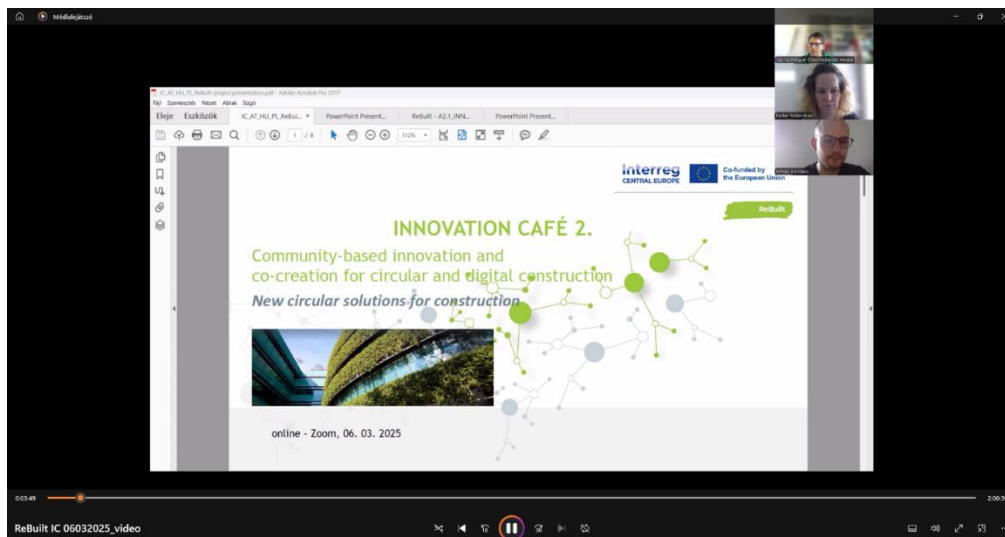
Co-funded by  
the European Union



| Time          | Content                                                                                              | Presenter                                         |
|---------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 10:00 - 10:05 | Welcome and short introduction                                                                       | Krisztina Rimányi<br>Vas County Government Office |
| 10:05 - 10:15 | Introductory round                                                                                   | All participants                                  |
| 10:15 - 10:25 | <b>Hempstatic GmbH</b><br>Fire resistance in hemp-based insulation materials                         | Alexander Ebert<br>R&D Associate at Hempstatic    |
| 10:25 - 10:40 | Q&A / discussion                                                                                     | Bojan Poletanovic, TU Wien<br>All participants    |
| 10:40 - 10:50 | <b>MAKrópa Kft.</b><br>Concrete additive to replace up to 100% gravel/sand with mixed shredded waste | Krisztián Méhes<br>MAKrópa Kft.                   |
| 10:50 - 11:05 | Q&A / discussion                                                                                     | Eszter Kun, BURST<br>All participants             |
| 11:05 - 11:15 | Coffee break                                                                                         |                                                   |
| 11:15 - 11:25 | <b>Warsaw Institute of Technology</b><br>RecykloFiber - Insulation Board from Waste Materials        | Leszek Majewski<br>Warsaw Institute of Technology |
| 11:25 - 11:40 | Q&A / discussion                                                                                     | Daniella Mehanni, TU Wien<br>All participants     |
| 11:40 - 12:00 | Final discussion<br>Wrap-up and conclusions                                                          | All participants                                  |



## Annex 2: Screenshots





Workplace Meeting Krisztian Mehcs's screen Sign in Recording... EN View

## INTRODUCTION

- Waste Light Concrete (WLC)
- 300+ waste mixes tested
- Composite plastics, cigarette buds, wood, glass, polystyrene, PVC...
- Roads, pavements, objects built
- Production permit for WLC additive, road substrate (CKT) and insulating blocks in hand
- Multiple international awards
- Laboratory tested
- Industry tested
- NATO shooting range tested
- Based in Hungary

Participants (19)

Find a participant

|                                     |            |  |  |
|-------------------------------------|------------|--|--|
| Vas Vármegyei Ö...                  | (Host, me) |  |  |
| Krisztian Mehcs                     |            |  |  |
| Eszter Fodor-Kun                    |            |  |  |
| AjdaPiršZidar                       |            |  |  |
| Alexander Ebert                     |            |  |  |
| Bojan Poletanovic (TU Wien / Str... |            |  |  |
| Branko Kosi                         |            |  |  |
| Daniella Mehanni - TU Wien          |            |  |  |
| Ewa Cimander-Staszak (IETU)         |            |  |  |
| Juž Kimovec                         |            |  |  |
| Leszek Majewski                     |            |  |  |
| LiljanaPešut                        |            |  |  |
| Luka Žurman                         |            |  |  |
| Marek Matejczyk (IETU, Poland)      |            |  |  |
| Mihály Kondacs                      |            |  |  |

Invite Mute all

Audio Video Participants Chat React Share Host tools AI Companion Apps Pause/stop recording More End

Keresés

HUN 10:57 2025.03.06.



## 3. Innovation Café Group 2: Germany, Slovenia, Croatia

### 3.1. Event Overview

The event - a workshop for Innovative circular and digital solutions for construction in Central Europe took place on **Friday, 14. 03. 2025, 10:00 - 12:00** and was implemented **online**, via **Teams**.

This was the innovation café for the country group Slovenia, Croatia and Germany, and the following organisations were involved in the organisation of the café: Slovenian National Building and Civil Engineering Institute, Chamber of Commerce and Industry of Štajerska, Nigrad, civil engineering company, d.o.o., POR Consult, Projects of Sustainable Development, d.o.o. (POR), and Munich University of Applied Sciences MUAS

The event was attended by a total of 41 participants, including 3 innovators, project partners and guests.

Saša Fluher, POR, welcomed participants to the third Innovation Café, part of the Interreg CE ReBuilt project involving nine countries. Saša Fluher facilitated introductions among the participants, emphasizing the diverse expertise present at the Innovation Cafe. The session featured presentations from Felix Wiese on a software tool for concrete plants, Dr. Shivakumar Mani on hempcrete noise barriers, and Dr. Maida Paulin on alkali-activated pavements. Participants were encouraged to engage and share their insights throughout the event.

### 3.2. Innovation Presentations

During the event, 3 innovations were presented.

These innovations are:

#### 3.2.1. BETTER CONCRETE, Software tool for concrete plants

Software tool that enables cheaper and more sustainable concrete production for ready-mix concrete manufacturers, saving cement by optimising packing density in concrete plants and producing CO2 reduced concrete.

