Interreg CENTRAL EUROPE

Co-funded by the European Union

ReBuilt

Report of Regional workshop for mapping of barriers and opportunities for circular and digital construction (D1.1.1)

Summary - by TU Wien (Austria)

Austria

TU Wien, Faculty of Civil and Environmental Engineering - Institute of Material Technology, Building Physics and Building Ecology

DI Daniella Mehanni, Prof. Ildiko Merta

Version 1.1

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Summary

In the frame of Activity A1.1 “Initial Mapping of Stakeholders and the State-of-the-Art in central European construction and spill-off sectors”, a workshop on “Circular and Digital Construction in Austria – Current status and educational gaps” was held online in collaboration with the Climate Lab. The objective was to identify the state of the art, barriers and potentials of implementing circular and digital construction practices in Austrian education programmes. In an initial impulse phase good practices were presented by presenters from the stakeholder groups university, architecture and small and medium enterprises (SME). The presented inputs laid a foundation for the two focus groups. Group 1 specialized on university students whilst group 2 gathered vocational students and industrial stakeholders (architecture, construction industry and SME).

In the following section the key findings are presented:

- **Industry/SME:** Participants report about an increased use of digitalization, especially Building Information Modelling in the project execution phase. Employees reported that construction workers are not trained to the current state of the art on sustainable building practices. In SME, participants report that interdisciplinarity is facilized due to broad knowledge covered in team. The current barriers are legislative and economic restrictions of using circular materials and marginal acceptance. Practices around circular economy require knowledge transfer and collaboration between relevant stakeholders
- **University**: Circular Economy in construction requires interdisciplinary collaborations, thus, fostering interactions between different stakeholder groups is necessary. Participants believe that Circular Economy should be considered as elementary subject. Barriers that inhibit educational opportunities are currently courses that are not adapted to the current state of the art. To develop effective training programmes and foster life-long training, it is required to include stakeholders coming from interdisciplinary fields of study. Preparing study material is time-intensive and requires interdisciplinary communication
- **Vocational Schools**: Exchange between vocational schools and industrial stakeholders is crucial as students can access practical knowledge.

1. Introduction

Deliverable D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction aims at collecting the findings of the regional workshops, that took place in all ReBuilt countries. It is a major step the workshops extend and verify the knowledge and information, that has been collected within the desktop research phase of the Activity 1.1. This way, the current status, gaps and potentials for circular and digital construction will be identified and summarized in programme area.

The results will feed into the First transnational central European circular and digital construction conference D.1.1.2. As a result of the initial mapping, regional workshop, transnational conference, a Conceptual note for activities needed for development of circular and digital construction (D1.1.3) will be developed. Furthermore, other work packages will build upon this task in WP1, WP2 and WP3.

2. Basic information about the workshop

Name of the event:

(DE) Zirkuläres und Digitales Bauen in Österreich – Status Quo und Bildungspotentiale

(EN) Circular and Digital Construction in Austria – Current status and educational gaps

Type of event: stand along ReBuilt event in collaboration of Climate Lab (Impact Hub situated in Vienna)

Date, time: 11th of December 2023 9-11 o'clock

Location: Online

Agenda of the event:

09:00-09:15	Introduction of TUW – Current Gaps and educational Potentials of circular and digital construction
09:15-09:20	Introduction of Climate Lab
09:20-09:50	Keynote presentations Industry/SME: Hempstatic | DI Elena Yaneva University: TU Wien | Prof. Thomas Bednar Architecture: forschen planen bauen ZT | DI Thomas Romm
09:50-10:40	Focus groups – interactive session
10:40-11:00	Group discussion – Summarization of the results

Presentations available: **Yes** /No

Number of participants: 28 active participants // 41 registrations received

List of organizations, type of organizations listed:

Organizations participating: Bau.Energie.Umwelt Cluster NÖ, TU Wien, Greenpass GmbH, alchemia nova, Bautechnikum Wien, TU Graz, Hempstatic, Strabag, Zukunftsargentur Bau, ParaStruct, IKA Akademie der bildenden Künste, Climate Lab, PORR

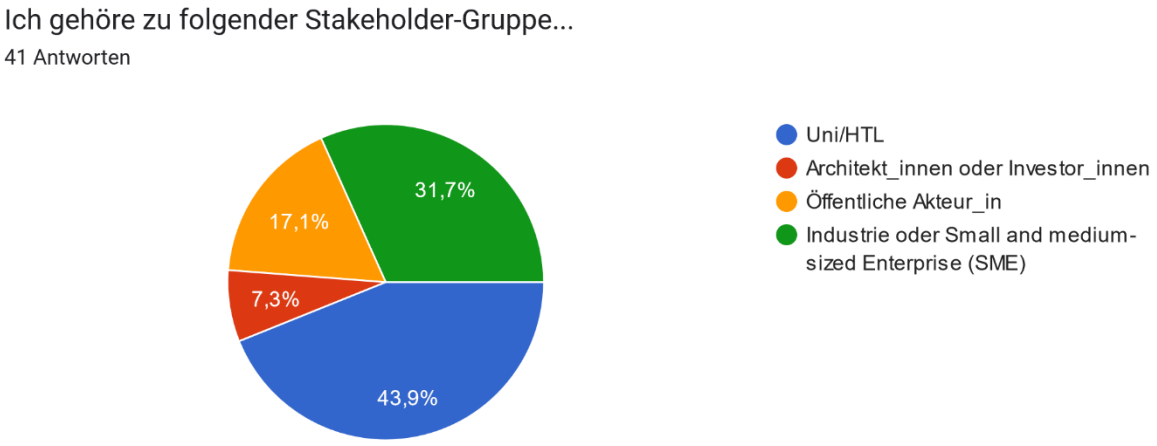
Type of Stakeholders represented in the participants list:

Blue: University/Vocational Schools

Red: Architects and Investors

Yellow: Public Stakeholders

Green: industry or SME



3. ReBuilt focus of the event

Objective of the event:

- Identification of the current state of the art, gaps and potentials in circular and digital construction
- Presentation of good practices and their point of view on sustainability in construction
- Networking between different stakeholders

The objective of the workshop was to identify the current educational gaps, and potentials of circular and digital construction. Good practices were presented by three keynote speakers from different stakeholder groups. Within these talks the speakers shared their experience on opportunities of their applied circular and digital practices and market acceptance.

Thereafter, the participants were invited to join two groups in Zoom Breakout-Sessions representing the stakeholder groups university (group 1) and vocational schools, industry+SME and architecture (group 2). As platform of choice “Miro” was used to collect all inputs of the participants.

Within the groups, the following pillars were discussed:

- Identification of good practices and innovations
- Barriers, potentials, and social acceptance of circular construction;
- Education potential for circular economy, etc.

Essentially, an exchange between relevant stakeholders was encouraged. The outputs of the focus groups are outlaid in the following sections.

4. Identification of good practices and innovations

The following good practices and innovations were identified within the workshop:

- Participants from **university** have all visited or conducted lectures on digitalization and circular economy
- Participants from the **industry** reported an increasing use of digitalization, especially Building Information Modelling (BIM) in the project execution phase as well as considerations concerning sustainable construction. Regarding the training opportunities experienced from the participants, it was reported that employees have access to educational programmes, regular seminars and workshops.
- Participants from **small and medium enterprises (SME)** concluded that interdisciplinarity and continuous learning is promoted in the everyday life of start-ups. Employees stay up to date by reading relevant journals, visit congresses and trade fairs or experience specific trainings.
- Participants from **Vocational Schools** reported that an exchange between teachers and relevant industrial stakeholders is proactively happening.
- **Research Project:** Transformer funded by the research funding agency FFG – in this project an existing vacant building shall serve as an educational hub for young pupils. The aim is the sensibilization of students regarding material life cycles as well as consumer behaviour.
- **SME** - ParaStruct is a start-up which explores the manufacturing of circular materials using secondary raw materials obtained from mineral and biogenic waste streams.
- **adASTRA program** – intrapreneurial program by Strabag to support the implementation of business ideas/start-up creation.
- **SIMULTAN** – represents a software developed by TU Wien that aids in the planning process to optimize design and build building complexes.
- **Hempstatic** - start-up which produces hemp-based sound-insulation materials.

5. Barriers, potentials, and social acceptance of circular construction

Relevant outcome of the discussion:

It was recommended to re-think the handling of existing buildings that have reached the end of their life cycle. Participants agreed upon re-using building components. Recycling of primary materials should be enforced in regard of the waste hierarchy to optimize the overall resource efficiency. Essentially legislative and economic restrictions hinder the (re-)use of circular materials. Additionally, a lack of specifically and interdisciplinarily trained employees is observed.

Identified barriers:

- Legislative and economic restrictions of using circular materials
- Practices around circular economy require knowledge transfer and collaboration between relevant stakeholders
- Education as a key component:
    - Lack of interdisciplinary knowledge: A large share of the teachers do not possess sufficient interdisciplinary knowledge
    - A lot of resources are required to efficiently transfer interdisciplinary knowledge.
    - Contents taught in lectures are not up to date to the current state of the art
- Relevant stakeholders lack acceptance and experience regarding the use of circular and bio-based construction materials.

Identified potentials:

- Circular economy should be implemented throughout all training/education programmes to raise the knowledge and acceptance towards circular and digital practices.

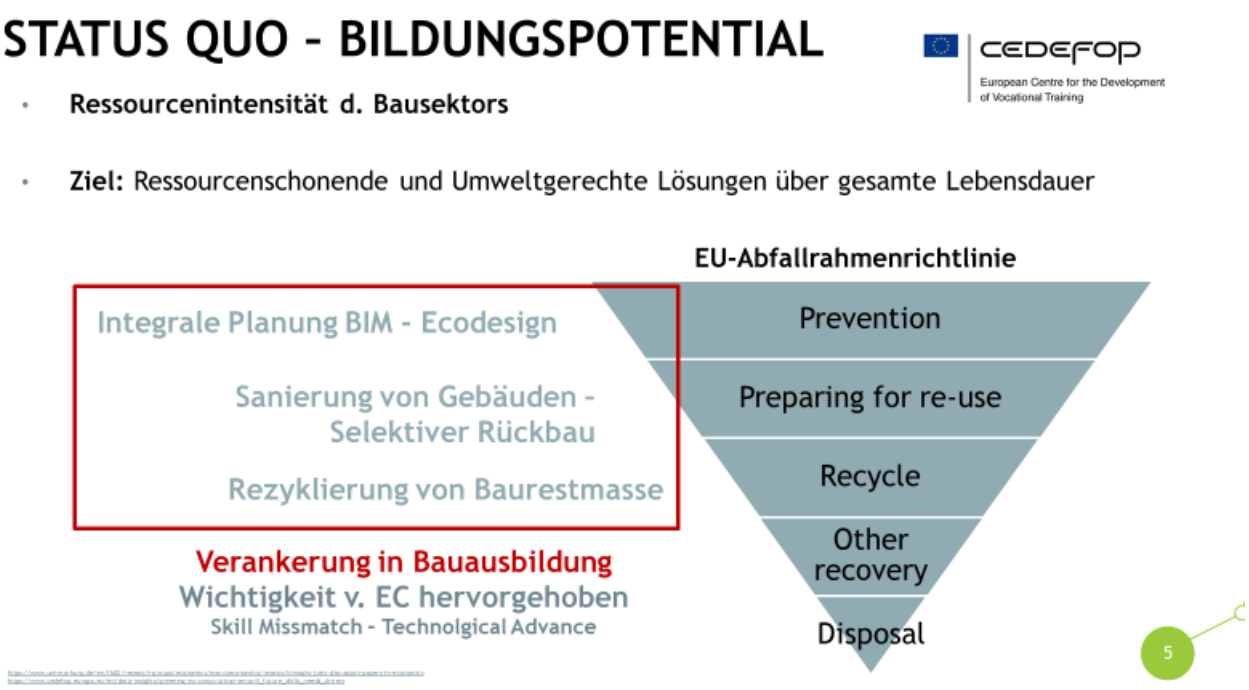


Figure 1 Excerpt from the introductory presentation on the importance of education in regard of the waste hierarchy

- **University:**
  - Include more practical applications of circular and digital construction instead of theory in lecture
  - Promote interactions with experts from different stakeholder groups in order to increase interdisciplinarity and to create T-shaped experts. Presentation of good practices within lectures would aid in sensitizing students on possible technological solutions.
  - Anchor "sustainability" in curricula – this step would require an exchange with the relevant policy-makers and lecturers.
  - Raise awareness amongst teachers on taxonomy and circular economy and mandate specific contents
  - Promote scholarships and awards for students researching on green practices in construction

Conclusions, major findings about the social acceptance of circular construction:

- Relevant stakeholders are highly motivated of using innovative tools, yet the acceptance of circular materials is not given at this point due to lack of knowledge, prices or due to the convenience

6. Education potential for circular economy, etc

Relevant outcome of the discussion:

In focus groups consisting of 10 people, relevant questions from the following categories were discussed: (1) Status Quo, (2) Barriers and (3) Potentials of implementing circular and digital construction in educational programmes. Lastly, participants were directed to formulate wishes to other stakeholder groups. The participants were asked to reflect upon these key terms and questions:

1. Status Quo
    a. Practical experience on circular economy and digitalization in construction
    b. What is my company actively doing to train employees and CE and digitalization in construction?
2. Barriers in education
    a. Stimulating hypotheses were suggested and discussed by the participants: (1) "Lack of interdisciplinary knowledge: The majority of lecturers do not have sufficient and interdisciplinary knowledge" and (2) Limited consideration of the circular economy in curricula: circular economy does not yet play a major role in does not yet play a major role in education and training in the construction sector"
3. Potentials and solutions in education
    a. Which solutions are required in the educational system?
    b. What do your wishes for other stakeholders?

Which type of education and target groups were concerned? (e.g. higher education, vocational education, life-long learning, students, professionals, etc.)

All stakeholders represented in the quintuple helix were included in the workshop. Participants from University, vocational schools, industry (construction and architects), start-ups as well as representatives from think-tanks were included.

What knowledge gaps, skills are missing for some specific groups?

1) Industry:
    a. SME: training programmes exist, interdisciplinary knowledge is facilized due to broad knowledge covered in team
    b. Industry: construction workers are not trained to the current state of the art – workshops and continuous learning programmes should be implemented.
2) University & Vocational Training:
    a. Vocational Students: participants report that the practical relevancy of certain topics is not often clear. Interactions with other industrial stakeholders to integrate practical elements into the study are promoted.
    b. University: circular economy and digital construction requires interdisciplinary knowledge. Thus, fostering interactions between different stakeholder groups is

necessary. Basic knowledge on circular economy should be considered as an elementary subject.

Participants were asked to identify their wishes to other groups:

From University to other stakeholders:

In the context of industrial and small to medium-sized enterprises (SMEs), there is a call to enhance collaboration with educational institutions.

Architects are encouraged to be trained on circular economy (supported professional development opportunities) and to perceive sustainability as a positive and innovative design method/task.

Vocational students (HTL) and other universities are urged to integrate circular economy into their curriculum by including experts from different sectors.

For public stakeholders, the emphasis is on making circular economy accessible for all age groups.

From participants representing vocational schools, industry and SMEs to the following stakeholders:

Architects:

- Undertake more pilot projects/pioneering initiatives to establish circular and digital construction practices.
- Incorporate sustainable building materials into planning and engage in more dialogue with clients to implement sustainable products/ideas.
- Display openness to publicly tendering test projects.

Vocational schools:

- Foster connections and collaborative challenges with start-ups, create internship opportunities, and establish open industry networks.
- Facilitate permeability and further education opportunities for former HTL graduates.
- Build competencies for working professionals through evening programs.
- Strengthen collaboration with industries and universities for internships, courses, and projects.

University:

- Implement pilot projects, collaborations, and facilitate market access.
- Provide internship opportunities for vocational students.
- Advocate against further hindrances, such as Green Deal lobbying.
- Proactively address future potentials and strengthen earnest efforts.
- Welcome openness to Open Innovation and clear support for piloting.
- Offer opportunities for knowledge transfer and skill enhancement for SMEs, freelancers, and artisanal businesses (future clients).
- Leverage a strong established network and influence to foster a sustainable economy from its inception.
- Attract talent through innovation events and share insights.

Industry:

- Implement pilot projects, collaborations, and facilitate market access.
- Provide internship opportunities for vocational students.
- Advocate against further hindrances, such as Green Deal lobbying.

- Proactively address future potentials and strengthen earnest efforts.
- Welcome openness to Open Innovation and clear support for piloting.
- Offer opportunities for knowledge transfer and skill enhancement for SMEs, freelancers, and artisanal businesses (future clients).
- Leverage a strong established network and influence to foster a sustainable economy from its inception.
- Attract talent through innovation events and share insights.

Public Stakeholders:

- Advocacy for legal determinations which facilitate circular and digital construction practices
- Adjusting tender criteria (circularity rate, minimum shares of secondary raw materials, primary energy consumption).
- Serious halt to new construction projects and consistent demonstration of reuse potentials.