**Key Focus Area:** software, web-based interface, concrete plants, packing density, pilot projects, Business model, partnerships with ready-mix concrete plants

**Presenter:** Felix Wiese (Civil Engineer)



### Key Discussion Points:

The discussion centred around the development and adoption of "Better Concrete," a software solution aimed at reducing cement usage in concrete production by optimizing packing density. A major concern highlighted was the significant CO2 emissions from cement production, which surpass those of the aviation industry due to the massive scale of concrete manufacturing. The software's ability to optimize material composition to minimize cement content without compromising quality presents both an environmental and economic advantage, particularly as cement prices continue to rise. However, a critical challenge is the absence of a user-friendly interface, which is necessary for seamless integration into concrete plants' existing systems. The team acknowledged the need for external expertise to develop a web-based application and is seeking funding to facilitate this. Additionally, industry engagement was discussed as a key hurdle, with the team struggling to establish direct connections with ready-mix concrete plants for pilot testing. Suggestions were made to attend industry fairs and collaborate with circular funding initiatives to gain exposure and credibility. Another point of discussion was the potential expansion of software functionality, including features to calculate CO2 savings and cost reductions, making the solution more attractive to users. There was also consideration of alternative business models, such as revenue-sharing based on the cost savings realized by concrete plants, to further incentivize adoption. The conversation concluded with a strong emphasis on partnerships, industry networking, and refining the product to align with market needs.

### Potential for Market Scaling:

The market for "Better Concrete" has significant scalability potential due to the sheer volume of concrete production globally. Even small reductions in cement usage can have a profound environmental and economic impact. With rising cement costs, concrete producers are incentivized to adopt efficiency-driven innovations. Additionally, regulatory trends favouring sustainable building materials create a favourable environment for adoption. By refining the software's usability and expanding features, such as cost and CO2 savings tracking, and revisiting the business model, the solution could attract a broader customer base, including sustainability-focused firms and policymakers.

### Next steps for innovation:

- Felix Wiese will seek funding to develop a user interface and website for the Better Concrete software.
- Alenka Mauko will follow up with Felix Wiese regarding potential collaboration with concrete plants that utilize recycled aggregates.
- Felix Wiese should Attend industry fairs and leverage networking opportunities to build strategic relationships.
- Felix Wiese to integrate cost and CO2 savings tracking to enhance user appeal.



- Felix Wiese to explore alternative pricing strategies, such as revenue-sharing based on cost savings.
- Mateja Simčič will send information about upcoming circular funding fairs to Felix Wiese to facilitate his participation.

### 3.2.2. CoGreen d.o.o., Novel Highway/Railway Hempcrete Noise Barriers (NoHiRiNoise)

**Development of a highway noise barrier made of hempcrete, which is environmentally friendly, recyclable and has a lower embodied energy for a longer service life.**

**Key Focus Area:** noise barriers, Carbon Sequestration, durability, fire resistance, and cost-effectiveness, international partnerships and legislative pathways

**Presenter:** Dr Shivakumar Mani, (R&D Engineer-CoGreen d.o.o)

#### **Key Discussion Points:**

Dr. Shivakumar Mani's presentation centred around innovative hempcrete noise barriers for highways and railways, emphasizing their environmental benefits, sustainability, and efficiency in noise reduction. Traditional noise barriers made of concrete, steel, aluminium, and wood contribute significantly to carbon emissions and have limitations in noise absorption. The hempcrete alternative developed by CoGreen integrates hemp, lime, and water to create a lightweight, eco-friendly barrier that provides better sound absorption, lower embodied energy, and enhanced breathability.

A key aspect of the discussion was the carbon sequestration potential of hempcrete, which helps mitigate global warming. While life cycle analyses have been conducted in the past, further studies are needed to validate the sequestration claims. The barriers are designed with a density of 300 kg/m<sup>3</sup>, capable of reducing noise levels by 45-50 dB, and are optimized for low- to medium-cost production compared to conventional barriers.

Following Dr. Shivakumar Mani's presentation a detailed discussion took place focusing on several critical aspects.

One of the key discussion points raised was regarding the carbon sequestration data presented by Dr. Shivakumar Mani. Alenka Mauko inquired about how the CO<sub>2</sub> sequestration values were calculated and whether the figures were based on hemp's natural sequestration capabilities, mineral carbonation, or a combination of both. Dr. Shivakumar Mani acknowledged that a comprehensive Life Cycle Assessment (LCA) had not yet been conducted on the specific density of Hempcrete being developed for the noise barriers. While an earlier LCA study was done in collaboration with EIT Climate and Culture, it was outdated and needed to be redone to ensure accurate, verifiable environmental impact data. Alenka emphasized the



importance of having scientifically validated data to support sustainability claims, especially when introducing such products into the market.

Merta Ildiko, representing the Technical University of Vienna, addressed the regulatory and legislative challenges associated with bio-based building materials. She pointed out that despite the historical use of hemp in construction, modern European certification standards (CE marking) require rigorous long-term durability testing before such materials can be widely adopted. She emphasized that the primary barrier to mainstream acceptance of Hempcrete noise barriers is the lack of comprehensive studies on their long-term performance under different environmental conditions. Dr. Shivakumar Mani responded by highlighting historical examples of hemp-based construction still standing today, but Merta Ildiko clarified that modern regulations do not recognize traditional knowledge alone—technical testing and approvals are mandatory.

Several participants, including Dragica Marinič and Alenka Mauko, discussed the potential for international collaboration in advancing Hempcrete-based noise barriers. They noted that multiple companies across Central Europe are exploring hemp-based construction materials, but many face similar challenges, including legislative hurdles, long certification procedures, and limited market access. Alenka suggested forming a cluster of producers and researchers across Slovenia, Slovakia, and other Central European nations to share knowledge, conduct joint research, and advocate for better regulatory support for bio-based materials. This would not only help streamline certification but also encourage wider adoption of hemp-based noise barriers in infrastructure projects.

Saša Fluher noted the role of architects in facilitating the acceptance of such materials through education and suggested a polygon where architects could see the benefit of the hempcrete first-hand.

#### **Potential for Market Scaling:**

The market potential for hempcrete noise barriers is significant, particularly in Europe, where green transition policies are driving demand for sustainable infrastructure solutions. With increasing urbanization and rising concerns over air and noise pollution, hempcrete barriers offer a cost-effective and environmentally friendly alternative. The growing interest from Central European countries, combined with support from EU-funded projects, suggests that the technology can be scaled beyond Slovenia into neighbouring markets. However, widespread adoption will require overcoming legislative hurdles, developing standardized testing protocols, and increasing industrial production capacity. A strategic approach involving public-private partnerships, academic research collaborations, and regulatory engagement will be essential to accelerate market entry and achieve commercial viability.

#### **Next steps for innovation:**

- Dr. Shivakumar Mani should consider conducting necessary life cycle analyses



- Steps should be taken to enhance fire resistance and durability through supplementary binders and coatings to achieve Class A fire rating.
- Collaboration with other European hempcrete producers should be considered to build a regional supply chain and advocacy network.
- Dr. Shivakumar Mani should consider to install prototype barriers in targeted locations to gather real-world performance data, validate efficiency, and it could serve as an education polygon to educate about the hempcrete.

### 3.2.3. TERMIT d.d. & Slovenian National Building and Civil Engineering Institute

The project aims to utilise waste materials that would otherwise be sent to landfill, develop innovative, environmentally friendly and durable pavements with improved performance characteristics, and reduce the carbon footprint through circular economy practices.

**Key Focus Area:** alkali-activated pavement slabs using industrial waste materials, market viability, carbon footprint, technical and regulatory barriers

**Presenter:** Dr. Majda Pavlin

#### **Key Discussion Points:**

Majda Pavlin discussed the development of alkali-activated pavement materials using non-hazardous waste (including municipal and construction waste), aiming to reduce the carbon footprint of construction. By employing alkali activation, which requires mineral waste rich in silicon and alumina, the project seeks to minimize the carbon footprint of building operations, which contribute significantly to global CO<sub>2</sub> emissions. Majda Pavlin discussed the current status of the pilot production of alkali-activated pavement materials, emphasizing the need for additional investment to address aesthetic problems and optimize the mix design. She noted that while mechanical properties are comparable to traditional concrete, challenges with leaching and production speed remain (slow production process currently limits scalability). Potential clients have shown interest, but further research and market validation are necessary.

After Majda Pavlin's presentation, the discussion revolved around several critical aspects of the alkali-activated pavement slabs project:

Majda Pavlin highlighted that the project is at TRL 5-6, meaning it has been validated in a relevant environment but requires further optimization before full commercialization. One of the major challenges is the absence of industry standards for alkali-activated materials, which presents a regulatory hurdle. To bring the product to market, technical approvals and a CE label must be secured.

Martin Palou from the Slovak Academy of Sciences pointed out the problem of slag availability in the future due to the regulations related to decarbonization in steel or iron industries. He pointed out that most metallurgical industries are closed or are changing their production technology to reduce CO emissions. There are not more fly ashes and kaolin as natural raw materials are expensive.



Dr. Shivakumar Mani raised concerns about the variability of waste materials used in the production process, particularly bio-ashes and slags. Majda Pavlin explained that pre-treatment methods such as drying and milling are employed to minimize inconsistencies. However, leaching of toxic elements remains an issue. The current formulation is close to meeting environmental standards, with only one element still exceeding acceptable limits.

Majda Pavlin also explained that one of the key challenges identified during benchmarking is that the current production process is too slow compared to conventional pavement slab manufacturing. The curing time of one day allows for relatively quick demoulding, but low production capacity (10-20 slabs per day) remains a constraint. This slow process could lead to higher production costs, making the product more expensive than commercial alternatives.

Dragica Marinič raised a question regarding the market interest. Majda Pavlin explained, that there is existing market interest, as evidenced by letters of support from multiple companies. However, further engagement with potential customers is needed to assess their willingness to adopt the product. The team is considering outreach efforts to gauge commercial feasibility and refine its business strategy.

Durability was a key focus, with Andreas Appel asking whether additives had been explored to improve performance. Majda Pavlin confirmed that alternative co-binders like mineral wool had been tested but posed durability challenges. The choice of MetaKaolin was primarily to address leaching issues rather than durability concerns, although it also enhances the product's frost resistance.

Dr. Shivakumar Mani raised a question about the potential for mold growth on alkali-activated materials. Majda Pavlin explained that due to their high pH, mold growth is unlikely. However, no formal tests have been conducted on this aspect yet.

#### Potential for Market Scaling:

The market for sustainable construction materials is **growing rapidly** due to increasing environmental regulations and industry demand for **low-carbon alternatives**. The alkali-activated pavement slabs offer a **viable solution to reduce CO2 emissions** and utilize **waste materials**, aligning with global sustainability goals. However, **production efficiency and cost competitiveness** remain key factors for market adoption. By refining manufacturing processes, securing regulatory approvals, and engaging with potential industry partners, the project can **scale from pilot production to full-scale commercialization** in sectors such as **urban infrastructure, road paving, and sustainable construction projects**.

#### Next steps for innovation:

- Majda Pavlin to reach out to producers of pavement slabs to gather information that could accelerate pilot production and improve production speed and reduce costs.



- Majda Pavlin to continue optimizing the mix design to minimize leaching issues and address aesthetic problems before moving to the next stage of the project.
- Majda Pavlin to identify grants, investors, or industry collaborations for scaling up production
- present the innovation to interested companies to gauge their response and interest in the product.
- Majda Pavlin to work towards obtaining CE certification and other necessary approvals.
- Majda Pavlin to assess the investment needed for production and the associated costs to evaluate revenue streams.

### 3.3. Collaborative Outcomes

A strong synergy among the three innovations mainly lies in their shared emphasis on transforming waste materials into high-value, sustainable construction products. Each initiative leverages circular economy principles by repurposing industrial by-products, construction waste, or alternative raw materials, reducing landfill dependency and lowering carbon emissions. Another commonality is the focus on enhancing material durability and performance to meet industry standards, ensuring that these innovations can serve as viable alternatives to traditional materials. Additionally, all projects recognize the importance of scalability and commercialization, facing similar challenges in optimizing production processes, securing regulatory approvals, and gaining market acceptance. Collaborative opportunities exist in knowledge-sharing, joint research efforts, and aligning with policy frameworks to accelerate the adoption of these materials.

### 3.4. Conclusion

The presentations and discussions provided valuable insights into the future of sustainable materials and innovation in the construction industry. While each project demonstrated significant progress in material development and pilot production, the path to commercialization remains a challenge due to regulatory barriers, production efficiency concerns, and cost competitiveness. The need for further research, investment, and industry partnerships was a recurring theme, along with the importance of addressing market acceptance and scalability. Overall, the session reinforced the potential of innovative, waste-based materials in reducing carbon footprints and promoting circular economy principles, while also highlighting the crucial next steps required for broader adoption and impact.



## 3.5. Annexes

### Annex 1: Invitation and agenda



## INVITATION

to the online workshop

**Innovative circular and digital solutions for construction in  
Central Europe**

**WHEN: Friday, 14. 03. 2025, 10:00 - 12:00**

Online implementation via MS Teams

Registration via [online forum](#) until Tuesday 11.03.2025, 12:00

**Dear innovators, industry professionals, decision - makers, researchers,  
policy expert and other curious people.**

All ReBuilt stakeholders are cordially invited to join the workshop Innovative circular and digital solutions for construction in Central Europe, which will present selected innovations covering the broad framework of the circular economy, with a focus on different materials, technologies and approaches to sustainable construction.

The purpose of the Innovation Cafe (iCafe) is to encourage and empower people to innovate and collaborate to scale innovations and support market penetration of presented circular solutions in the construction sector.