Conclusions, major findings about education potential:

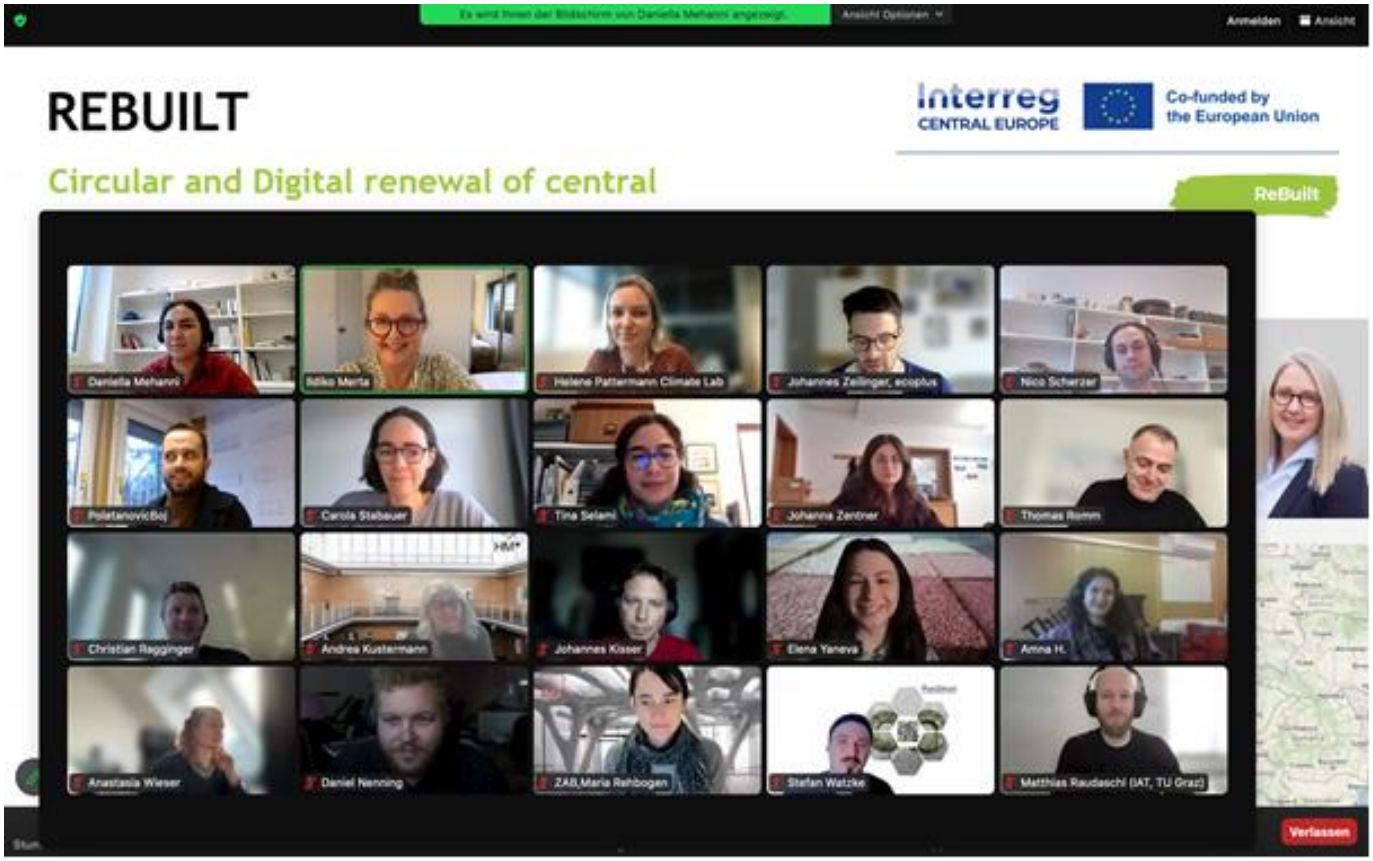
- Students show a strong level of interest in circular and digital construction. Barriers that inhibit educational opportunities are currently courses that are not adapted to the current state of the art.
- To develop effective training programmes and foster life-long training, it is required to include stakeholders coming from interdisciplinary fields of study. Preparing study material is time-intensive and requires interdisciplinary communication
- Participants concluded that the number of educational training programmes are increasing, nevertheless, the impact and effectiveness of these trainings will unfold in the next years
- A major lever to promote research and development at universities is enabling more opportunities for research funding and the creation of PhD positions.

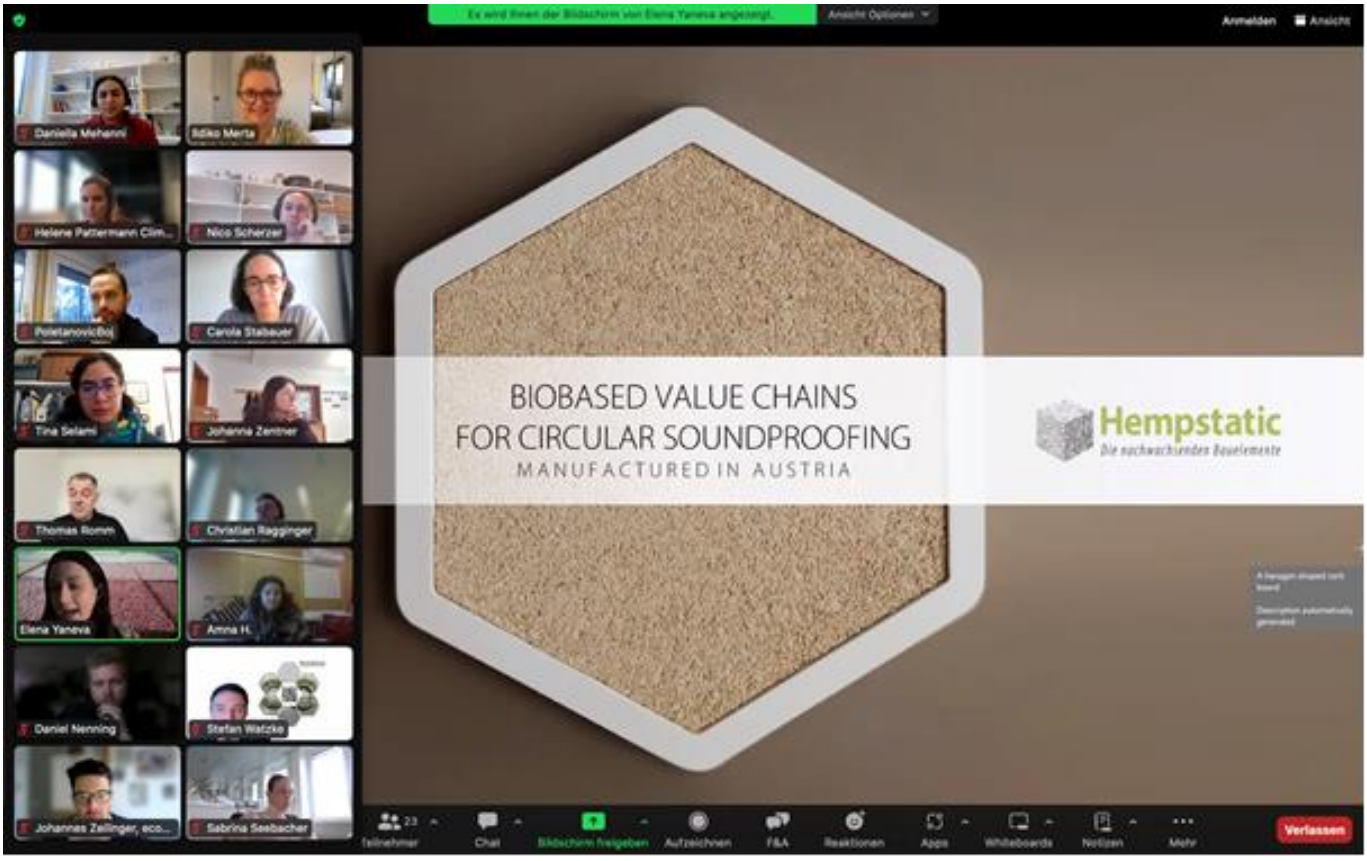
7. Communication of the event

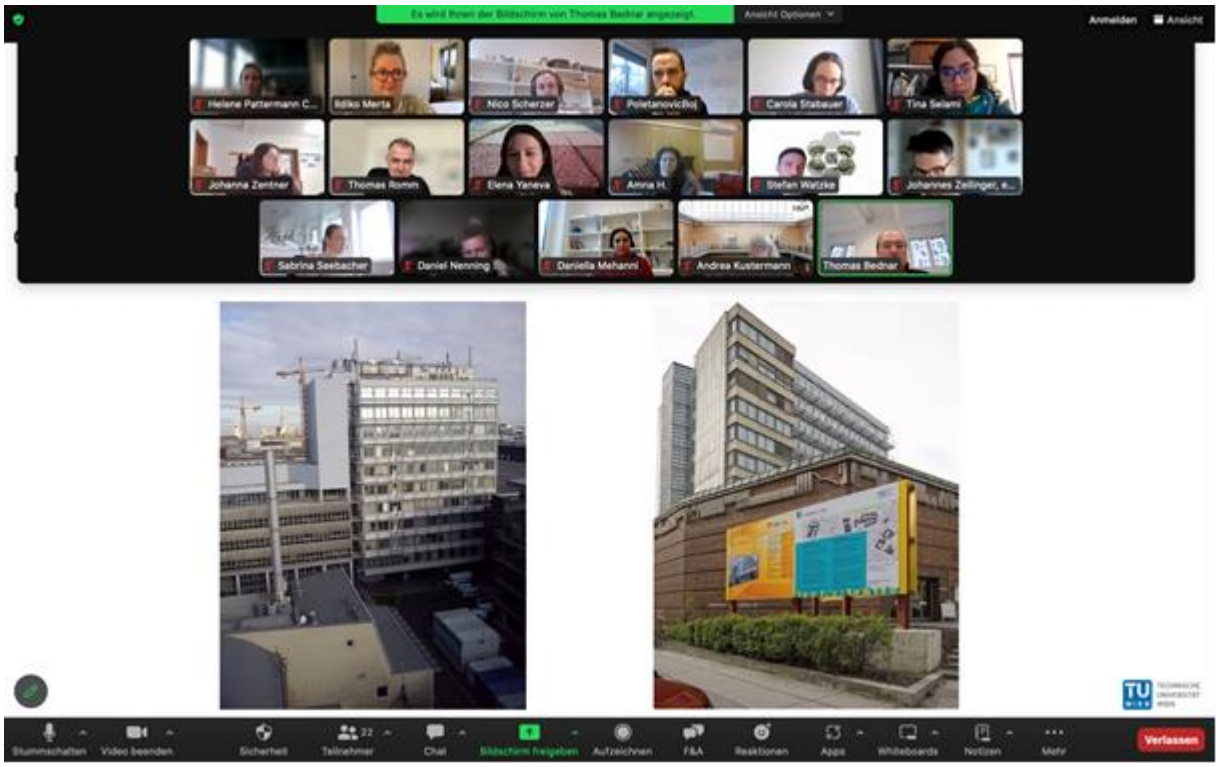
Dissemination of the event:

The results of the focus sessions were distributed amongst the participants and people that initially signed up for the workshops and are included in the Appendix. Images of the event are provided on the following pages. The event was promoted on the TU Wien project homepage and a recap of the event was posted as well. In total, two social media posts on LinkedIn were made by the Climate Lab and by a keynote speaker.

Photos of the event:







Dissemination of the event:

Daniella Mehanni reposted this

Climate Lab
4,630 followers
1h •

⏳ ♻️ Letzte Chance - Online Workshop "Zirkuläres Bauen" 🟦... gemeinsam mit der Technische Universität Wien organisieren wir einen Online-Workshop zum Thema "Zirkuläres und Digitales Bauen in Österreich – Status Quo und Bildungspotential".

🛠️ Gemeinsam möchten wir Lücken und Potenziale in der Bauausbildung identifizieren und diskutieren. Zunächst werden Vertreter:innen aus verschiedensten Bereichen des Bausektors über Ihre Erfahrungen zu nachhaltigen Baupraktiken die Diskussion anregen.

🔨 Anschließend diskutieren wir in Fokusgruppen die Frage, wie zirkuläres und digitales Bauen in Österreich in Aus-/Weiterbildung implementiert werden kann?

🤩 Wann und Wo?
👉 Montag, 11. Dezember, 09:00-11:00; Online
Anmeldung 👉 Bis 6. Dezember hier: https://lnkd.in/gjkrb9a7
Weiter Infos 👉 https://hubs.ly/Q02bNh5r0

ℹ️ Der Workshop ist Teil des Forschungsprojektes "ReBuilt – Circular and Digital Renewal of Central Europe Construction and Building Sector", das vom EU-Programm Interreg Central Europe unterstützt wird.

#ReBuilt, #InterregCE
, #cooperationiscentral #smarter #greener #CircularEconomy #Circularity #Bauwend

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December 18th, 2023

Importance of Education in Implementing Circular and Digital Practices



November 27th, 2023

Invitation: Workshop on Circular and Digital Construction in Austria – Status Quo and Educational Potential

Poster promoting the event:

TU WIEN Bau & Umwelt wbb

In Kooperation mit CLIMATE LAB

Interreg CENTRAL EUROPE
Co-funded by the European Union
ReBuilt

ZIRKULÄRES UND DIGITALES BAUEN IN ÖSTERREICH - STATUS QUO UND BILDUNGSPOTENTIAL

Montag, 11.12.2023 9:00-11:00, online

- Vorstellung ReBuilt und ClimateLab
- Status quo et quo vadis?
- Good Practices zum Thema Kreislaufwirtschaft und Digitalisierung in der Anwendung
  - → Industrie und SME: *Hempstatic - Biobased Value Chains for Circular Soundproofing* - Elena Yaneva (Hempstatic)
  - → Universität: *Simultan Metadaten-Modell: Sicherstellung von digitaler Konsistenz, Interoperabilität und Praktikabilität* – Sabine Sint (TU Wien)
  - → Architektur: *tba* - Thomas Romm (forschen planen bauen)
- Fokusgruppen zu Fragestellung: Wie kann zirkuläres und digitales Bauen in Österreich in Aus-/Weiterbildung implementiert werden?

wir freuen uns, Sie im Namen der Technischen Universität Wien zu unserem Workshop "Zirkuläres Und Digitales Bauen In Österreich - Status Quo Und Bildungspotentiale" einzuladen. Die Veranstaltung wird im Rahmen des EU-Projekts "ReBuilt" stattfinden.

Ziel des Workshops ist es gemeinsam mit Ihnen Lücken sowie Potentiale in der Bauausbildung zu identifizieren und diskutieren. Um ein breites Bild zu bekommen, richtet sich der Workshop an verschiedene Interessensvertretungen, darunter **HTL/Universität, Architekt_Innen und Investor_Innen, öffentliche Akteur_Innen und Industrie**.

Worum geht es in ReBuilt?

ReBuilt ist ein internationales Forschungsprojekt, welches durch das Förderprogramm Interreg Central Europe möglich gemacht wird. Das Ziel des Projektes ist es **Trainingsprogramme für relevante Akteur_Innen zu entwickeln**, an technischen und wissenschaftlichen Lösungen zu arbeiten und schließlich eine gemeinsame Strategie für zirkuläres und digitales Bauen in Europa zu entwickeln.



#cooperationiscentral

www.interreg-central.eu/projects/rebuilt/

Exert of Miro-board used during the focus groups



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ReBuilt

ZIRKULÄRES UND DIGITALES BAUEN IN ÖSTERREICH

- STATUS QUO UND BILDUNGSPOTENTIAL -

Montag, 11.12.2023 9:00–11:00, online

Teil 1: Impulsphase

- Einführung – Vorstellungsrunde
- Vorstellung Climate Lab
- Impulstalks zum Thema Kreislaufwirtschaft und Digitalisierung in der Anwendung
  - → Industrie und SME: *Hempstatic - Biobased Value Chains for Circular Soundproofing* - Hempstatic | DI **Elena Yaneva**
  - → Universität: *Simultan Metadaten-Modell: Sicherstellung von digitaler Konsistenz, Interoperabilität und Praktikabilität* – TU Wien | Prof. **Thomas Bednar**
  - → Architektur: forschen planen bauen ZT | DI **Thomas Romm**

Teil 2: Reflexionsphase

- Fokusgruppen zu Fragestellung: Wie kann zirkuläres und digitales Bauen in Österreich in Aus-/Weiterbildung implementiert werden?
- **Gruppendiskussion**

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Projekthomepage:
https://rebuilt.project.tuwien.ac.at/about/

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www.interreg-central.eu/projects/rebuilt/

Vertreter_innen

Organisationsteam: TU Wien, Climate Lab

Teilnehmer_innen: Bau.Energie.Umwelt Cluster NÖ, TU Wien, Greenpass GmbH, alchemia nova, Bautechnikum Wien, TU Graz, Hempstatic, Strabag, Zukunftsargentur Bau, ParaStruct, IKA Akademie der bildenden Künste

Resultate der Fokusgruppen

Die Fokusgruppe Industrie-HTL-Architekt_inenn wurden die Herausforderungen sowie die Potentiale für zirkuläres und digitales Bauen in der Aus- und Weiterbildung erörtert unter der Moderation von Daniella Mehanni, TU Wien. Für die Erarbeitung wurde die Plattform Miro verwendet

Praktische Erfahrungen der Teilnehmenden bei Kreislaufwirtschaft und Digitalisierung im Bauwesen:

- Emissionsarme Produktion Standardisierung, Industrie 4.0 mit dem Ziel/Vision der Klimaneutralität bis 2040
- Lokale Wertschöpfung/Mehrwert für die regionale Wirtschaft
- BIM und Digitalisierung liegen stark im Fokus, ebenso Verknüpfung Digitalisierung und Kreislaufwirtschaft: vermehrt Digitalisierung von Aufbereitungsprozessen und Verarbeitung von neuen Abfallströmen zu Sekundärrohstoffen
- Wandel wahrnehmbar in Richtung Nachhaltigkeit/Kreislaufwirtschaft im Bauwesen
- Verstärkter Austausch innerhalb des Konzerns zwischen Abteilungen (z.B. Planung und Abfallmangement)
- HTL: Austausch mit relevanten Stakeholder vorhanden, Ausbildung BIM+CE in Teilen vorhanden. Vision: Implementierung im Lehrplan wie auch eine unmittelbare Umsetzung im Unterricht

Good Practices:

Transformer – Förderung Forschungsprojekte hinsichtlich Verwendung von Leerstand als Lehrort für Schüler_innen

adASTRA Programm – Intrapreneurship-Programm der Strabag zur Unterstützung zur Umsetzung von Geschäftsideen/Start-Up Schaffung

ParaStruct – Entwicklung von zirkulären Materialien aus Reststoffmassen biogenen und mineralischen Ursprungs v.a. Feinstfraktionen

Was macht mein Unternehmen aktiv, um Mitarbeiter_innen auszubilden?