With us will be:



**BETTER CONCRETE, Software tool for concrete plants**

"Software tool that enables cheaper and more sustainable concrete production for ready-mix concrete manufacturers, saving cement by optimising packing density in concrete plants and producing CO2 reduced concrete."



**CoGreen d.o.o., Novel Highway/Railway Hempcrete Noise Barriers (NoHiRiNoise)**

"Development of a highway noise barrier made of hempcrete, which is environmentally friendly, recyclable and has a lower embodied energy for a longer service life."



**TERMIT d.d. & Slovenian National Building and Civil Engineering Institute**

"The project aims to utilise waste materials that would otherwise be sent to landfill, develop innovative, environmentally friendly and durable pavements with improved performance characteristics, and reduce the carbon footprint through circular economy practices."



#### Agenda:

| Time          | Content                                                                                         | Presenter                                                                |
|---------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 10:00 - 10:05 | Welcome and short introduction                                                                  | Saša Fluher (POR)<br>Dr. Alenka Mauko Pranjić, ZAG,<br>leader of project |
| 10:05 - 10:15 | Introductory round                                                                              | All participants                                                         |
| 10:15 - 10:25 | <b>BETTER CONCRETE</b><br>Software tool for concrete plants                                     | Felix Wiese (Civil Engineer)                                             |
| 10:25 - 10:40 | Q&A / discussion                                                                                | Saša Fluher (POR), All<br>participants                                   |
| 10:40 - 10:50 | <b>CoGreen d.o.o.</b><br>Novel Highway/Railway Hempcrete Noise<br>Barriers (NoHiRiNoise)        | Dr Shivakumar Mani, (R&D<br>Engineer-CoGreen d.o.o)                      |
| 10:50 - 11:05 | Q&A / discussion                                                                                | Saša Fluher (POR), All<br>participants                                   |
| 11:05 - 11:15 | Coffee break                                                                                    |                                                                          |
| 11:15 - 11:25 | <b>TERMIT d.d. &amp; ZAG</b><br>Mineral waste into alkali-activated<br>pavements (Project WALK) | Dr. Majda Pavlin                                                         |
| 11:25 - 11:40 | Q&A / discussion                                                                                | Saša Fluher (POR), All<br>participants                                   |
| 11:40 - 11:55 | Final discussion                                                                                | Saša Fluher (POR), All<br>participants                                   |
| 11:55 - 12:00 | Wrap-up and conclusions                                                                         | Saša Fluher (POR)                                                        |

- The workshop will be **English**, and it is **free of charge**.
- The session will be **recorded**.
- The **online link** to participate in the workshop will be sent the **one or two days** before.

**We want to hear your opinion and learn from your experiences,  
so, we invite you to join us.**

For more information on ReBuilt and online workshop (A.2.1), please contact [ajda.pirs@stajerskagz.si](mailto:ajda.pirs@stajerskagz.si).

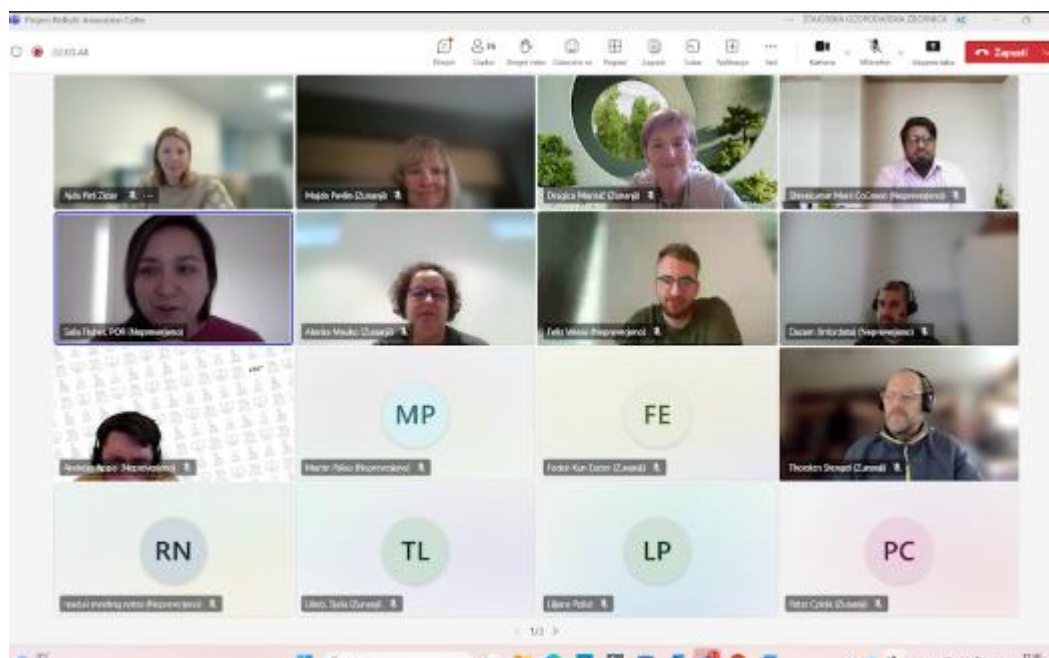
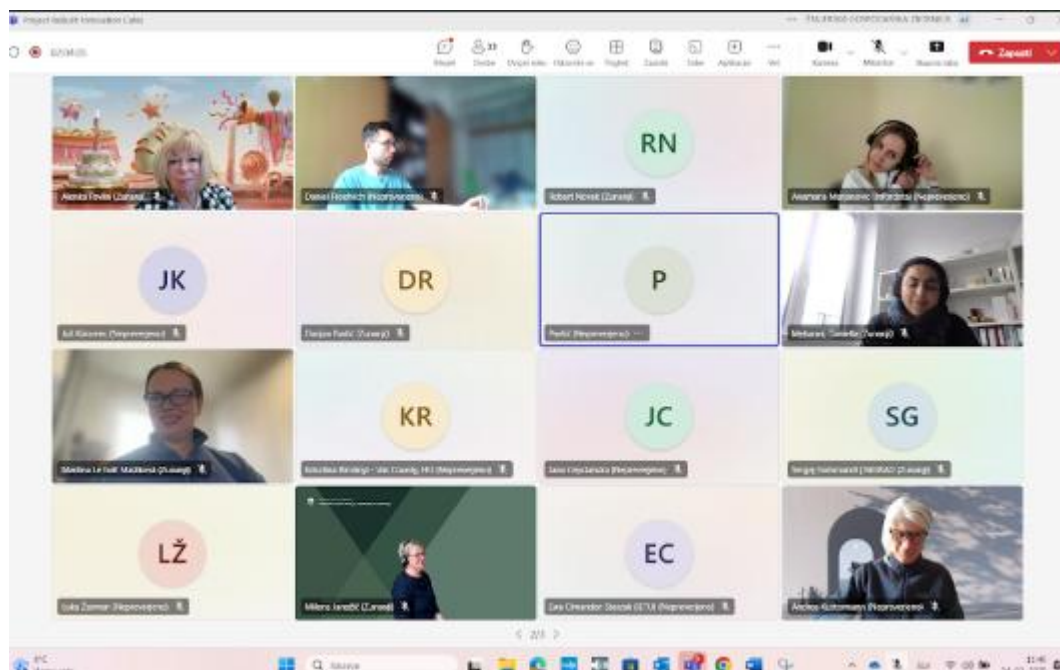
The online workshop is part of the project ReBuilt which is part of programme Interreg Central Europe.