- Teilnahme an Workshops und Seminaren
- Fachliteratur, Kongresse, Messen, themen-spezifische Weiterbildungen
- Inklusion in allen Unternehmensbereichen
- SME: Team vereint bereits interdisziplinäres Know-How, Kontinuierliches Lernen an der Tagesordnung
- HTL: Schulungen für Lehrer_innen an der PH geplant (HTL Mödling)

Bringt's was?

Pionierarbeit wird letztendlich in den kommenden Jahren ersichtlich

Welche Lösungen braucht es im Bildungswesen

HTL: Mehr Bezug zu Anwendungen beispielsweise durch Wirtschaftlichkeitsrechnung, Zugänglichkeit zu der Thematik ermöglichen, um breite Masse zu erreichen und Interesse zu wecken.

Industrie: Weiterbildungen und Workshops für am Bau-arbeitende, um somit dem aktuellen Stand der Technik nachzugehen.

Es verlangt mehr Öffentlichkeitsarbeit und Bewusstseinschaffung der inhärenten Potentiale der Kreislaufwirtschaft und langfristigen Überblick durch beispielsweise Erwachsenenbildung und Kompetenzaufbau quer durch die Bevölkerung

Wünsche an andere Stakeholdergruppen:

Wünsche an Architekt_innen:

- Mehr Pilotprojekte/Pionierarbeit, um zirkuläre und digitale Baupraktiken durchzusetzen.
- Mehr mit nachhaltigen Baumaterialien planen. Mehr Austausch mit Bauherr_innen, um nachhaltige Produkte/Ideen umzusetzen
- Offenheit für das öffentliche Ausschreiben von Testprojekten

Wünsche an HTL:

- Kontakt und gemeinsame Challenges mit Startups, Praktikumsmöglichkeiten, offene Industrienetzwerke schaffen
- Durchlässigkeit und Weiterbildungen für (ehem.) HTL-Abgänger
- Kompetenzaufbau für professionelle Arbeitende in Abendprogrammen
- Zusammenarbeit mit Industrie und Universitäten stärken, für Praktika, Lehrveranstaltungen, Projekte

Wünsche an Universität

- Förderung von interdisziplinärer Forschung, Start-Up Inkubatoren,
- Organisation von Student_innen-Challenges mit Unternehmen
- Promotion von nachhaltigen Jobstellen
- Bewusstseinsschaffende Öffentlichkeitsarbeit für Nicht-Akademiker_innen
- Aufbrechen, Überwinden von Instituts- und Universitätsgrenzen
- Zur Verfügung stellen von Labor- und Testeinrichtungen für Start-Ups, die außerhalb der Organisation gegründet wurden
- Wirtschaftsrelevante Themen klar auf nachhaltiger/zirkulärer Zielsetzung vermitteln

Wünsche an öffentliche Akteur_innen

- Unterstützung bei der Umsetzung von Standardisierung und Pilotierung kreislauffähiger, nachhaltiger und digitaler Lösungen
- Einforderung gesetzlicher Feststellung abseits jeglicher Tagespolitik
- Ausschreibungskriterien anpassen (Zirkularitätsrate, Sekundärrohstoff-Mindestanteile, Primärenergieverbrauch)
- Ernsthafter Stopp von Neubau-Projketen und konsequentes Zeigen von Weiternutzungspotentialen

Wünsche an Industrie:

- Pilotprojekte, Kooperationen, Marktzugang
- Praktikumsplätze für HTL-Schüler_innen
- Keinen weiteren Sand ins Getriebe! (z.B. Green Deal Lobbyismus)
- Zukunftspotentiale frühzeitig angehen und ernsthafte Bestreben stärken
- Offenheit für Open Innovation und Pilotierung klar begrüßen
- Mitnahme und Kompetenzerweiterungen für KMUs, Selbstständige und Handwerker-Betriebe anbieten (zukünftige Kundinnen)
- Starkes etabliertes Netzwerk und Einfluss nutzen, eine zukunftsfähige Wirtschaft aus der Wiege zu heben
- Talentanwerbung durch Innovationsveranstaltungen, zur Verfügung stellen von Erkenntnissen

Zusammenfassung Rebuilt Workshop

Universität - Fokusgruppe

Climate Lab Moderation

11.12.2023, 09:00-11:00

Online via Zoom

In der Fokusgruppe Universität wurden die Bildungspotenziale für Kreislaufwirtschaft und Digitalisierung im universitären Kontext mit Stakeholdern aus der Lehre unter der Moderation von Helene Pattermann, Climate Lab erarbeitet. Diese Fokusgruppe baute auf den Ergebnissen aus den Workshops im Zuge des Projektes “Verankerung der Kreislaufwirtschaft in Aus-und Weiterbildungen im Bausektor” auf. Diese Ergebnisse wurden zu Beginn zur Diskussion gestellt und dann weiterbearbeitet.

Status Quo Teilnehmende:

Alle Teilnehmende haben bereits Vorlesungen zu Digitalisierung und Zirkularität besucht bzw. Geleitet.

Praktische Erfahrungen der Teilnehmenden bei Kreislaufwirtschaft und Digitalisierung im Bauwesen:

- Reuse stößt oft noch an legale Hindernisse
- Stößt mittlerweile auf mehr Interesse von allen Seiten
- Gleichzeitig sind Kosten oft immer noch maßgebend
- KW-Wissen ist Querschnittsmaterie
- Forschungsprojekte durchgeführt zu kreislauffähigen Standard-Details, rückbaufähigen Schnittstellen zwischen Beton/Holzbauteilen und Ausbau/TGA, Datenstrukturen
- Lehre: Entwerfen zirkulär- schwierig umzusetzen/zu denken

- Recycling Gesteinskörnung und R-Beton im Bereich von Abschlussarbeit, Forschung an HM
- Akzeptanz in Baubranche schaffen

Größte Herausforderungen bei Verankerung von Kreislaufwirtschaft in der Ausbildung

Ergänzung zur vorab identifizierten größten Hebel:

"Mangel an interdisziplinärem Wissen: Der Großteil der Lehrenden verfügt nicht über ausreichendes und interdisziplinäres Wissen"

- Oft sind Inhalte mehrere Jahre alt und werden nicht regelmäßig upgedatet
- Fokus: Klimaschutz und nicht ausschließlich Klimawandelanpassung
- teilweise wird ungern zusammengearbeitet
    - 1 Jahr Vorbereitung: Interdiszipli. Vorlesung: nicht einfach, sehr schön
    - Institute -Struktur, ECTS will man behalten (Geld, Lehrerfüllung)
    - Zeitfaktor nicht unterschätzen (gemeinsame Sprache)
- manchmal können in eine LVA nicht alle Aspekte gepackt werden und es bräuchte eine größere Umsetzung mit mehr ECTS
    - zu viel für Studierende (Aufwand- Vorkenntnisse: zb Informatik Grundwissen aufbauen

"Begrenzte Berücksichtigung der Kreislaufwirtschaft in Lehrplänen: die Kreislaufwirtschaft spielt in der Aus- und Weiterbildung im Baubereich noch keine große Rolle"

- kaum Zeit für "neue" Lehre im Lehrplan (Studierende und Lehrende)
- ECTS doch sehr maßgeblich- was wird weggelassen?
- Barrierefreiheit noch ein Freifach
- Was wird gekürzt? Immer mehr Arbeit
- Viele relevante Studien haben noch keine verpflichtenden Lerninhalte zu dem Thema sondern nur als Freifächer oder als visiting lectures
- Städtebau und Klimaschutz zusammendenken: "Die Stadt als CO2-Senke" löst die "Stadt der kurzen Wege" ab
    - Noch viele abzuholen - Stadtplanung noch nicht so weit
    - Nutzungsoffenheit
    - nicht nur Bauphysik

Welche Lösungen braucht es in der universitären Ausbildung?

- Anhand von realen Anwendungsbeispielen besser verstehen lernen
    - mehr Bilder
    - Best Practice, nicht nur Theorie (zu abstrakt): Site visits
- Inhalte bringen um das Prinzip von Kreislauf-Hubs verständlich zu machen (by the people for the people)
- Klare Fokusbildung: Klimaschutz
- Einblicke in eine Kreislaufwirtschaft-System
- Fokussierung in Projekten auf interdisziplinäre Aspekte mit Expert*innen aus den verschiedenen Bereichen
- Stellenangebote mit konkreten Fokus - Zeit für die Einarbeitung ermöglichen
- positive Praxisbeispiele um Sichtbarkeit zu schaffen und dadurch Akzeptanz zu erhöhen in späteren Beruf
- mehr Zeit für alle (Lehrende und Studierende)
    - Semesterübergreifende LVs
- Die Aufgabe positiv einfügen (Studierende/Lehrende/Profs mitnehmen)
- Begriffe möglichst klar definieren - konkrete Ziele/Methoden ableitbar
    - z.B. Baurecht
    - Definitionen eingrenzen
    - Allgemeingültigkeit wäre wünschenswert
- KLW verpflichtend in viele Fächer und Studienrichtungen reinbringen
    - Rektor an Board bringen
    - Teil der Statik muss sich mit Reuse beschäftigen
    - Motivation der Lehrenden (weniger als Budget)
    - Seminare sind sehr frei - größere Vorlesungen von Leitung abhängig
- Sozioökonomischer Wandel durch KLW in der Praxis
    - Studium sehr prägend- Best Practice wäre gut für spätere Akzeptanz
- Rahmenbedingungen für Klimaschutz (Bewertung & Taxonomie)
    - Lebenszykulus Bau Aufgabe Architekten - Fokus verschoben
    - Ökoeffizient- Wiederverwendung- Co2 Gutschrift, Rohstoffe im Kreis
    - Lehrpläne/Honorare müssen Hand in Hand gehen

Wünsche an andere Stakeholdergruppen

Wünsche an Industrie/SME

- Verstärkt mit Lehre zusammenarbeiten

Wünsche an Architekt:innen

- Schulungen für Architekt:innen zu KLW machen (geförderte Weiterbildungsangebote)
- Nachhaltigkeit als positive neue Entwurfsmethode/Aufgabe verstehen

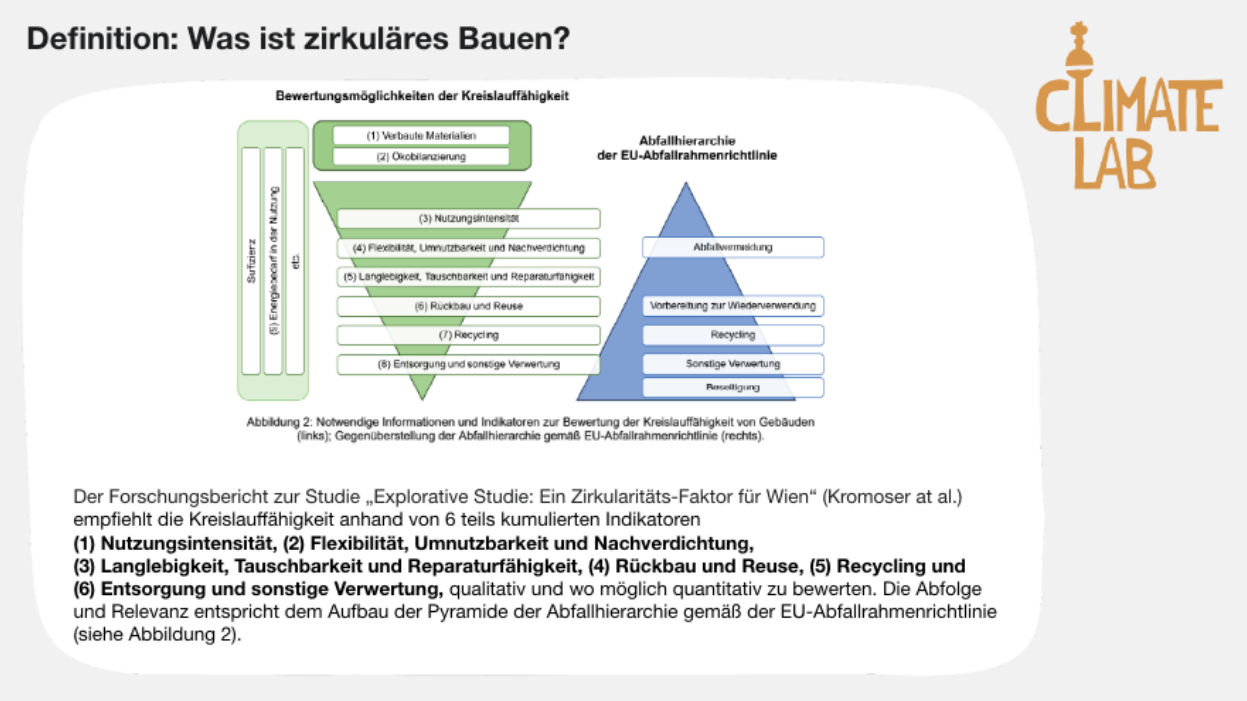
Wünsche an HTL und andere Universitäten:

- KLW von Expert:innen in das Curriculum einbringen

Wünsche an öffentliche Akteur*Innen:

- KLW in Bildung für alle Altersgruppen zugänglich machen

Definition: Was ist zirkuläres Bauen?



Vorstellung identifizierte Hebel aus dem Workshop im 19.10.2023 (Climate Lab)

Forschung und Entwicklung

- Forschungsförderung (Forschung liefert Inhalte für Ausbildung)
- Schaffung von Doktorant:innenstellen

- Förderschwerpunkte (Budget) - damit die Aspekte in der Lehre berücksichtigt werden
- Über die Leistungsvereinbarungen abrechnen, keine extra Förderungen
- Förderungen über mehrere Teile der Wertschöpfungskette denken

Bewusstseinsbildung Lehrende (Zielausrichtung)

- Bewusstseinsbildung bei Lehrenden (Weiterbildung zu Taxonomie, Ziele Kreislaufwirtschaft) um Beschleunigung der Etablierung zu erwirken
- Kooperation mit Ministerium für Forschung, Bildung und Wissenschaft
- Fortbildungskampagne für die existierenden Lehrenden
- Stipendien, Preise, Verleihungen zu dem Thema
- verpflichtend Inhalte vorgeben (über Zielvereinbarungen)

Interesse bei Studierenden

- Junge Generation fordert Kreislaufwirtschaftsinhalte von Ausbildungen

Ausbildungsinhalte erweitern und anpassen

- Etablierung von KW-Vorlesungen in Studiengängen (Raumplanung, Städtebau, Architektur, Bauwesen, Landschaftsarchitektur)
- Etablierung von Basiswissen über Kreislaufwirtschaft und interdisziplinäre Vorlesungen in allen relevanten Bauausbildungen
- Gleichzeitige Ansätze in allen Ausbildungen: Lehre, HTL, Universität und FHs, Weiterbildungen
- Planer müssen ein Fokus sein, da sie Umsetzung planen und Richtung vorgeben
- Ressourcenzuteilung zur Etablierung von mehreren Masterstudien
- Forschungsprojekte - Raum Neues auszuprobieren (ohne zusätzliche Förderanträge)

Kreislaufwirtschaft muss integraler Bestandteil des Wirtschaftens werden

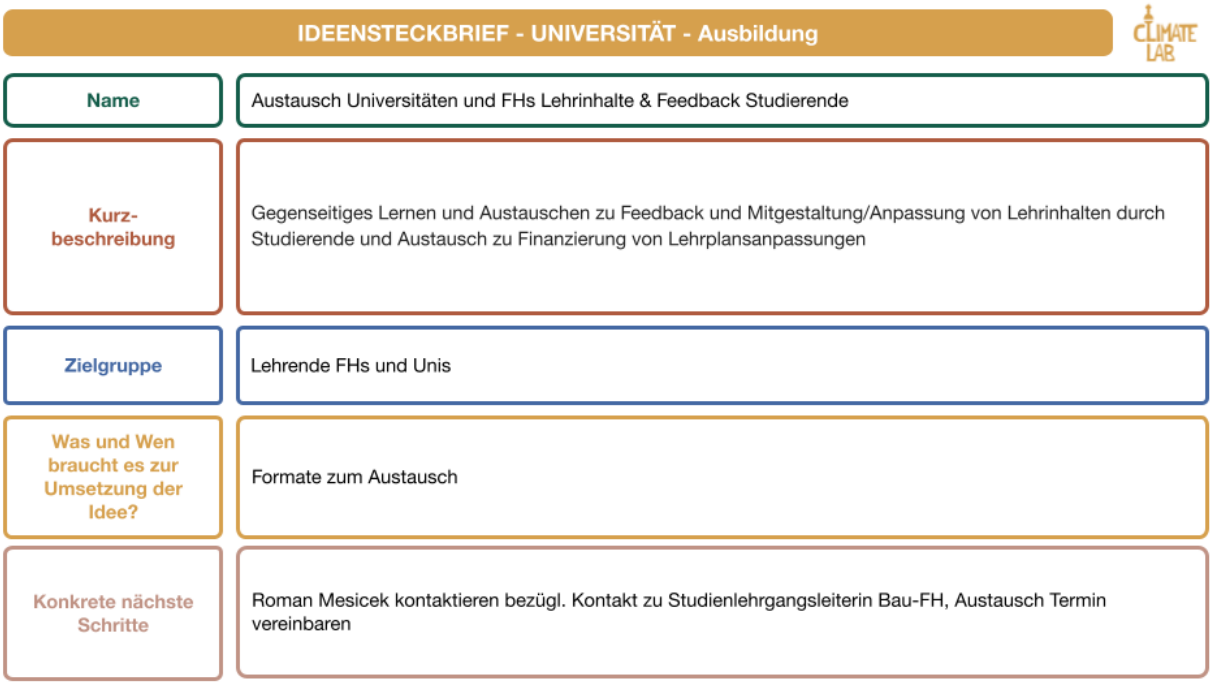
Standards und Normen (indirekte Auswirkung auf Ausbildung)

- Verpflichtende Standards (zu Sekundärrohstoffen, Aufnahme in Ausschreibungskriterien)
- Anreize schaffen (Finanzielle, nicht-finanzielle)
- Gibt es strenge Normen und Regelungen - fließt das auch in die Ausbildung ein

Kostenwahrheit (indirekte Auswirkung auf Ausbildung)

- Kreislaufwirtschaft muss in Honorar der Planer:innen abgebildet werden

Ideensteckbriefe aus vorangegangenen Workshop im Climate Lab



IDEENSTECKBRIEF - UNIVERSITÄT - Ausbildung	
Name	Austausch Universitäten und FHs Lehrinhalte & Feedback Studierende
Kurz-beschreibung	Gegenseitiges Lernen und Austauschen zu Feedback und Mitgestaltung/Anpassung von Lehrinhalten durch Studierende und Austausch zu Finanzierung von Lehrplansanpassungen
Zielgruppe	Lehrende FHs und Unis
Was und Wen braucht es zur Umsetzung der Idee?	Formate zum Austausch
Konkrete nächste Schritte	Roman Mesicek kontaktieren bezügl. Kontakt zu Studienlehrgangsleiterin Bau-FH, Austausch Termin vereinbaren

IDEENSTECKBRIEF - UNIVERSITÄT - Ausbildung	
Name	Dialogformat Studierende und Lehrende
Kurz-beschreibung	Studierenden fehlt derzeit Wissen zu Kreislaufwirtschaft und sie haben nicht die Zeitressourcen Studium kritisch zu hinterfragen. Ziel wäre “Feedbackrunden” nach Beispiel auf FHs auf Unis zu etablieren.
Zielgruppe	Lehrende des Studiengangs Architektur und Raumplanung
Was und Wen braucht es zur Umsetzung der Idee?	3 Studierende, die das organisieren (konkret: Viictoria sucht 2 weitere Studierende)
Konkrete nächste Schritte	1 Planungstreffen Studierende, Lehrende einladen, Gruppe aus Studierenden formieren, Meinungen abfragen und dann in kleiner Runde an Lehrende herantragen.

IDEENSTECKBRIEF - UNIVERSITÄT - Ausbildung	
Name	Summer School
Kurz-beschreibung	Inputvorträge von relevanten Akteur:innen entlang des Lebenszyklus mit praktischen Übungen in Teams & on-site visits
Zielgruppe	Bachelor Studierende von diversen Studienrichtungen (Ö und Erasmus)
Was und Wen braucht es zur Umsetzung der Idee?	Pädagogisch geschulte Expert:innen, Organisatoren (Raum, Material, Versorgung), Fördergeber, Studienprogramm-Verantwortliche
Konkrete nächste Schritte	Organisationsteam aufbauen, Expert:innen finden und briefen, Interesse wecken, Studierende motivieren (ETCS), Programm aufbauen, Feedback und Evaluierung

Rückmeldungen und Anregungen bitte an Helene Pattermann

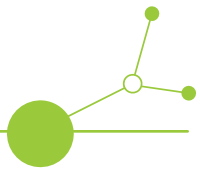
www.climatelab.at

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ReBuilt

D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction



Croatia

POR

Tadej Žurman, Šasa Fluher

Version 1.0

29.03.2024



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Summary

The regional workshop was designed to offer more personal, in-depth approach, resulting in very focused discussion on the topics chosen:

1. Identification of relevant policies, strategies and legislation and

2. Barriers, potentials, and social acceptance of circular construction

to cope with the issues that Croatia is facing:

- About 6 million tons of waste is produced in Croatia every year (about 1.5 tons per person per year).
- Croatia's economy is only 2.7% circular.
- Most of this waste comes from the construction sector and households.
- The waste management system in Croatia relies mainly on landfilling; 58% of the municipal waste produced in Croatia ends up in one of 80 active landfills in the country.
- Illegal landfilling remains a long-lasting problem.
- The construction and demolition waste sector have large material and carbon footprint and were also affected by the devastating earthquakes of 2020 and the related surge in construction and demolition waste.
- Only 5% of construction waste is recovered in Croatia.

The workshops lead us to the following conclusions – actions to taken into consideration:

- Advocating for the enforcement of legislation through a top-down approach, incorporating supervision, routine inspections, and the application of fines for non-compliance.
- Highlighting the critical importance of enhanced cooperation and communication among stakeholders to address the gap between policy formulation and practical implementation
- Affirming the validity of the objectives outlined in the proposed Circular Economy Action Plan for Construction Waste Management
- Establishment of supervision mechanisms to ensure that waste producers adhere to proper CDW handling practices and comply with relevant regulations.
- Some stakeholders are already aware that adopting new and improved practices is essential, others still must be educated about the long-term benefits of sustainable waste management, highlighting the potential economic, environmental, and social advantages of adopting responsible practices.
- Significant improvement of local environment by eliminating illegal landfilling.
- Education, outreach campaigns, and targeted communication strategies have a power to foster a culture of responsible waste management.
- Negative effect of reliance on virgin materials can be mitigated by implementing taxes or levies on virgin materials and providing financial incentives for recycling initiatives.
- Stimulating economic growth through the establishment of a novel waste recovery sector or sub-sector.

1. Introduction

Deliverable D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction aims at collecting the findings of the regional workshops, that took place in all ReBuilt countries. It is a major step the workshops extend and verify the knowledge and information, that has been collected within the desktop research phase of the Activity 1.1. This way, the current status, gaps and potentials for circular and digital construction will be identified and summarized in programme area.

The results will feed into the First transnational central European circular and digital construction conference D.1.1.2. As a result of the initial mapping, regional workshop, transnational conference, a Conceptual note for activities needed for development of circular and digital construction (D1.1.3) will be developed. Furthermore, other work packages will build upon this task in WP1, WP2 and WP3.

2. Basic information about the workshop

Name of the event: Regional workshop for mapping of barriers and opportunities for circular and digital construction

Type of event: stand along ReBuilt event

Date, time: 27.3.2024, 10.30am

Location: online

Agenda of the event:

1. Identification of relevant policies, strategies and legislation in Croatia and
2. Barriers, potentials, and social acceptance of circular construction

Presentations available: Yes

Number of participants: POR + 5

List of organizations, type of organizations listed:

- I.C.E.
- Sol.lex.sus
- Croteh
- Kirby IMG d.o.o.
- Projekt 65

3. ReBuilt focus of the event

Objective of the event:

The objective of the workshop is to expand and validate understanding and information concerning the present status, shortcomings, and prospects for circular and digital construction specifically within Croatia. It aims to delve deeper into the aspects (pillars) mentioned below, exploring the unique context of Croatia and identifying strategies to leverage the potential of circular and digital construction practices in the country. Through presentations that will facilitate discussion, participants will gain insights into the specific challenges and opportunities present in Croatia's construction sector and work towards developing tailored solutions to promote sustainability and innovation in the industry.

Which pillars of assessment of the initial mapping were discussed:

- Identification of relevant policies, strategies and legislation (e.g. waste management, construction, (bio)circular economy);
- Barriers, potentials, and social acceptance of circular construction.

4. Identification of relevant policies, strategies and legislation

The workshop began with a presentation by a project partner offering some statistical data of waste produced in Croatia andissues identified in the sector, emphasising the importance of policy and legislation in the context of circular and digital construction. The presentation included an overview of relevant regulations and ordinances at the national level on waste management, disposal and EoW status.

Due to a small number of participants a fruitful focused discussion was developed, exploring how these policies influence different aspects of the construction industry, such as waste management, disposal, EoW status considerations and broader sustainability initiatives. Key points were highlighted, challenges, and opportunities discussed. Through this exploration, participants gained insights into the interconnectedness of policies and their impacts on promoting sustainability within the construction sector.

Participants have actively engaged in a discussion, sharing their knowledge, experiences, and perspectives on relevant policies and legislation, drawing on diverse backgrounds and expertise.

What was the outcome of the discussion?

Following the presentation of Croatia's regulations, ordinances, Waste Management Plan of the Republic of Croatia for the period 2023-2028, and the proposed Circular Economy Action Plan, participants engaged in a thorough discussion. They collectively acknowledged that Croatia possesses adequate national legislative acquis and policies. However, there was a shared sentiment that these policies often fall short in terms of effective implementation due to a lack of adequate supervision. Furthermore, an in-depth discussion on the EoW Criteria was developed.

Participants emphasized the importance of enforcing legislation through a top-down approach, which involves rigorous supervision, regular inspections, and the imposition of fines for non-compliance. However, they highlighted a significant challenge stemming from the insufficient number of public supervisory employees tasked with overseeing compliance.

Moreover, the discussion shed light on the existing gap between policy formulation and practical implementation. Participants identified a critical need for enhanced dialogue and collaboration among various stakeholders, including national, regional, and municipal decision-makers, legislators, and actors across of the value chains. They emphasized the importance of fostering greater cooperation and communication channels to bridge this gap and ensure that policies are effectively translated into action on the ground.

The proposed Circular Economy Action Plan for Construction Waste Management provides a roadmap aimed at diminishing waste generation and attaining the EU objective of achieving a 70% recovery rate for construction waste, encompassing recycling and other forms of waste utilization. It includes goals like strengthening the market for secondary raw materials and by-products, improving construction waste data collection, reducing illegal construction waste dumping, and increasing waste recovery. The participants unanimously concurred on the significance of these objectives in advancing sustainable waste management practices within the construction sector.

Conclusions, major findings about relevant policies, strategies and legislation:

- Advocating for the enforcement of legislation through a top-down approach, incorporating supervision, routine inspections, and the application of fines for non-compliance.
- Highlighting the critical importance of enhanced cooperation and communication among stakeholders to address the gap between policy formulation and practical implementation
- Affirming the validity of the objectives outlined in the proposed Circular Economy Action Plan for Construction Waste Management

Please, list the key identified policies, strategies and legislation for e.g. waste management, construction, (bio)circular economy, digitalisation.

- Waste Management Plan of the Republic of Croatia for the period 2023-2028 and proposed Circular Economy Action Plan on Construction and Demolition Waste
- proposed Circular Economy Action Plan for Construction Waste Management
- Waste Management Act (OG 84/21)
- Ordinance on Waste Management (OG 81/20)
- Ordinance on the Methods and Conditions of Waste Disposal, Categories and Working Conditions for Landfills (OG 114/15, 103/18, 56/19)
- Ordinance on Construction Waste and Asbestos-Containing Waste (OG 69/16)
- Ordinance on the Waste Catalogue (OG 90/15)
- Ordinance on By-products and End-of-waste Status (OG 117/14)
- Ordinance on the Register of Environmental Pollution (NN 3/2022)

5. Barriers, potentials, and social acceptance of circular construction

As mentioned above the workshop began with a presentation by a project partner offering some statistic data of waste produced in Croatia and issues identified in the sector, emphasising the importance of policy and legislation in the context of circular and digital construction, followed by the results of the PESTEL and SWOT analyses conducted in the initial mapping activity.

Also, in this regard, a productive discussion took place, validating the barriers and potentials surrounding waste management, disposal practices, and sustainability initiatives in general, in the Republic of Croatia. The discussion was grounded in economic, sociological, and environmental perspectives, also acknowledging political, legislative and technological aspects, providing a comprehensive understanding of the challenges and opportunities associated with these aspects within the Croatian context.

Relevant outcome of the discussion:

The participants agreed that the absence of effective supervision over waste producers and their handling practices concerning Construction and Demolition Waste (CDW) poses significant challenges. This lack of oversight creates opportunities for irresponsible waste management practices, including illegal dumping or improper disposal methods. Without proper supervision, there is a risk of non-compliance with waste management regulations, leading to environmental pollution, health hazards, and the inefficient use of resources. Addressing this issue requires the establishment of robust monitoring and enforcement mechanisms to ensure that waste producers adhere to proper CDW handling practices and comply with relevant regulations.

Participants are also concerned that some stakeholders may prioritize short-term economic gains over environmental concerns, leading to careless disregard for sustainable waste management practices. This behaviour can manifest in practices such as cost-cutting measures that compromise environmental standards, illegal dumping to avoid disposal fees, or failure to invest in sustainable waste management technologies. Participants propose the enhancement of stakeholders' engagement and promoting awareness about the long-term benefits of sustainable waste management, highlighting the potential economic, environmental, and social advantages of adopting responsible practices.

Furthermore, a gap in understanding CDW among decision-makers and the general public was mentioned. Decision-makers may lack the necessary knowledge about the environmental impact of CDW and the importance of proper waste management practices. Similarly, the general public may have limited awareness about CDW, its sources, and its potential environmental consequences. Participants propose enhancing awareness through education, outreach campaigns, and targeted communication strategies to foster a culture of responsible waste management and encouraging stakeholders to adopt sustainable practices.

Participants further outlined the inexpensive virgin materials that affect the demand for secondary raw materials and efforts to close the material loops, hinder recycling efforts, as businesses may find it more cost-effective to use virgin materials instead of investing in recycling processes, and overall impede progress towards circular economy goals. This reliance on virgin resources may also have negative environmental implications.

Identified barriers:

- Inadequate Supervision over Waste Producers (also due to insufficient number of public supervisory employees)
- Prioritizing economic benefits over environmental benefits
- Low Awareness about CDW
- Inexpensive virgin materials

Identified potentials:

- Establishment of supervision mechanisms to ensure that waste producers adhere to proper CDW handling practices and comply with relevant regulations.
- Some stakeholders are already aware that adopting new and improved practices is essential, others still must be educated about the long-term benefits of sustainable waste management, highlighting the potential economic, environmental, and social advantages of adopting responsible practices.
- Significant improvement of local environment by eliminating illegal landfilling.
- Education, outreach campaigns, and targeted communication strategies have a power to foster a culture of responsible waste management.
- Negative effect of reliance on virgin materials can be mitigated by implementing taxes or levies on virgin materials and providing financial incentives for recycling initiatives.
- Stimulating economic growth through the establishment of a novel waste recovery sector or sub-sector.

Conclusions, major findings about the social acceptance of circular construction:

Even though strong interest by some actors to tackle the issue of CDW recovery in a sustainable and environmentally sound way is present, and awareness of some stakeholders that new, better practices are definitely needed, promoting social acceptance of circular construction still requires comprehensive efforts to:

- enhance awareness
- engage stakeholders
- communicate the benefits of adopting circular principles in the construction sector.