Read more: <https://www.interreg-central.eu/projects/rebuilt/>





## Annex 2: Screenshots





**Mineral waste into alkali-activated pavements**

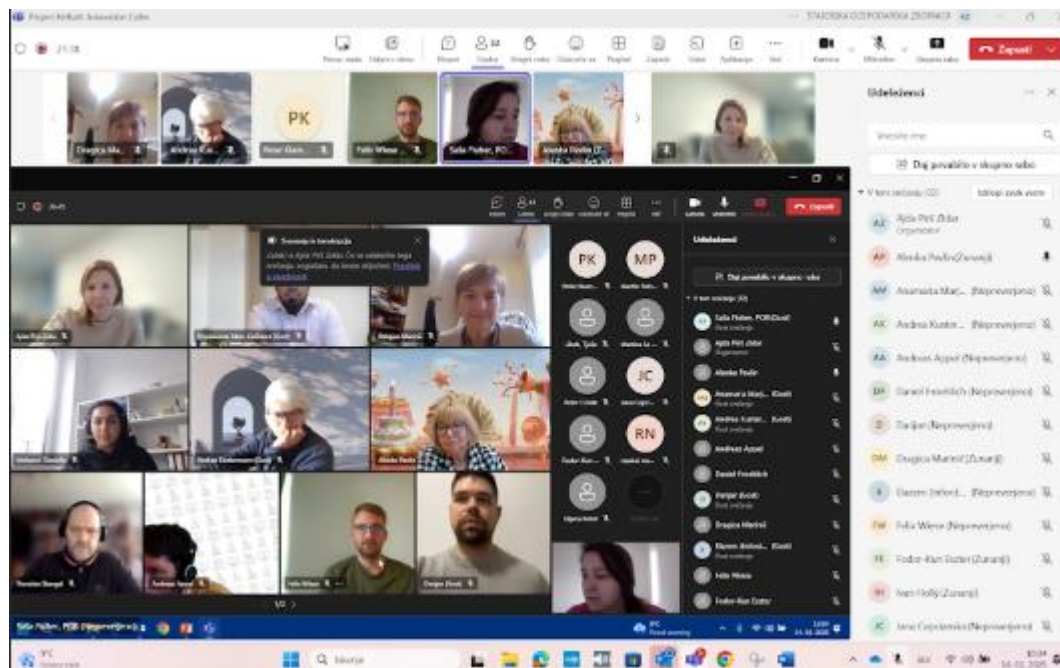
**AZ.1 INNOVATION CAFES**  
Online | 14 March 2025

Majda Pavlin, Alenka Pavlin, Ana Marija Huber, Vilma Ducman

**1st International conference on Innovative use of Hemp in Construction Sector (IHC).**

Dr. Ildiko Merta (TU Wien): Expert in sustainable building materials and construction techniques. [en.fgg.uni-lj.si](mailto:en.fgg.uni-lj.si)  
 Dr. Andrej Šmid (Studio Bboxa): Architect specializing in innovative architectural solutions incorporating natural materials like hemp. [en.fgg.uni-lj.si](mailto:en.fgg.uni-lj.si)  
 Laetitia Marrot (FRISSEBE): Researcher focusing on fire safety and sustainable building engineering. [en.fgg.uni-lj.si](mailto:en.fgg.uni-lj.si)  
 Elena Yaneva (Hempstatic): Advocate for hemp-based construction materials and sustainable building practices. [en.fgg.uni-lj.si](mailto:en.fgg.uni-lj.si)  
 Dr. Thirumalini Selvaraj (VIT University): Academic with expertise in sustainable construction materials and technologies. [en.fgg.uni-lj.si](mailto:en.fgg.uni-lj.si)  
 Michela Turin (TU Delft): Researcher in sustainable architectural design and materials. [en.fgg.uni-lj.si](mailto:en.fgg.uni-lj.si)  
 Dr. Mauko Pranjić's presentation provided insights into the integration of hemp and natural fibers in construction materials, highlighting findings from the ReBuilt project.

These speakers shared insights on integrating hemp into construction, advancing sustainable building practices, and exploring innovative materials.





## 4. Innovation Café Group 3: Slovakia, Italy, Czech Republic

### 4.1. Event Overview

- Date of Innovation Café: 4th March 2025
- Countries Involved: Czech Republic, Slovak Republic, Italy
- Number of Participants: 33

During the Innovation Café, we had the privilege of hearing from four inspiring innovators.

Agenda of the meeting:

| Time          | Content                                                                                                                                                            | Presenter                                        |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 11.00 - 11:05 | Welcome and short introduction.                                                                                                                                    | Martina Le Gall Maláková (IIC)                   |
| 11:05 - 11:15 | Introductory round                                                                                                                                                 | All participants                                 |
| 11:15 - 11:25 | <b>Proposed pilot projects for a digital materials management solution to boost the circularity of the buildings and construction sector in the Danube region.</b> | Benjamin Hague, Head of Think Tank at INCIEN     |
| 11:25 - 10:35 | Q&A / discussion                                                                                                                                                   | Martina Le Gall Maláková (IIC), All participants |
| 11:35 - 11:45 | <b>Concretes made of brick and mixed recycled aggregates</b>                                                                                                       | Jiri Fiala, Red - Beton                          |
| 11:45 - 11:55 | Q&A / discussion                                                                                                                                                   | Martina Le Gall Maláková (IIC), All participants |
| 11:55 - 12:05 | <b>Smart low-carbon construction from recycled raw materials</b>                                                                                                   | Martin Pribila, Talpa House                      |
| 12:05 - 12:15 | Q&A / discussion                                                                                                                                                   | Martina Le Gall Maláková (IIC) All participants  |
| 12:15 - 12:25 | <b>Circular economy and sustainable construction sector in real estate</b>                                                                                         | Marcel Sedlak, HB Reavis                         |
| 12:25 - 12:35 | Q&A / discussion                                                                                                                                                   | Martina Le Gall Maláková (IIC), All participants |
| 12:35 - 12:50 | Final discussion                                                                                                                                                   | Martina Le Gall Maláková (IIC), All participants |
| 12:50 - 13:00 | Wrap-up and conclusions                                                                                                                                            | Martina Le Gall Maláková (IIC)                   |



## 4.2 Innovation Presentations

### 4.2.1. Presentation 1: Proposed pilot projects for a digital materials management solution to boost the circularity of the buildings and construction sector in the Danube region

**Presenter:** Benjamin Hague, Head of Think Tank at INCiEN

The pilot projects being developed within the Danube regional project Circular DigiBuild was introduced. The pilot projects will focus on potential use cases (such as creation of a digital twin to inventory and certify building materials) for a digital materials management solution based on the **UUProtocol**, a universal digital framework for managing and tracking data on materials and components in buildings.