6. Communication of the event

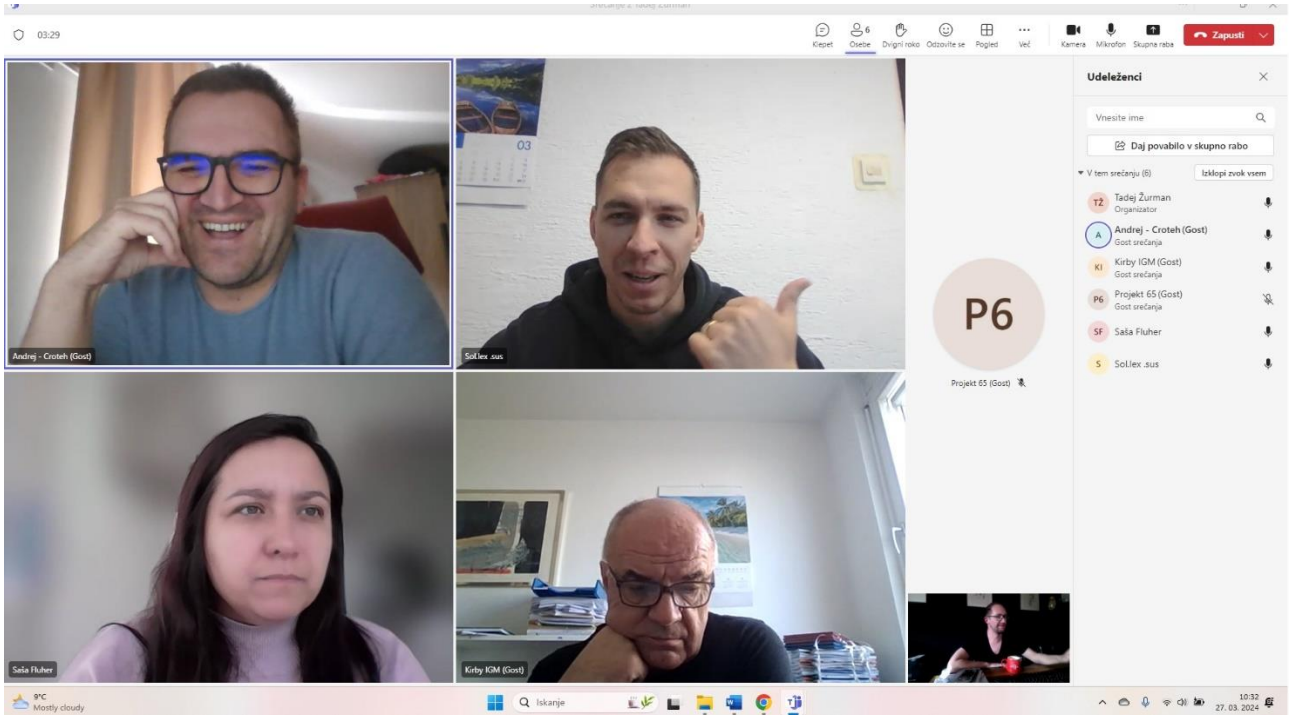
We have carefully chosen the participants of the event in order to obtain the most valuable input for the topics discussed. Participants were contacted in person or by phone to inform them of the upcoming workshop, providing participants with detailed information about the workshop, date and time.

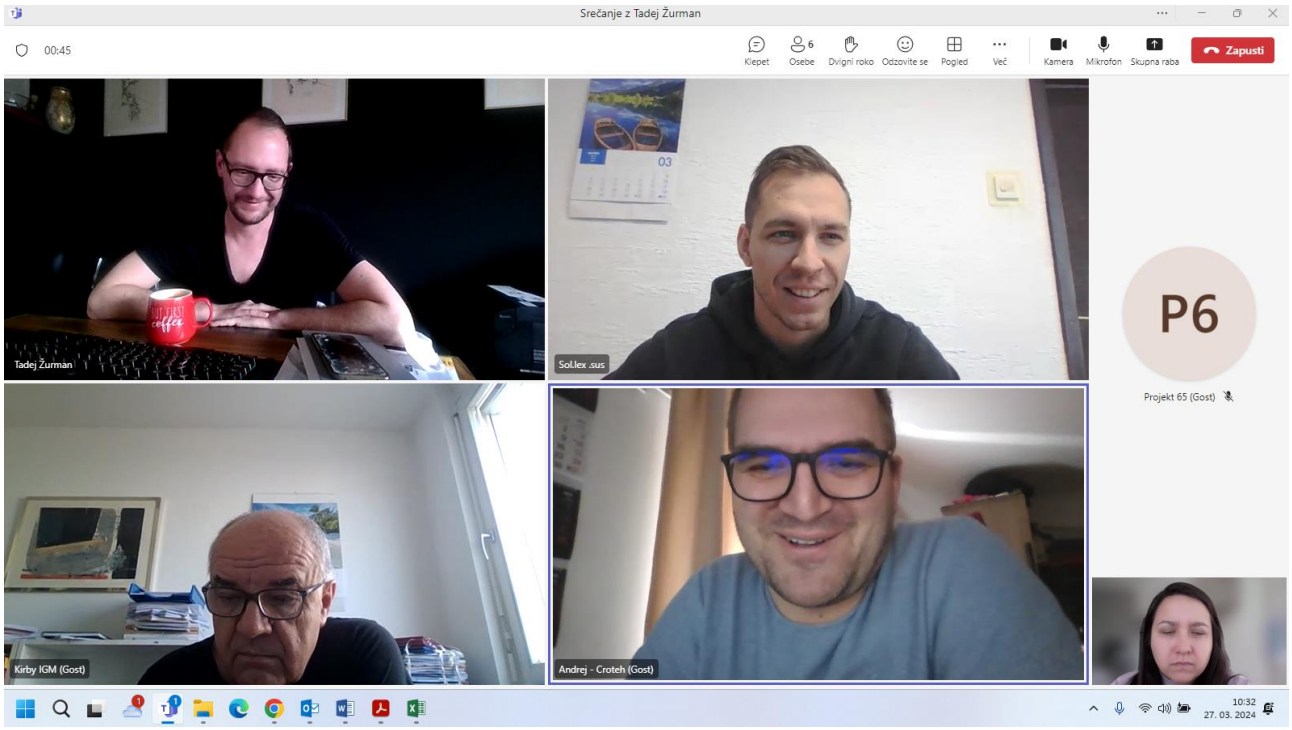
Workshop materials (presentations) were shared with the participants at the end of the event. Additionally, to conclude the workshop, we emphasised networking opportunities for participants to stay connected with each other and continue discussions beyond the workshop. The participants shared their contact information for ongoing communication and collaboration.

After the event a thank-you call was made to all participants, expressing appreciation for their attendance and contributions to the workshop.

Furthermore, participants will be receiving future updates to keep them informed about any follow-up actions or future events related to the topics discussed during the workshop.

Photos and minutes including notes of the event were prepared.





7. Any other relavant information to share

Participants show special interest in EoW criteria.

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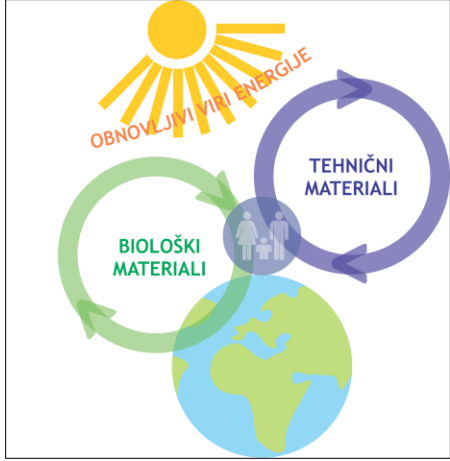
Act 1.1 Regionalna radionica za mapiranje prepreka i mogućnosti za kružnu i digitalnu gradnju



POR, PP7

On-line | 27-3-2024

STATISTIČKI PODACI – „ŠTO JE PROBLEM“



- U Hrvatskoj se godišnje proizvede **6 milijuna tona otpada (oko 1500 kg po osobi godišnje).**
- Hrvatsko gospodarstvo je samo **2,7% kružno**.
- Većina tog otpada dolazi iz **građevinskog sektora** i kućanstava.
- **Ilegalno odlaganje** građevinskog otpada u prostor i okoliš ostaje dugotrajan problem.
- Sektor građevinskog otpada i otpada od rušenja odabran je kao prioritet za razvoj petogodišnjeg **akcijskog plana kružnog gospodarstva 2023-2027**. Ovi sektori imaju veliki materijalni i ugljični otisak, ali su također bili pogođeni razornim **potresima 2020** i povezanim porastom građevinskog otpada i otpada od rušenja.
- U Hrvatskoj se **oporabi samo 5% građevinskog otpada -** prijelaz na kružno gospodarstvo na tom području najveći je izazov





Mapiranje dionika - tko je problem

Skupina glumaca	Glumci unutar skupina	Opis1
Proizvođači otpada	Proizvođač otpada	Svatko čije aktivnosti stvaraju otpad (izvorni proizvođač otpada) ili svatko tko provodi prethodnu obradu, miješanje ili druge radnje koje dovode do promjene u prirodi ili sastavu tog otpada.
	Držač otpada	Proizvođač otpada ili fizička ili pravna osoba koja je u posjedu otpada
Prerađivači otpada	Prerađivač otpada	Pravna ili fizička osoba čija je djelatnost prerada otpada.
	Sakupljač otpada	Svatko čija je djelatnost skupljanje otpada, uključujući prethodno razvrstavanje i prethodno skladištenje otpada za potrebe prijevoza do postrojenja za obradu otpada
	Transporter otpada	Pravna ili fizička osoba čija je djelatnost prijevoz otpada od posjednika otpada prema Uredbi o otpadu.
	Posrednik za otpad	Svako poduzeće koje organizira oporabu ili zbrinjavanje otpada u ime drugih, uključujući posrednike koji fizički ne posjeduju otpad
	Trgovac otpadom	Svako poduzeće koje djeluje u ulozi nalogodavca za kupnju i naknadnu prodaju otpada, uključujući trgovce koji fizički ne posjeduju otpad.

IDENTIFIKACIJA RELEVANTNIH POLITIKA, STRATEGIJA I ZAKONODAVSTVA U HRVATSKOJ

Plan gospodarenja otpadom Republike Hrvatske za razdoblje 2023-2028
predloženi Akcijski plan kružnog gospodarstva za gospodarenje građevinskim otpadom (nudi Roadmap)
Zakon o gospodarenju otpadom (NN 84/21)
Pravilnik o gospodarenju otpadom (NN 81/20)
Pravilnik o načinima i uvjetima zbrinjavanja otpada, kategorijama i uvjetima rada odlagališta otpada (NN 114/15, 103/18, 56/19)
Pravilnik o građevnom otpadu i otpadu koji sadrži azbest (NN 69/16)
Pravilnik o Katalogu otpada (NN 90/15)
Pravilnik o nusproizvodima i ukidanju statusa otpada(NN 117/14)
Pravilnik o Registru onečišćavanja okoliša (NN 3/2022)



Political	Regulation is established and would be sufficient but is not implemented - lack of supervision.
	No dialog between decision-makers, legislators, and actors.
	Demand-side measures are needed for use of SRM based construction products made from recycled CDW in construction sector.
Economic	No final market for SRM based construction product is existing in the subject area.
	Low price virgin raw materials.
	No encouragement for use of SRM based construction products.
Sociological	Increasing social acceptance of SRM based products.
	Fact-based responsible media coverage of SRM based products use is needed.
	Education and awareness raising of sustainable.
Technology	Dissemination of BAT is very important as well as lifelong learning and education.
	Investment in new technologies.
Legislation	Legislation should be implemented via a top-down approach (supervision, inspections, and fines).
Environmental	There is gap between policies and actual practice. Low awareness among general public in industry about environmental responsibility.

Rasprava

STRENGTHS	WEAKNESSES
- Strong interest by some actors to tackle the issue of CDW recovery in a sustainable and environmentally sound way. - Existing awareness of some stakeholders that new, better practices are definitely needed. - Adequate national legislative acquis and policies.	- Complete lack of supervision over waste producers and their practices of CDW handling, which is in national jurisdiction. - Careless disregard by some stakeholders to environment driven by economic gain. - General awareness about CDW is still very low among decision-makers and general public.
OPPORTUNITIES:	**THREATS:**
- Lower costs of management in the case of recycling into SRM based construction products. - Significant improvement of local environment by eliminating illegal landfilling. - Economic growth by establishing virtually a new sector or sub-sector of waste recovery. - Increased attractiveness of developing tourism activities in the region.	- Inexpensive virgin materials. - Balkanization of responsibilities between investors, construction companies, transporters, collectors and other stakeholders. - Insufficient numbers of public supervisory employees. - Poor dialogue between national, regional and municipal actors, and with stakeholders within the of value chain.

Rasprava za prepoznavanje prepreka i potencijala

ZAKLJUČAK:

- Prezentacija
- NETWORKING – ostanite povezani

Održivi razvoj znači da umjesto ograničenih prirodnih resursa iskorištavamo neograničene sposobnosti našeg uma.

Juha Sipila

HVALA VAM

Interreg CENTRAL EUROPE

Co-funded by the European Union

ReBuilt

D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction

Czech Republic
Czech Green Building Council
Markéta Novotná, Petr Zahradník, Simona Kalvoda

Version 1.0
23.01.2024

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Summary

Czech Green Building Council as the only Czech project partner in the consortium organized a specific workshop related mainly to continuation of initial mapping. The mapping has been initiated soon after the project ReBuilt started and its content has been several times discussed during relevant events and meetings before we introduced first draft of the mapping files.

The Workshop on November 22nd helped broaden our knowledge in the area on one hand and bring deep overview of the project ReBuilt to relevant stakeholders.

There were 19 participants incl. speakers, covering 7 different stakeholder types on the meeting.

The meeting took place in Prague at the premises of the Faculty of Civil Engineering of the Czech Technical University in Prague.

Main findings:

- We have to endorse existing national strategy for circular economy and support creation and monitoring of ambitious but feasible action plan.
- Cooperation with the Ministry of Industry and Trade and the Ministry for Environment are the most crucial partners.
- It is necessary to fill gaps in quality data about existing state of the art in circularity and digitalization.
- We have to focus on “powerful” stakeholders that can help us accelerate and push for better legal and less bureaucratic construction environment. Powerful means big organizations, well and longtime established organizations or some state entities.
- Find synergies with organizations having similar goals, e.g. Incien (Institute for Circular Economy).

1. Introduction

Deliverable D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction aims at collecting the findings of the regional workshops, that took place in all ReBuilt countries. It is a major step the workshops extend and verify the knowledge and information, that has been collected within the desktop research phase of the Activity 1.1. This way, the current status, gaps and potentials for circular and digital construction will be identified and summarized in programme area.

The results will feed into the First transnational central European circular and digital construction conference D.1.1.2. As a result of the initial mapping, regional workshop, transnational conference, a Conceptual note for activities needed for development of circular and digital construction (D1.1.3) will be developed. Furthermore, other work packages will build upon this task in WP1, WP2 and WP3.

2. Basic information about the workshop

Name of the event:

Type of event: stand along ReBuilt event or connected event

Date, time: 22nd November 2023, 15.00 – 17.00

Location: Prague, ČVUT, Faculty of Civil Engineering

Agenda of the event:

- Simona Kalvoda – introduction; 5 min
- Antonín Lupíšek, Anna Kloužková – Decarbonization roadmap and introduction to the context within the ReBuilt project; 15 min
- Markéta Novotná, Petr Zahradník - Initial mapping revision – stakeholders, legal framework, initiatives, good practice; 25 min
- Simona Kalvoda, Markéta Novotná, Petr Zahradník – discussion; 5x 15 min (15 min per each pillar of assessment of the initial mapping)

Presentations available: Yes, 2 separate annexes No. 1 and 2

Number of participants: 19

List of organizations, type of organizations listed:

Included as a separate annex No.3

	Company	**Stakeholder type**
1	Envitrail	consultancy
2	ČVUT UCEEB	academia
3	CZGBC	NGO
4	CZGBC	NGO
5	CZGBC	NGO
6	CEVRE Consultants s.r.o.	consultancy
7	Daikin	manufacturer
8	CPIPG	developer
9	YIT	developer
10	Skanska Residential a.s.	developer
11	KKCG Real Estate Group	developer
12	Stora Enso	manufacturer
13	DEK (ÚRS CZ)	manufacturer
14	SEVEn	consultancy
15	EY	consultancy
16	ČVUT UCEEB	academia
17	Šance pro budovy	NGO
18	Zero Architecture	architects
19	Heimstaden	property management

3. ReBuilt focus of the event

Main goals of the workshop:

- To discuss importance of digitalization and circular economy in national context, to identify barriers and relevant measures that shall be taken by
- Get up-to-date experience of the invited stakeholders regarding above mentioned digitalization and circular economy and find relevant partners (stakeholders) to be involved, gaps to be identified etc.
- Connect digitalization and circular economy to decarbonization roadmap of the Czech building sector initiative that was under development of the Czech Green Building Council.

During the first part of the workshop, we introduced ongoing works on the decarbonization roadmap that definitely contains both embodied and operational carbon that shall be minimized / reduced to zero one day.

ReBuilt project topics well correspond to this activity as the embodied carbon can be lowered through efficient circularity incorporated to whole life cycle assessment of buildings / materials. Further, digitalization can significantly help increase efficiency of construction (incl. energy performance) of buildings and thus operational and embodied carbon as well.

During the first presentation, identified groups of barriers (30+ barriers in total) have been introduced. There are many technical, economic, legislative and educational barriers.

Second presentation related to the initial mapping of the national environment in digitalization and circularity. It defines today's goals:

- in accordance with the content of the ReBuilt project, revise the proposed measures related to circularity and digitization - specify the solution, find out whether something like this is already being done somewhere
- what measures are missing there
- what all key stakeholders – (government departments and organizations) – should do

Methodology of the workshop:

- Revisions in 2 groups per each of 5 pillars of assessment of the initial mapping (10 min each)
- Common reading and joint discussion (5 min each pillar)

Which pillars of assessment of the initial mapping were discussed:

- Stakeholders mapping (public, private);
- Identification of relevant policies, strategies and legislation (e.g. waste management, construction, (bio)circular economy, digitalisation);
- Identification of good practices and innovations;
- Barriers, potentials, and social acceptance of circular construction;
- Education potential for circular economy, etc.

4. Stakeholders mapping

Please, describe the workshop activity about the stakeholder mapping such as methodology, activities, participant contribution etc. obtain information about the stakeholder mapping.

After presentation of the types of barriers that we had identified earlier during previous works on the initial mapping and decarbonization roadmap, we separated all the stakeholders to two similar groups. We mixed the stakeholder types to keep the two groups as diversified as possible. After separate group discussions we discussed their conclusions briefly.

What were the outcome, findings of the workshop?

- The discussion based on the list of previously listed stakeholders was mostly about the strong actors that shall be able to move the circularity and digitalisation forward as they can play role of market leaders. There are dozens of companies and organizations, but only few of them can play the leading role.
- On the public sector level we have identified mostly central government bodies (5 ministries and their topically related departments) and government itself (as a political entity that can set tasks to those ministries directly) and regional governments.
- During future work we will focus on meetings and cooperation with above mentioned organizations.

Conclusions, major findings about stakeholder mapping

- During further stakeholder cooperation, we have to focus on cooperation with the Ministry of Industry and Trade and the Ministry for Environment because they are the most crucial partners.
- We have to focus on other “powerful” and “change-supporting” stakeholders that can help us accelerate and push for better legal and less bureaucratic construction environment. Powerful means big organizations, well and longtime established organizations or some state entities. Big organizations usually have personnel capacity to implement sustainable principles in their companies and become market leaders.
- Find synergies with organizations having similar goals, e.g. Incien (Institute for Circular Economy), CZBIM (Professional BIM Council).

Please list the relevant identified stakeholders in your country according to the quintuple helix. Highlight their role in the stakeholder ecosystem.

The stakeholders are listed in the excel file as a separate annex of this report and annex of the workshop presentation.

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5. Identification of relevant policies, strategies and legislation

Please, describe the workshop activity about the policy and legislation identification e.g. methodology, activities, participant contribution etc.

After previous presentations and stakeholder mapping discussion we moved to discuss policies and strategies that we have searched for before. We kept two separated groups of attendees. The process was the same, after separate group discussions we discussed their conclusions briefly.

What was the outcome of the discussion?

In the Czech Republic we have the Strategic framework of the circular economy of the Czech Republic 2040 and its action plan for period till 2027 (Action plan Circular Czech Republic). There are lots of specific tasks with deadlines and responsible bodies that shall fulfil these tasks based on governmental decree.

Further, there is the Waste management plan of the Czech Republic that shall help set strategic framework for decrease of waste volume in general, support circularity as well and minimize landfilling in the country.

Regarding the digitalization, besides digitalized building permitting, BIM shall be implemented in public procurement and generally supported its use in building processes and building operation.

These documents shall give a very robust base for creating successfully working circular and digital construction. There are still many unclear responsibilities, practical implementation is lacking capacity of governmental officers and will of many business stakeholders.

Conclusions, major findings about relevant policies, strategies and legislation:

- We have to endorse existing national strategy for circular economy and support creation and monitoring of ambitious but feasible action plan.
- It is necessary to fill gaps in quality data about existing state of the art in circularity and digitalization.

Please, list the key identified policies, strategies and legislation for e.g. waste management, construction, (bio)circular economy, digitalisation.

- Strategic framework of the circular economy of the Czech Republic 2040
- Action plan Circular Czech Republic 2023-2027
- Waste management plan of the Czech Republic
- BIM Implementation Strategy in the Czech Republic

6. Identification of good practices and innovations

Please, describe the workshop activity about the good practices and innovations e.g. methodology, activities, participant contribution etc.

During discussion about good practice, we all together were searching for interesting and potentially replicable examples that deserve to be more promoted and spread to broad public.

Representatives of Skanska updated the Rebetong which is recycled concrete that can be used for load bearing durable construction.

This discussion was connected to the next point 7. Barriers, potentials, and social acceptance of circular construction, because information website Recyklujme stavby! about recycling was identified as an ideal innovative good practice example. This website (Let´s recycle! In English) https://www.recyklujmestavby.cz/ can help promote, explain and remove myths related to the recycled materials and circularity.

What was the outcome of the discussion?

Unclear or blocking legislation and mistrust of non-professionals (clients) are two biggest barriers of broader use of recycled materials. The legislation has been discussed before.

Not only specific materials (Rebetong, wooden structures) and projects (Čertův Vršek or Modřanský cukrovar by Skanska using Rebetong) but trustful platforms creation is necessary (e.g. the website Recyklujme stavby!).

Conclusions, major findings about good practices and innovations

- Good practice examples shall be promoted by professional associations and supported (e.g. auspice) by governmental bodies to make them trustful.
- The promotion has two main target groups – 1) professionals who are often conservative and they mistrust these new principals (mostly use of recycled materials) and 2) broad public with social acceptance barrier (more below in chapter 7.)
- We will cooperate with authors of the Recyklujme stavby! Sites (ČVUT – Czech Technical University in Prague) by promoting the website and its principles and searching for good practices that can be put on the sites.

Please, list here the identified good practices and innovations, describe them briefly, why they are considered so, and give reference to them.

The identified good practices and innovations are listed in the excel file as a separate annex of this report and annex of the workshop presentation.

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7. Barriers, potentials, and social acceptance of circular construction

Please, describe the workshop activity about the barriers, potential and social acceptance of circular construction e.g. methodology, activities, participant contribution etc.

Relevant outcome of the discussion:

We discussed barriers during previous group discussions related to stakeholders mapping, legal framework and policies and good practice.

The biggest barriers and thus potential to change the current situation have been identified in improvement of the legal framework that often blocks and rejects use of recycled materials and in public resistance to purchase such materials.

Identified barriers:

- Law on waste management (demolition material becomes waste and cannot be used in any simple way).
- Insufficient system of waste/recyclable material collecting. Production capacities are sufficient.
- Public resistance and mistrust to recycled material.

Identified potentials / conclusions:

- Feedback of business actors to governmental officers can help change the legal framework on waste.
- Education of professionals (mainly architects and designers) is necessary. The Chamber of Architects and Chamber of Engineers should play main role here in cooperation with topical associations.
- Awareness raising of broad public is needed to increase market demand. To address most of the public, payment for lucrative PR campaign is necessary. This should be paid by government. The content of such campaign should be made by professional associations (to keep it neutral) and supported by socio-economic survey.

8. Education potential for circular economy, etc

Please, describe the workshop activity about the education potential for circular economy e.g. methodology, activities, participant contribution etc.

Relevant outcome of the discussion:

Insufficient education and awareness raising have been identified as the biggest barriers of broadening the circularity in practice.

Based on previous discussions, we cooperate with e.g. the Czech Technical University (sustainability and circularity are subjects of studies there, above mentioned website Recyklujme stavby! Has been created there as well). Further we are in close touch with the Incien (Circular Economy Institute) that strongly supports professionals´ education in circularity.

With Incien we have signed Memorandum of Understanding where we officially set grounds for even more intensive cooperation in the future within our specific but synergic projects. The Memorandum is included as a separate annex, file MoU CZGBC INCIEN.pdf.

Besides circularity we cooperate with the CZBIM (Professional BIM Council) on several topical meetings and seminars.

Which type of education and target groups were concerned? (e.g. higher education, vocational education, life-long learning, students, professionals, etc.)

We stressed mostly the university education of architects and designers (engineers).

What knowledge gaps, skills are missing for some specific groups?

1) Industry: In some cases, there is a mistrust to circular solutions given by conservativeness of people.
2) Government and Public servants: Insufficient feedback from industry about existing barriers. Diversified “voice” of industry that needs to be unified through associations. Lack of data about current practice and thus unclear strategy for decision making (although the circular strategy exists).
3) University & Vocational Training: It is necessary to broaden education curricula and get to a detail. It relates mostly to the vocational trainings and life-long learning. In student education (even more in vocational education) there are problems with general lack of persons in construction sector.
4) Architects and Investors: Mistrust to the circularity (many myths around the topics) and higher investment costs (e.g. when BIM shall be requested)

Conclusions, major findings about education potential:

- Cooperation with the Czech Technical University and Incien on strong and continuous increase of education system regarding circularity.
- Support bigger demand for trainings by motivating students including site visits in cooperation with industrial leading actors.

9. Communication of the event

We invited in advance a defined group of persons who are mostly relevant to the topic. On the list we have representatives of manufacturers, developers, consultancy, academia, architects, NGOs and property management. All the persons are experts in their areas and have some experience with circularity in their companies. Email and pdf invitations as well as two presentations for internal use are attached.

https://www.czgbc.org/en/events/workshop-on-the-decarbonization-roadmap-of-the-czech-construction-industry







Interreg CENTRAL EUROPE

Co-funded by the European Union

ReBuilt

D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction

Germany
Hochschule München HM
Munich University of Applied Sciences MUAS
Department of Civil Engineering
Institute for Materials and Building Research

Johanna Zentner, Prof. Andrea Kustermann

Version 1.1

29.02.2024

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11. Any other relavant information to share ..... Error! Bookmark not defined.

Summary

The Munich University of Applied Sciences (HM), a project partner in the consortium, organised a special workshop in December with the main objective of bringing together the different stakeholders and discussing the main barriers to the use of recycled aggregates in concrete. All stakeholders listed in the initial mapping (A1.1) were invited to attend the workshop and also to participate in a survey on the main applications and main barriers of the circular economy in mineral recycling.

Main barriers:

- Dependence on regional availability of recycled material.
- Inconsistent availability in terms of quantity and quality, Lack of purity of mineral waste.
- Difficulties in obtaining approvals for processing plants.
- The quality of recycled material for use as an aggregate in concrete needs to be higher than for other applications, which means more testing, verification and documentation; depending on the application there are different testing and verification requirements.
- Problems associated with the new asbestos directive and alkali-classification is problematic.
- Concrete technology requirements.
- Recycled concrete is often more expensive than standard concrete.
- Assessment of sustainability when dealing with material flows or their diversion.

Challenges for concrete producers, the ready-mix concrete industry and recyclers in particular:

- There are currently only a few suppliers of certified recycled aggregates for building materials for concrete production on the market.
- Processing is time consuming and high-quality material is required.
- High recycling rates in road construction, civil engineering, and backfilling.
- Recycled sand is not yet approved (if so, can it be used?).
- Additional storage facilities required.
- May only be used for interior components.
- Not yet fully accepted.

How can more recycled concrete enter the market?

- Sustainable construction requires better planning; more and earlier communication between all parties involved in the project.
- Lack of time in the building and during the construction process.
- Setting clear quality rules (type, grain size, etc.).
- Few suppliers of certified recycled building materials only make sense if continuous production and acceptance is guaranteed.
- A main suggestion was: To use recycled concrete with lower replacement rates than allowed and to put it into continuous production, the aggregate should be at least 10-15 wt.-%.
- Recycled concrete should be allowed to be produced with excavated soil

1. Introduction

Deliverable D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction aims at collecting the findings of the regional workshops, that took place in all ReBuilt countries. It is a major step the workshops extend and verify the knowledge and information, that has been collected within the desktop research phase of the Activity 1.1. This way, the current status, gaps and potentials for circular and digital construction will be identified and summarized in programme area.

The results will feed into the First transnational central European circular and digital construction conference D.1.1.2. As a result of the initial mapping, regional workshop, transnational conference, a Conceptual note for activities needed for development of circular and digital construction (D1.1.3) will be developed. Furthermore, other work packages will build upon this task in WP1, WP2 and WP3.

2. Basic information about the workshop

Name of the event:	Stoffkreislauf mineralischer Bauabfälle -Verwertung im R-Beton. Erfahrungsaustausch und Diskussion **Material cycle of mineral construction waste - utilization in R-concrete. Exchange of experience and discussion**
Type of event:	Stand along ReBuilt event at HM
Date, time:	12th of December 2023; 8 am to 11:30 am
Location:	Munich University of Allied Science (HM), Faculty of Civil Engineering of the Munich University of Applied Sciences Institute for Building and Material Research Karlstraße 6, Munich, Room 401

Agenda of the event:

- Round of introductions and presentation of the "ReBuilt" project
- Keynote speech by BIV Baustoffe, Steine und Erden: Bernhard Kling: *Barriers to implementation in practice*
- Keynote speech by Munich University of Applied Sciences: Prof. Kustermann, Johanna Zentner, Nico Obermeier: *State of research on the topic of recycled concrete*
- Presentation of a *practical example*: J. Schowalter
- Exchange of experiences and discussion
- Summary of results and outlook

Presentations available: Yes

Number of participants: 40

List of organizations, type of organizations listed:

- Demolition/construction waste recycling companies
- Concrete Producers, Ready-Mixed Concrete Industry
- Public authority
- Construction companies
- Research

3. ReBuilt focus of the event

The idea of the workshop was to identify and discuss gaps and potentials in the implementation of the construction materials cycle and construction education. In order to get a broad picture, the workshop was aimed at different stakeholders, including the public sector, recycling and ready-mixed concrete industry and construction companies.

Which pillars of assessment of the initial mapping were discussed:

- Stakeholders mapping (public, private);
- Current volume/ demand for recycled construction materials and associated issues/ technical challenges;
- Relevant regulations, standards, directives and guidelines in German legislation e.g. waste management, construction, circular economy;
- Identification of good practices and innovations, pilot projects;
- Barriers, potentials, and social acceptance of circular construction;
- Education potential for circular economy and cooperation, digital tools.

4. Stakeholders mapping

During the workshop, the stakeholder network wasn´t topic of the discussion. But the main barriers and problems for the recycler and also for the user of recycled materials in recycled concrete were discussed.

What were the outcome, findings of the workshop?

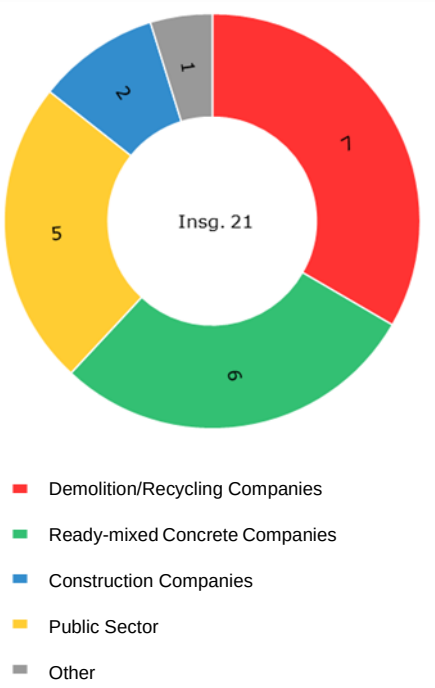
Supply of certified recycled building materials only makes sense if continuous production and acceptance, problem supply chain is not seamless.

Conclusions, major findings about stakeholder mapping

- Increased use of recycled aggregates in concrete depends on regional availability of recycled material; depends on regional availability of recycled material.
- Inconsistent availability in terms of quantity and quality.
- Assessment of sustainability when dealing with material flows or their diversion.

Please list the relevant identified stakeholders in your country according to the quintuple helix. Highlight their role in the stakeholder ecosystem.

- Economy:
  - Demolition companies: Dismantle existing buildings professionally and prepare materials for recycling.
  - Concrete producers: Develop ecological concrete products and promote sustainability in building materials.
  - Construction companies: Deliver construction projects, implement sustainable building practices and comply with building standards.
- Government:
  - Regional authorities: Create building and environmental laws, monitor compliance and regulate the construction industry for sustainability.
- Academia:
  - Research (HM): Researching building materials and construction methods, sharing knowledge and innovation with the construction industry.



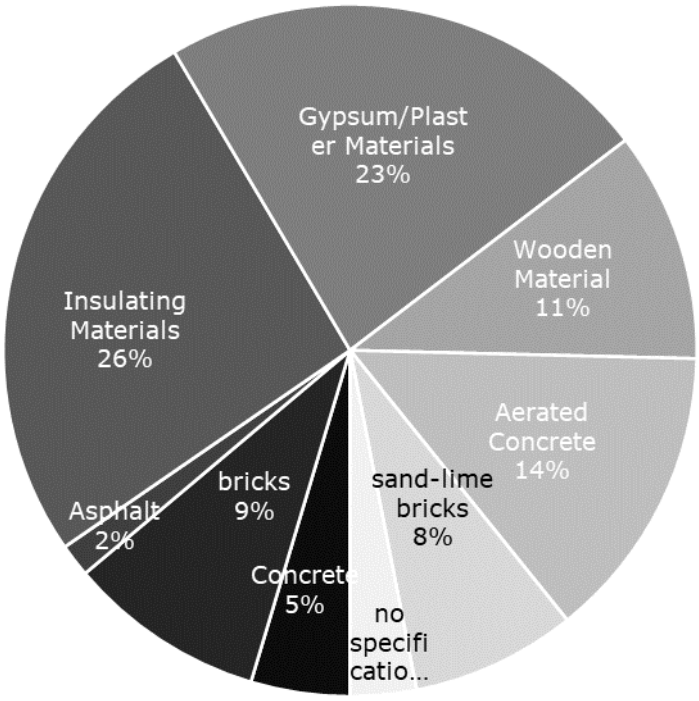
A list of stakeholders is provided in a separate file.

5. Status quo and challenges in recycling construction materials

During the workshop, the current experiences and demand for recycled construction materials, as well as the associated problems and technical challenges, were discussed in detail between the different stakeholder sectors. In addition, specific questions on this topic were included in the survey prepared for the workshop. The results of the survey were analysed separately for each sector.

What was the outcome of the discussion/ survey?

- Participants estimated that less than 50% of demolition materials are still being disposed of. These are mainly insulation materials and gypsum products, which are most frequently disposed of or landfilled (see diagram).