**Key Focus Area:**

- Exploring synergies between Interreg projects within the Danube program.
- Addressing challenges and opportunities in circular construction and digitalization of material flows.
- Developing pilot projects in Austria, Croatia, and Bulgaria to enhance tracking and certification of building materials.

**Key Discussion Point:**

**1. Challenges in Circular Construction:**

- Need for large-scale energy renovations in Czechia.
- High number of unoccupied or underutilized dwellings requiring reconstruction.
- Extensive brownfields with potential for material reuse.
- Lack of standards for recycled/reused materials.
- Market barriers, including low demand and high costs of circular materials.

**2. Regulatory and Market Barriers:**

- Lack of clear guidelines on circular materials.
- Low consumer awareness and demand.
- Bureaucratic complexity, insufficient legal incentives to encourage circular practices.
- Poor collaboration across the value chain and limited incentives for participation.

**3. Technological Barriers:**

- Limited digitalization and smart technology adoption in construction.
- Gaps in training, R&D investment, and infrastructure.
- High initial costs of digital integration.

**4. Pilot Project Development:**

- Objective: Develop scalable solutions for tracking and certifying construction materials.
- Implementation in Austria (AWS), Croatia (Innovation Centre Nikola Tesla), and Bulgaria (Recheck).



- Collaboration with construction companies to track and inventory materials in real-time.
- Use of **UU Protocol**, a decentralized, open-source system for digital material identification and lifecycle tracking.
- Ensuring compatibility with existing BIM (Building Information Modeling) and regulatory frameworks.

#### 5. Call for Participation:

- Seeking stakeholders in Austria, Croatia, and Bulgaria to support or participate.
- **Interest in existing digital platforms, infrastructure** that can be used to manage in a very flexible and dynamic way the data and the material flows in the building sector
- Opportunity for regional multi-stakeholder engagement throughout the project duration.

#### Potential for Market Scaling:

- The Bulgarian project aims to demonstrate how advanced digital solutions can unlock the untapped potential of circular economy principles.
- Through real-time data sharing and verification, each participant gains greater transparency on material quality, provenance or origin and market worth, thus simplifying collaborative decision-making and boosting overall sustainability outcomes.
- Further:
  - Creation of **digital twins** for real-time inventory and certification of building materials.
  - Development of **financial instruments** to support circular economy adoption.
  - Integration of **transparent markets** for secondary materials.

#### Next Steps:

- Continue outreach and stakeholder engagement in Czechia and in every other country, there's ample opportunity still to get involved.
- Continue and finalize pilot project work plans and identify participating companies/buildings.
- Monitor policy developments, especially regarding EPBD (Energy Performance of Buildings Directive).
- Refine project implementation based on real-world testing and feedback.

### 4.2.2. Presentation 2: Concretes made of brick and mixed recycle aggregates

**Presenter:** Ing. Jiří Fiala, Head of Technology at Red-Beton

Presentation of the practical use of recycled brick in concrete mixtures, which are used in ready-mix concretes and for simple prefabrication followed. The current use of recycle aggregates in concretes in the Czech Republic, the classification of concretes by content of recycled material used according to strength and environmental class, and certification options were presented.



### **Key Focus Area:**

- Development of sustainable concrete using brick and mixed recycled aggregates.
- Addressing environmental and economic challenges in the construction industry.
- Overcoming legislative and market barriers to wider adoption of recycled concrete.

### **Key Discussion Points:**

#### **1. Introduction to Red-Beton:**

- A small company focused on developing sustainable construction materials.
- Specializes in recycled concrete, combining recycling, ecology, and durability.
- Main product: Concrete made from brick or mixed recycled aggregates sourced from construction and demolition waste.

#### **2. Challenges in Adopting Recycled Aggregate Concrete:**

- Construction waste management: Millions of tons of waste end up in landfills, limiting the availability of recyclable materials.
- Depletion of natural aggregates: No new quarries are opening in the Czech Republic, creating a shortage of natural aggregates for large-scale construction.
- Market resistance: While recycled concrete is accepted, there is hesitancy towards using brick-based recycled aggregates.
- Legislative barriers:
  - EN 206 limits recycled aggregate use to 50%.
  - Lack of EU support for the broader application of recycled aggregates in construction.

#### **3. Red-Beton's Solution - Sustainable Concrete with Recycled Aggregates:**

- Same physical and mechanical properties as standard concrete (compressive strength, water absorption, frost resistance).
- 14% lower carbon footprint compared to natural aggregate concrete.
- Economic benefits: Production costs reduced by up to 20%.
- Circular economy impact:
  - Saves 1.5 million tons of natural resources annually in the Czech Republic.
  - If only 10% of total concrete production used recycled aggregates, this would significantly reduce the demand for natural aggregates.

#### **4. Technology & Services Provided:**

- Support for customers in recycling construction waste.
- Training on effective production of high-quality recycled aggregates.
- Optimization of concrete mix for different construction applications.
- Licensing and technology transfer for companies interested in adopting sustainable concrete solutions.

### **Potential for Market Scaling:**

- Expanding acceptance of recycled aggregate concrete in the construction industry.



- Collaboration with policymakers to amend EN 206 and increase the allowable percentage of recycled aggregates.
- Pilot projects demonstrating the long-term durability and performance of recycled concrete.
- Raising awareness among construction companies about the benefits and cost savings of using recycled aggregates.
- Integration into circular economy policies to promote sustainable building practices.

**Next steps:**

- Participate in pilot projects to demonstrate its feasibility in various construction applications.
- Engage in discussions on secondary raw materials to increase market confidence and demand.
- The long-term durability of concrete with recycled aggregates should be investigated.

### 4.2.3. Presentation 3: Circular economy and sustainable construction sector

**Presenter:** Parmar Abhishek, HB Reavis

The third presentation spoke about a strategy to reduce and track upfront embodied carbon in buildings through design, procurement, and construction processes, ensuring real emission reductions before utilizing carbon offsetting.