- The current estimated demand for recycled aggregates across all survey respondents is in the medium range. The most popular recycled aggregate is type 1, which is obtained from concrete demolition waste. The most commonly used fractions are medium (2 - 8 mm) and coarse (≥ 8 mm), while the least used is fine (≤ 2 mm).
- Survey respondents indicated that recycled demolition materials are used most frequently in road construction and least frequently in building construction.
- The regional demand for recycled concrete is considered to be slightly low.
- Responses to whether the supply of recycled aggregates meets demand vary widely, ranging from supply exceeding demand to a shortage.
- According to the survey results, on average between 20 and 35% of natural aggregate is replaced by recycled aggregate.
- Interviewees indicated that, in general, they had few positive experiences in dealing with recycled concrete. The technical challenges identified by the respondents are in particular.
  - Higher/unstable water content (especially type 2).
  - Inhomogeneity of recycled aggregate.
  - Lack of consistent quality level.
  - Differentiation according to intended use/component.

- Often recycled aggregate/recycled concrete is more expensive than natural aggregate/standard concrete.
- At the moment only few suppliers of certified recycled aggregates for building materials for concrete production on the market.
- Processing time-consuming, high-quality material required.

Conclusions, major findings about the status quo and the challenges in recycling construction materials:

- On-site recycling is often difficult to achieve due to lack of recycling facilities and storage or landfill space.
- Long transport distances increase costs.
- Excessive contamination (e.g. asbestos) is a barrier.
- Conventional standard concrete is less expensive.
- There is a regional dependency on availability.
  - → Setting clear quality rules (type, grain size, etc.).
  - → An important suggestion was: In order to be able to use recycled concrete with lower replacement rates than allowed and to allow continuous production, the proportion of aggregates should be at least 10-15% by weight.
  - → Recycled concrete should be allowed to be produced with excavated soil.

6. Identification of relevant policies, strategies and legislation

During the workshop, the main barriers and problems caused by relevant regulations, standards, directives and guidelines in German legislation, e.g. waste management, construction, circulars, for the recycler and also for the user of recycled materials were discussed. The survey also asked about the relevant guidelines and their challenges.

What was the outcome of the discussion?

- Strength limitations exist, but higher strengths are possible with recycled concrete.
- There is no approval for recycled sand.
- No approval for recycled grain types 3 and 4 to German standard.
- Mixed grading curves (0/4, 0/8 mm) problematic as they contain unapproved recycled sands.
- There is also no approval for recycled aggregate from excavated soil.
- Increased testing, verification and documentation requirements.
- There are different testing and verification requirements depending on the application.
- Some of the standards are difficult to understand.
- There are problems with the new asbestos directive.
- Classification of alkalis is difficult.
- The quality of recycled material for use as an aggregate in concrete needs to be higher than for other applications. Quality assurance is more complex than for primary concrete.

Conclusions, major findings about relevant policies, strategies and legislation:

- Approval of higher strengths
- Approval of fine fractions
  - → Setting clear quality rules (type, grain size, etc.).
  - → An important suggestion was: In order to be able to use recycled concrete with lower replacement rates than allowed and to allow continuous production, the proportion of aggregates should be at least 10-15% by weight.

Please, list the key identified policies, strategies and legislation for e.g. waste management, construction, (bio)circular economy, digitalisation.

- DAfStb Beton, rezyklierte Gesteinskörnung:2010-09
- DAfStb Alkali-Richtlinie:2013-10
- DIN EN 206:2021 - Concrete - Specification, performance, production and conformity
- DIN 1045-2:2014 - Concrete, reinforced and prestressed concrete structures - Part 2: Concrete - Specification, performance, production and conformity - Application rules for DIN EN 206

- DIN 1045-2:2023 - Concrete, reinforced and prestressed concrete structures – Part 2: Concrete
- DIN 4226-101:2017 - Recycled aggregates for concrete in accordance with DIN EN 12620 – Part 101: Types and regulated dangerous substances
- DIN 4226-102:2017 - Recycled aggregates for concrete in accordance with DIN EN 12620 - Part 102: Type testing and factory production control
- DIN EN 12620:2002 - Aggregates for concrete; German version EN 12620:2002+A1:2008
- Ersatzbaustoffverordnung
- Verfüll-Leitfaden

7. Identification of good practices and innovations

In 2 keynote speeches best practices were presented, also in real buildings (Landratsamt Eichstätt, pilot project LHM) and also research projects concerning recycling of mineral waste and properties of recycling concrete.

What was the outcome of the discussion?

- Good practice examples are existing.
- A big amount of recycling concrete according to the German standard has been used for buildings by at least one ready mixed concrete company since years
- Recycling Concrete beyond the standard has been used in only few pilot projects until now.

Conclusions, major findings about good practices and innovations:

- Some concrete manufacturers/ ready-mixed concrete companies/demolition companies and construction companies are already familiar with recycled building materials, but the majority of companies are not. The participants in the workshop are of course the interested and informed ones.
- Lack of transparency/acceptance leads to obstacles for companies.
- Pilot projects, possibly with the support of universities, are the way forward.

Please, list here the identified good practices and innovations, describe them briefly, why they are considered so, and give reference to them.

1. Reinforced concrete ceiling over underground parking garage made of recycled concrete (according to German standards) in Nördlingen



2. Landratsamt Eichstätt: Use of recycling concrete with up to 100% recycled aggregate for interior walls.



Test wall with recycling concrete with up to 100% recycled aggregate (Eichstätt)

3. In the pilot project of the ReBuilt Project 100% recycled aggregates will be used in a lot of load-bearing components and structures. The first ideas and tests were presented.



Ready-mixed concrete test for bore piles with recycling concrete with up to 100% recycled aggregate (Munich)

8. Barriers, potentials, and social acceptance of circular construction

The workshop also discussed the barriers, social acceptance and potential of circularity in relation to the use of recycled aggregates in recycled concrete. The workshop participants discussed a lot about their problems, their barriers and their ideas to improve the situation and to improve the circular construction.

Identified barriers:

- High recycling rates in road construction, civil engineering and backfilling
- Additional storage options necessary
- Possibly only usable for interior components
- structural engineers often tenders concretes with too high properties (minimum C30/37), what means an obstacle for the use of recycled concrete

Identified potentials:

- Architects and structural engineers plan with recycled building materials from the beginning
- Sustainable buildings need better planning

Conclusions, major findings about the social acceptance of circular construction:

- Acceptance still not fully available
- Need for more communication and more trans interdisciplinary communication
- Lack of time in the building and during building process
- More and earlier communication between all project participants

Still open questions for all stakeholders:

- Are the technical processing options sufficient?
- Are investments worthwhile?
- Are there plannable material flows?

9. Education potential for circular economy, etc

During the workshop and in the survey, participants were asked about both existing and desired training programmes in the field of recycling. Participants were also asked about the types of cooperation they would like to see between the various stakeholders, or which they felt would be useful.

Relevant outcome of the discussion/survey:
What new opportunities for cooperation (e.g. with recyclers, concrete manufacturers, authorities, research institutions) would contribute to improving the building materials cycle? The answers are sorted by branch of industry:

Building material manufacturers ↔ Research institutions	Exploring the feasibility
Authorities ↔ Building owners	Identification of components that are easy to implement
Authorities ↔ Concrete manufacturers	Approval of prefabricated grain mixtures (e.g. 0/16 mm)
Demolition companies ↔ Concrete manufacturers	Clear communication of the requirements for the recycled building materials

What knowledge gaps, skills are missing for some specific groups?

1) Industry:
   - no copying of specifications texts for tenderings, for circular economy we need new tenderings
2) Government and Public servants:
   - Circular economy needs an end of "cheap" construction and serious consideration of circularity and sustainability
3) University & Vocational Training:
   - structural engineers often tenders concretes with too high properties (minimum C30/37), what means an obstacle for the use of recycled concrete
4) Architects and Investors:
   - Circular economy needs an end of "cheap" construction and serious consideration of circularity and sustainability
5) Structural Engineers:
   - no granular subbase with very high quality concrete (e.g. C30/37)

Conclusions, major findings about education potential:

- Creation of a raw material strategy based on data on the regional use of demolition materials
- Knowledge transfer on the circular economy and sustainability in training occupations and degree courses for vocational students, students and companies

→ Digital tools for the coordination of supply and demand in the recycling materials sector:

None of the respondents currently use digital tools, but there is a desire to do so.

10. Communication of the event

The communication before and after the event was always via e-mail. The invitation was sent by e-mail on 6th December. Enclosed you can find a few photos of the workshop. The list of participants is also added.

The conclusion of the three keynote speeches are included in this summary. The presentations are available for all participants of the workshop.

We sent the participants a few days before the workshop a survey with a few questions about the topic. The main results are summarized in the enclosed report of the survey. The speakers' presentations and the evaluation of the survey were sent to all workshop participants.

Enclosed you can find photos about the event.









Stoffkreislauf mineralischer Bauabfälle - Verwertung im R-Beton

Erfahrungsaustausch und Diskussion

Einladung zu einem Austausch am Dienstag, den 12.12.2023 um 8:30 Uhr an der Hochschule München (Karlstr.6, Raum 401)

- Ab 8:00 Uhr Kaffee und kleines Frühstück
- Vorstellungsrunde und Vorstellung des Projekts “ReBuilt”
- Impulsvortrag BIV Baustoffe, Steine und Erden: Hemmnisse bei der Umsetzung in die Praxis
- Impulsvortrag Hochschule München: Stand der Forschung
- Impulsvortrag R-Beton - Erfahrungen aus der Praxis (J. Schowalter) Erfahrungsaustausch und Diskussion
- Zusammenfassung der Ergebnisse und Ausblick

Sehr geehrte Damen und Herren,

wir freuen uns, Sie im Namen der Hochschule München zu unserem Workshop "Stoffkreislauf mineralischer Bauabfälle – Verwertung im R-Beton" einzuladen, der im Rahmen des EU-Projekts "ReBuilt" organisiert wird.
Im Rahmen des Workshops möchten wir gemeinsam mit Ihnen Lücken sowie Potenziale in der Umsetzung des Baustoffkreislaufs und der Bauausbildung identifizieren und diskutieren. Um ein breites Bild zu erhalten, richtet sich der Workshop an verschiedene Interessensvertretungen, darunter die öffentliche Hand sowie Akteur:innen der Recycling- und Transportbetonbrache und Bauunternehmen.

Worum geht es in ReBuilt?

ReBuilt ist ein internationales Forschungsprojekt, welches durch das Förderprogramm Interreg Central Europe ermöglicht wird. Das Ziel des Projektes ist es, Trainingsprogramme für relevante Akteur:innen zu entwickeln, an technischen und wissenschaftlichen Lösungen zu arbeiten und schließlich eine gemeinsame Strategie für zirkuläres und digitales Bauen in Europa zu entwickeln.

Wir freuen uns auf Ihre Zusage – wenn möglich – bis 8.12.23 unter johanna.zentner@hm.edu

Herzliche Grüße,

Prof. Dr.-Ing. Andrea Kustermann

Stoffkreislauf mineralischer Bauabfälle - Verwertung im R-Beton

Informationsaustausch über die regionale Situation im Raum München, im Rahmen des EU-Forschungsprojekts „ReBuilt"

Zusammenfassende Ergebnisse der Diskussionen des Erfahrungs- und Informationsaustauschs im Rahmen eines workshops am 12.12. 23 an der Hochschule München

Die Hochschule für angewandte Wissenschaften München (HM) organisierte am 12. Dezember 2023 einen Workshop mit dem Hauptziel, die verschiedenen Interessengruppen zusammenzubringen und die Haupthindernisse für die Verwendung rezyklierter Gesteinskörnung in Beton zu diskutieren. Impulsvorträge wurden von Bernhard Kling, BIV und Jürgen Schowalter, Märker Transportbeton gehalten. Prof. Andrea Kustermann stellte den aktuellen Stand der Forschung aus Sicht der Hochschule München mit den wissenschaftlichen Mitarbeiter:innen Johanna Zentner, Nico Obermeier und Peter Wild dar.

Der workshop ist Bestandteil eines EU-Interreg Forschungsprojektes REBUILT. Dazu wurden verschiedenste Akteure in diesem Themenfeld eingeladen, an dem Workshop teilzunehmen und sich an einer Umfrage zu den wichtigsten Anwendungen und Hindernissen der Kreislaufwirtschaft im mineralischen Recycling zu beteiligen.

Zusammenfassend aus der Umfrage und auch den Diskussionen während des workshops konnte Folgendes als Ergebnis subsummiert werden:

Wichtigste Hindernisse:

- Abhängigkeit von der regionalen Verfügbarkeit von recyceltem Material.
- Uneinheitliche Verfügbarkeit in Bezug auf Menge und Qualität.
- Schwierigkeiten bei der Erlangung von Genehmigungen für Verarbeitungsanlagen.
- Die Qualität von rezykliertem Material für die Verwendung als Gesteinskörnung in Beton muss höher sein als bei anderen Anwendungen, was einen höheren

Aufwand an Tests, Überprüfungen und Dokumentation bedeutet; je nach Anwendung sind unterschiedliche Prüf- und Nachweise zu erbringen
- Unzureichende Reinheit der mineralischen Abfälle.
- Probleme im Zusammenhang mit der neuen Asbestrichtlinie, und die Alkali-Einstufung ist problematisch
- Anforderungen an die Betontechnologie.
- - Recyclingbeton ist oft teurer als Standardbeton.
- - Bewertung der Nachhaltigkeit beim Umgang mit Stoffströmen oder deren Umleitung.

Herausforderungen für die Betonhersteller, die Transportbetonindustrie und die Recycler im Besonderen:

- Derzeit gibt es nur wenige Anbieter von zertifizierten rezyklierten Gesteinskörnungen für Baustoffe zur Betonherstellung auf dem Markt.
- Die Verarbeitung ist zeitaufwändig, und es wird hochwertiges Material benötigt.
- Hohe Recyclingquoten im Straßen- und Tiefbau und bei der Verfüllung.
- Rezyklierter Sand ist noch nicht zugelassen (wenn ja, kann er verwendet werden?).
- Zusätzliche Lagermöglichkeiten erforderlich.
- Darf nur für Innenbauteile verwendet werden.
- Noch nicht vollständig akzeptiert.

Wie kann mehr Recyclingbeton auf den Markt kommen? Verbesserungsvorschläge

- Nachhaltiges Bauen erfordert eine bessere Planung.
- Zeitmangel im Gebäude und während des Bauprozesses
- Mehr und frühere Kommunikation zwischen allen am Projekt beteiligten Parteien.
- Festlegung klarer Qualitätsregeln (Art, Korngröße usw.).
- Wenige Lieferanten von zertifizierten Recycling-Baustoffen machen nur Sinn, wenn eine kontinuierliche Produktion und Abnahme gewährleistet ist.
- Eine wichtige Anregung war: Um Recyclingbeton mit geringeren Austauschraten als erlaubt zu verwenden und ihn in eine kontinuierliche Produktion zu überführen, sollte die Gesteinskörnung mindestens 10-15 Gew.-% betragen.
- Recyclingbeton sollte mit Bodenaushubmaterial hergestellt werden dürfen.

Stoffkreislauf mineralischer Bauabfälle - Verwertung im R-Beton

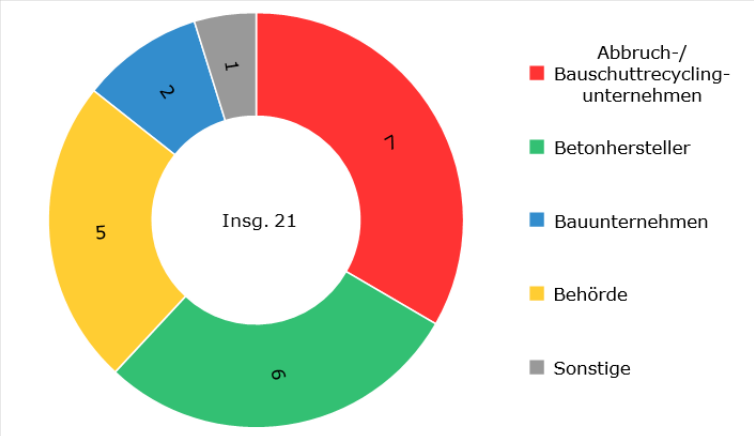
Informationsaustausch über die regionale Situation im Raum München, im Rahmen des EU-Forschungsprojekts „ReBuilt"

Auswertung Umfrage zum workshop vom 12.12.2023 an der Hochschule München

Diese Umfrage ist im Vorfeld und im Nachgang des gleichnamigen Workshops entstanden. Sie ist Bestandteil des EU-Interreg Forschungsprojekts mit dem Titel „ReBuilt". Die nachfolgende Auswertung ist kurz und prägnant, mit dem Ziel, alle Beteiligten über die Ergebnisse zu informieren. Wir danken Ihnen herzlich für die Teilnahme, Ihre dafür aufgewendete Zeit und Ihre Bereitschaft und Offenheit unsere Forschung zu diesem wichtigen Thema zu unterstützen.