**Key Focus Area:**

- Net Zero Upfront Carbon in Construction
- Whole Life Carbon Assessment (A1-A5 stages)
- Sustainable Procurement & Carbon Tracking
- Low-Carbon Materials & Circularity
- **Key Discussion Points:**
  1. Understanding Net Zero Upfront Carbon
  2. Strategies to Achieve Net Zero in Construction
    - **Design Phase:**
      - Develop **carbon-conscious design briefs** aligned with net zero goals.
      - Conduct **Whole Life Carbon Assessments (WLCA)** at each stage.
      - Minimize material use and optimize efficiency ("Build only what is necessary").
      - Ensure buildings are **all electric** for future low-carbon operation.
    - **Procurement Phase:**
      - **Cost vs. Carbon Analysis** - Balance financial feasibility with emissions impact.
      - Work with suppliers that have **net-zero carbon Commitments**.
      - **Mandate Environmental Product Declarations (EPDs)** for materials.
      - Explore **offsetting models** only after reductions are maximized.
    - **Construction Phase:**
      - **Upskilling workforce & supply chain** on carbon reduction.



- Encourage contractors to propose **low-carbon innovations**.
- Use **Rego-certified renewable energy** or on-site renewables.
- Minimize fossil fuel use by switching to **biodiesel, HVO, or electric equipment**.

### 3. Case Study: Worship Square (London, UK)

- A **pioneering net-zero-upfront carbon building** in Shoreditch, London.
- Achieved **18% lower emissions** than Greater London Authority's 2030 target.
- Key sustainability features:
  - **Low-carbon electric arc furnace steel** with high recycled content.
  - **Single-fired terracotta cladding** to reduce embodied carbon.
  - **Reused raised access flooring** from another project (6 out of 8 floors).
  - **High GGBS content in concrete** (up to 70%).
  - **Structural piling reuse** based on pre-demolition audits.
- Achieved **480 kg CO<sub>2</sub>/m<sup>2</sup>**, surpassing targets, and qualified for **Net Zero in Construction** through verified carbon credit retirement.

#### Potential for Market Scaling and Next steps:

- Develop standardized carbon tracking processes in procurement and construction.
- Promote carbon budgeting per package in projects.
- Encourage industry-wide upskilling and contractor engagement.
- Expand the use of reclaimed materials and circular design strategies.

#### 4.2.4. Presentation 4: Smart low-carbon construction from recycled raw materials

**Presenter:** Martin Pribila, Talpa House

Recycled Concrete and Sustainable Construction Materials in Practice was the last presentation of the first Innovation Caff  . It showed a practical approach to using recycled concrete and reclaimed materials in construction, focusing on real-world applications, challenges, and regulatory barriers.

#### Key Focus Area:

- Use of recycled concrete from old concrete (not bricks)
- Structural properties and material performance
- Challenges in obtaining regulatory approvals
- Policy recommendations for supporting innovation

#### Key Discussion Points:

1. Practical Application of Recycled Concrete
  - **Recycled concrete** used in **roof slabs, foundations, and structural elements**.



- Comparison between **brick-recycled concrete** (lower carbon footprint, lower cost, higher elasticity) and **concrete-recycled aggregate** (higher cost, requires stricter quality control).
- Combined **old (11 years)** and **new concrete (1.5 years)** to verify structural integrity.
- Adjusted **mix ratios** to improve water absorption and durability based on lab testing.

## 2. Challenges in Adoption & Regulation

- **Conservative approach** in Slovakia, Czech Republic, Austria, and Hungary—clients and inspectors are reluctant to use new materials.
- **Regulatory barriers:**
  - Site inspectors unfamiliar with **recycled materials** often **discourage** their use.
  - **Expensive approval processes** for small projects compared to large-scale developments.
  - Lifecycle assessments (LCA) are costly and time-consuming for individual buildings. Nevertheless, they must be investigated
  - **Higher scrutiny and double-checking** by regulators, increasing project complexity.
- **Insurance & liability concerns:**
  - Contractors bear full responsibility if anything goes wrong with new materials.
  - Clients demand **absolute certainty** in material performance.
  - No state-backed experimental projects to share risk and generate real-world data.

## 3. Cost Implications & Market Barriers

- **Recycled concrete from bricks** is **5-7% cheaper** than traditional concrete.
- **Recycled concrete from concrete** is **5% more expensive** due to testing and quality control.
- **Water recycling paradox:**
  - Fresh tap water costs **€2/m<sup>3</sup>**, while treated recycled water costs **€52/m<sup>3</sup>** due to regulatory controls.
- The government **imposes higher costs** on sustainable practices instead of incentivizing them.

## 4. Policy Recommendations & Industry Needs

- Need for **government-backed experimental pilot projects** where:
  - The state assumes partial responsibility for risks.
  - Projects generate **real-world data** to inform policymakers.
  - Regulations align with **practical construction realities**, not just lab tests.
- Eurocode should include **on-site testing standards** for innovative materials.
- Municipalities must **streamline approval processes** for sustainable materials.



#### Potential for Market Scaling and Next steps:

**Policy changes** to support experimental projects.

**Standardized material approval processes** to reduce costs for small-scale builders.

**Incentives for recycling materials** instead of penalizing their use.

**Collaboration between industry and government** to collect real-world data.

### 4.3. Collaborative outcomes

- **Cross-border collaboration** within the **Circular DigiBuild** project, integrating findings from Interreg initiatives in the Danube region.
- **Digital integration** using the **UU Protocol** for material tracking, ensuring compatibility with **BIM** and regulatory frameworks.
- **Multi-stakeholder engagement** involving **construction companies, policymakers, and tech providers** to advance material certification.
- **Technology transfer & standardization** efforts to harmonize **certification and financial incentives** for circular materials.

### 4.4. Conclusion: Summary of overall outcomes and insights

The presentations highlighted significant challenges, including regulatory gaps, low market demand, high costs of circular materials, and limited digitalization within the construction sector. However, several solutions have emerged, such as the use of low-carbon recycled concrete. Looking ahead, opportunities for scaling up these initiatives include policy reforms, particularly in adapting EN 206 for recycled concrete and aligning strategies with the Energy Performance of Buildings Directive (EPBD). Financial instruments aimed at supporting circular economy adoption will be crucial in overcoming cost barriers, while industry-wide upskilling and collaboration will drive broader adoption of sustainable practices. Finally, discussions highlighted the importance of aligning policy, technology and market incentives to accelerate circular construction across the region.



## 4.5. Annexes

Interreg  
CENTRAL EUROPE

Co-funded by  
the European Union

ReBuilt

### INVITATION

to the online workshop

**Innovative circular and digital solutions for construction in Central Europe**

**WHEN: Tuesday, 4. 3. 2025, 11:00 - 12:30**

Online implementation via MS Teams:

Pripojte sa k schôdzi teraz

ID schôdze: 328 003 386 474

Pristupový kód: ft3YJ6Qb

Dear innovators, industry professionals, decision-makers, researchers, policy expert and other curious people.

All ReBuilt partners are cordially invited to join the webinar Innovative circular and digital solutions for construction in Central Europe, which will present selected innovations covering the broad framework of the circular economy, with a focus on different materials, technologies and approaches to sustainable construction.

The purpose of the Innovation Cafe (iCafe) is to encourage and empower people.

With us will be:

- Benjamin Hague, Head of Think Tank at INCEN - Proposed pilot projects for a digital materials management solution to boost the circularity of the buildings and construction sector in the Danube region.

"The presentation will introduce pilot projects being developed within the Danube regional project Circular Digibuild. The pilot projects will focus on potential use cases (such as creation of a digital twin to inventory and certify building materials) for a digital materials management solution based on the UUProtocol, a universal digital framework for managing and tracking data on materials and components in buildings."

- Jiri Fiala, Red - Beton - Concretes made of brick and mixed recycled aggregates.

"Presentation of the practical use of recycled brick in concrete mixtures, which are used in ready-mix concretes and for simple prefabrication. The current use of RCA in the Czech Republic, the classification of concretes by content of recycled material used according to strength and environmental class, and certification options will be presented."

- Martin Pribila, Talpa House - Smart low-carbon construction from recycled raw materials

"Introducing the first recycled concrete waste in waterproof concrete-achieving 55% recycled aggregate while eliminating PVC, asphalt, and HDPE membranes."

- Marcel Sedlak, HB Reavis - Circular economy and sustainable construction sector in real estate

"The innovation at real estate sector is important to bring the added value for the clients."

**Agenda:**

| Time          | Content                                                                                                                                                     | Presenter                                        |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| 11:00 - 11:05 | Welcome and short introduction.                                                                                                                             | Martina Le Gall Maláková (IIC)                   |
| 11:05 - 11:10 | Presentation of project ReBuilt                                                                                                                             | Eva Kloužková (C20BC)                            |
| 11:10 - 11:25 | Proposed pilot projects for a digital materials management solution to boost the circularity of the buildings and construction sector in the Danube region. | Benjamin Hague, Head of Think Tank at INCEN      |
| 11:25 - 10:30 | Q&A                                                                                                                                                         | Martina Le Gall Maláková (IIC), All participants |
| 11:30 - 11:45 | Concretes made of brick and mixed recycled aggregates                                                                                                       | Jiri Fiala, Red - Beton                          |
| 11:45 - 11:50 | Q&A                                                                                                                                                         | Martina Le Gall Maláková (IIC), All participants |
| 11:50 - 12:05 | Smart low-carbon construction from recycled raw materials                                                                                                   | Martin Pribila, Talpa House                      |
| 12:05 - 12:10 | Q&A                                                                                                                                                         | Martina Le Gall Maláková (IIC) All participants  |
| 12:10 - 12:25 | Circular economy and sustainable construction sector in real estate                                                                                         | Marcel Sedlak, HB Reavis                         |
| 12:25 - 12:30 | Q&A                                                                                                                                                         | Martina Le Gall Maláková (IIC), All participants |
| 12:30 - 12:40 | Wrap-up, next steps and conclusions                                                                                                                         | Martina Le Gall Maláková (IIC), All participants |

The workshop will be English, and it is free of charge.

The session will be recorded.

If you have any questions, please contact us on: [malakova@industryinnovationcluster.sk](mailto:malakova@industryinnovationcluster.sk).

You are cordially invited!

The workshop is part of the ReBuilt: circular and digital renewal of the construction sector in Central Europe.

Co-funded by Interreg Central Europe

Read more: <https://www.interreg-central.eu/projects/rebuilt/>





## 5. Instead of the conclusion: Adherence to the methodology and the final word

Overall, the three Innovation Cafés proved to be interactive and engaging events that successfully fostered collaboration and innovation among participants. Their primary goal—promoting joint cooperation for scaling and market penetration of circular innovations in construction—was achieved. However, the process was not without its challenges.

The first and most crucial step, Selecting Innovations, proved to be particularly complex. Many innovators were reluctant to participate due to concerns about idea replication, time constraints, or limited resources. Despite these hurdles, the organizing teams successfully secured ten innovations: Group 1 (Austria, Hungary, Poland) and Group 2 (Germany, Slovenia, Croatia) each secured three, while Group 3 (Slovakia, Italy, Czech Republic) managed to secure four.

In contrast, Curating Participants was relatively smoother, thanks to the efforts of ReBuilt's communication manager (ŠGZ), who prepared invitations, promotional materials, and social media outreach. However, direct engagement by ReBuilt project partners proved to be the most effective approach in bringing together a diverse mix of stakeholders, including industry professionals, innovators, researchers, policymakers, and other interested participants. While some organizers provided pre-event briefing materials and others did not, this discrepancy did not seem to significantly impact the event outcomes.

All country groups followed similar event agendas, with none incorporating breakout sessions. One group included an introduction round, while the other two did not. A key factor in the success of the events, we believe was the preparation of presenters (innovators). Reviewing their presentations and holding preparatory meetings helped ensure that they effectively communicated their market potential, scalability challenges, and collaboration opportunities.

A notable challenge across all three events was the readiness of participants to openly share their ideas and lessons learned. Despite the relatively large number of attendees, engaging them in active discussions proved difficult. Encouraging more interactive participation remains an area for improvement in future events.

The post-implementation phase encompassed a comprehensive reporting process, with each country group responsible for compiling a detailed report on the outcomes and insights gained from the Innovation Café. As a result, there are noticeable stylistic variations between the sections contributed by different country groups. However, we believe that this diversity enhances the overall richness of the document, as it highlights the uniqueness and individual approach. While it is commendable that the reports exhibit a certain level of coherence, their differences are not only expected but also advantageous. These variations reflect the distinct perspectives and methodologies employed by each country group, ultimately enriching



the collective understanding of the Innovation Café's implementation and impact, making the document more insightful and engaging.

To conclude, the Innovation Cafés highlighted both the challenges and opportunities in advancing circular construction. Key barriers include regulatory gaps, low market demand due to high costs, and limited digitalization within the sector. Additionally, while material innovations like low-carbon recycled concrete and waste-based insulation show promise, commercialization remains a hurdle due to production inefficiencies, fire safety compliance, and cost competitiveness. However, several strategic actions emerged to accelerate adoption. Policy reforms and financial incentives will be crucial in overcoming cost barriers. Increased investment in research, production efficiency, and market acceptance strategies can further support scalability. Lastly, cross-sector collaboration—engaging policymakers, industry professionals, and researchers—will play a vital role in driving adoption.