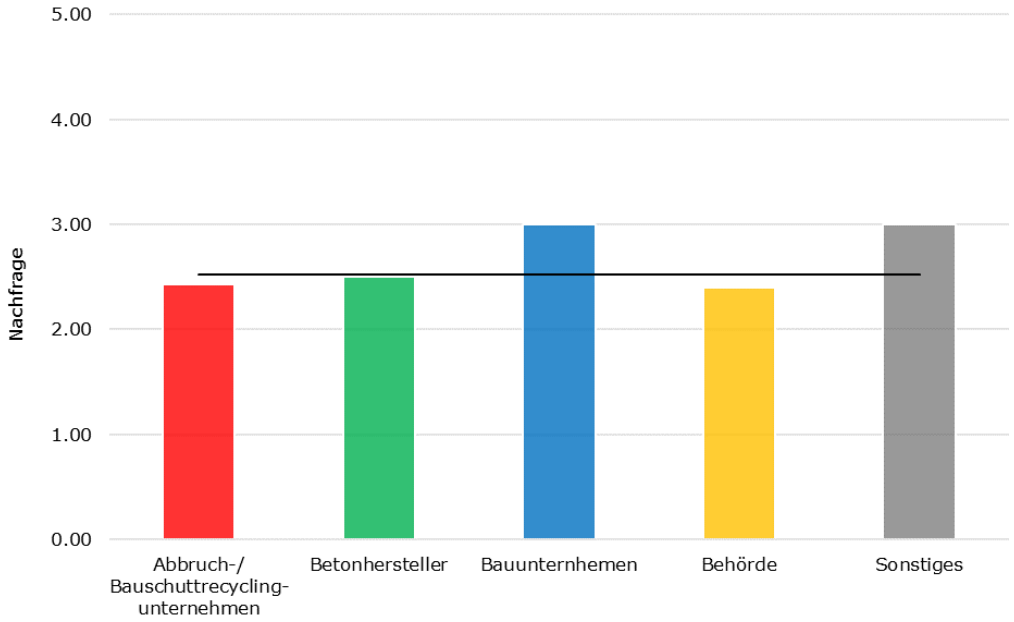
Die Umfrage wurde mithilfe von „Microsoft Forms" durchgeführt und umfasste hauptsächlich Auswahlfragen. Insgesamt nahmen 21 Stakeholder an der Umfrage teil. Die unter 1. dargestellten Branchen der Umfrageteilnehmenden wurde als Grundlage für die Auswertung herangezogen. Aufgrund der geringen Teilnahmequote, insbesondere aus einigen Branchen mit niedriger Beteiligung, wurde an einigen Stellen auf eine detaillierte Darstellung oder Auswertung verzichtet.

1. Branchen der Umfrageteilnehmenden inkl. Anzahl der Teilnehmenden:
   Die Frage lautete wie folgt: Bitte teilen Sie uns zu Beginn mit, in welcher Branche Sie tätig sind. Diese Information hilft uns, die Ergebnisse der Umfrage besser interpretieren zu können. Sollten einzelne Fragen für Sie nicht zutreffend sein, können Sie diese überspringen oder die Option 'Keine Angabe' wählen.



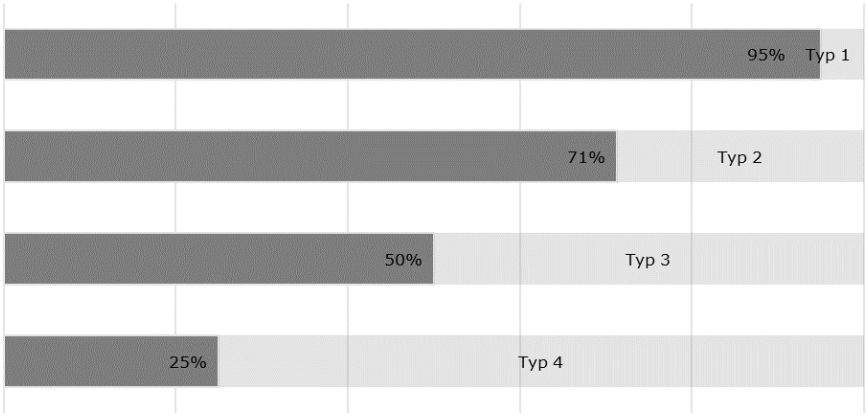
   Es ist zu beachten, dass im Bereich "Sonstiges" die genaue Branche nicht bekannt ist.

2. Aktuell eingeschätzte Nachfrage (0 ≙ keine Nachfrage; 5 ≙ hohe Nachfrage) nach rezyklierter Gesteinskörnung in Bayern:
   Die Frage lautete wie folgt: Wie schätzen Sie die aktuelle Nachfrage nach rezyklierter Gesteinskörnung in Bayern ein?

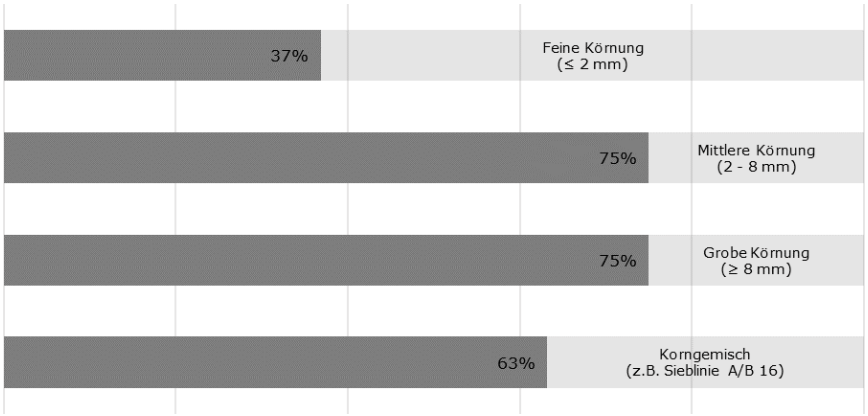


   Der Durchschnitt über alle Branchen hinweg beträgt 2,5.

3. Regional geschätzte Nachfrage nach Typen von rezyklierter Gesteinskörnung (Typ 1, Typ 2, Typ 3, Typ 4):
   Die Frage lautete wie folgt: Ordnen Sie die folgenden Typen rezyklierter Gesteinskörnung gemäß Ihrer geschätzten regionalen Nachfrage.



4. Regional geschätzte Nachfrage nach Fraktionen von rezyklierter Gesteinskörnung:
   Die Frage lautete wie folgt: Ordnen Sie die folgenden Fraktionen rezyklierter Gesteinskörnung gemäß Ihrer geschätzten regionalen Nachfrage.



5. Schwierigkeiten im Verkauf bestimmter Typen oder Fraktionen rezyklierter Gesteinskörnung in Unternehmen, einschließlich spezifischer Angaben zu auftretenden Problemen.
   Die Frage lautete wie folgt: Gibt es Typen oder Fraktionen von rezyklierter Gesteinskörnung, die sich in Ihrem Betrieb schwer verkaufen lassen? Wenn ja, können Sie spezifizieren, welche und was die Probleme dabei sind?

Abbruch-/ Bauschuttrecyclingunternehmen:
- Sand 0/2 mm - keine Zulassung gemäß Norm
- Gemische mit Sand 0/4 mm, 0/8 mm

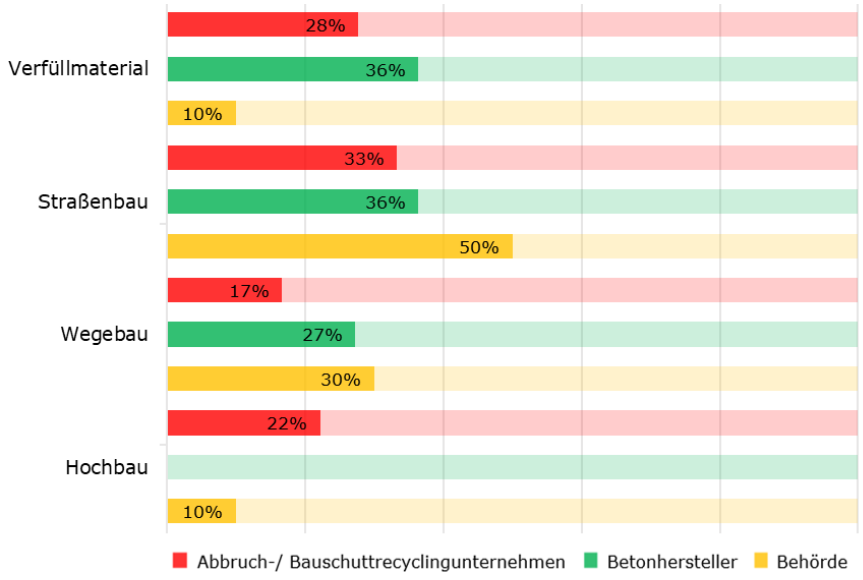
Betonhersteller:
- Sand 0/2 mm - keine Zulassung gemäß Norm
- Typ 3, Typ 4 - keine Zulassung gemäß Norm
- Typ 2 - technische Herausforderungen, Kundenakzeptanz

6. Haupteinsatzbereiche rezyklierten Abbruchmaterials in unserer Region:
Die Frage lautete wie folgt: Wo findet rezykliertes Abbruchmaterial in unserer Region hauptsächlich Verwendung?

Gesamtauswertung über alle Branchen hinweg:



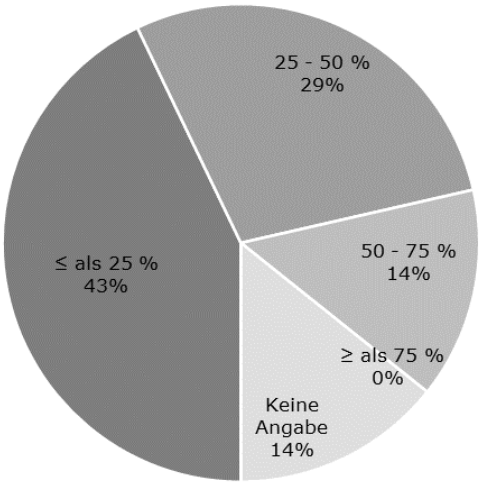
Auswertung nach relevanten Branchen (hier: Abbruch-/ Bauschuttrecyclingunternehmen, Betonhersteller, Behörden):



Die Einschätzung der unterschiedlichen Branchen bzgl. des Anteils an Verfüllung differiert stark. Hierbei fällt auf, dass die Abbruchunternehmen den Einsatz rezyklierten Abbruchmaterials nahezu gleichmäßig auf die vier Einsatzbereiche verteilen. Auch bei den Betonherstellern ist dies der Fall, allerdings wird hier keine Anwendung im Hochbau verzeichnet. Im Bereich der Behörden zeigt sich, dass die Einschätzung besteht, dass rezykliertes Abbruchmaterial am häufigsten im Straßenbau Verwendung findet und am wenigsten als Verfüllmaterial oder im Hochbau eingesetzt wird.

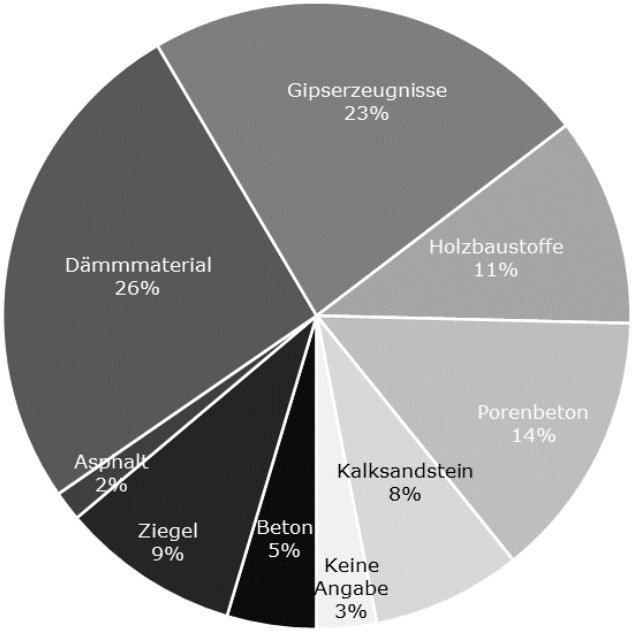
Es ist anzumerken, dass vier der insgesamt sieben Teilnehmer aus der Abbruchunternehmen-Branche angegeben haben, dass rezykliertes Abbruchmaterialien verstärkt im Hochbau eingesetzt werden. Hier könnte es sich um Beteiligte an Pilotprojekten handeln.

7. Geschätzter Anteil (≤ als 25 %, 25 – 50 %, 50 – 75 %, ≥ als 75 %, keine Angabe) an entsorgtem Abbruchmaterial im Vergleich zur Rezyklierung und genannte Gründe für die Entsorgung (Originalzitate):
   Die Frage lautete wie folgt: Wie hoch ist der Anteil des Abbruchmaterials, der in unserer Region entsorgt oder deponiert wird, anstatt es zu rezyklieren? Können Sie die Gründe für diese Entsorgung erläutern?

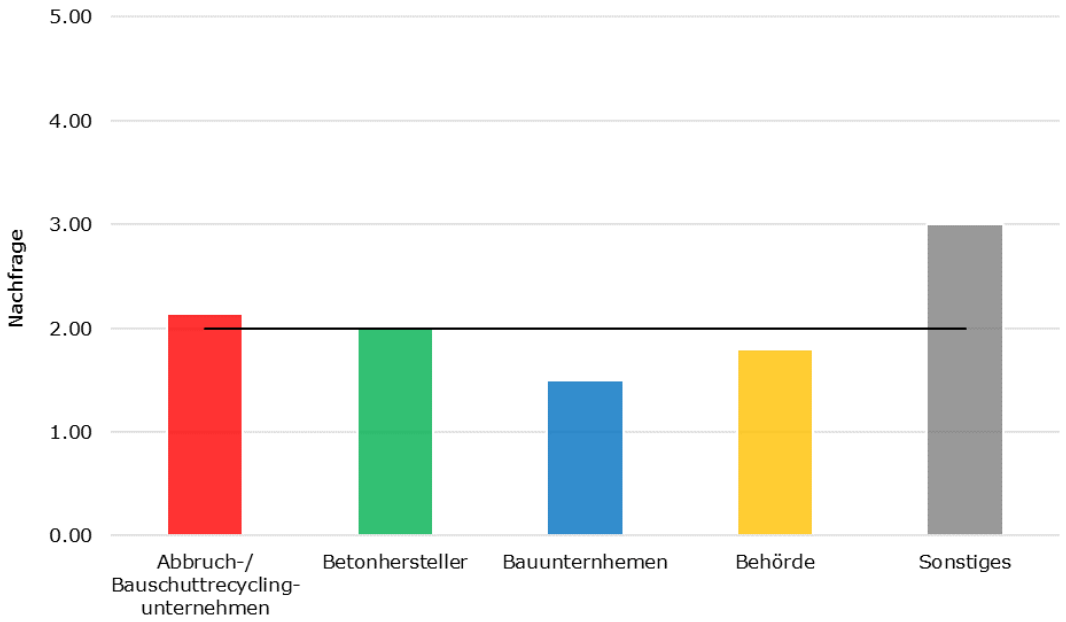


- „Recycling vor Ort schwer umsetzbar (Ausschreibungsfehler)"
- „Fehlende Recyclinganlagen"
- „Lange Transportwege → erhöhen die Kosten"
- „Zu hohe Schadstoffbelastung"
- „Standardbeton ist kostengünstiger"

8. Am häufigsten entsorgte oder deponierte Materialien beim Abbruch eines Bauwerks in unserer Region:
   Die Frage lautete wie folgt: Welche Materialien werden regional beim Abbruch eines Bauwerks am häufigsten entsorgt oder deponiert?



9. Regionale Nachfrage (0 ≙ keine Nachfrage; 5 ≙ hohe Nachfrage) nach R-Beton in Bayern:
   Die Frage lautete wie folgt: Wie hoch ist die regionale Nachfrage nach R-Beton in Bayern?



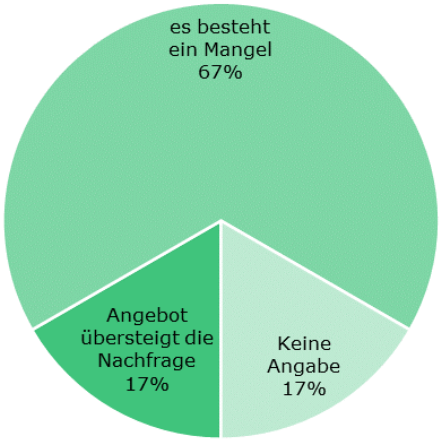
   Der Durchschnitt über alle Branchen hinweg beträgt 2,0.

10. Durchschnittliche Lieferung von R-Beton pro Jahr in m³:
    Die Frage lautete wie folgt: Wie viel R-Beton liefert Ihr Betrieb durchschnittlich pro Jahr in m³ aus?

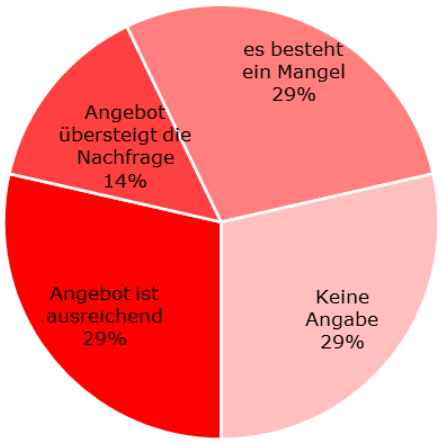
    Die Spanne variiert je nach Betonhersteller erheblich, von 0 bis 50.000 m³. Ein Teilnehmender gab an, dass im Raum Berlin deutlich mehr R-Beton ausgeliefert wird, als in Bayern.

11. Übereinstimmung zwischen Angebot und Nachfrage von rezyklierter Gesteinskörnung (ohne Differenzierung der rezyklierten Körnungs-Typen) für die Herstellung von R-Beton, beschränkt auf die Branchen Betonhersteller und Abbruch-/ Bauschuttrecyclingunternehmen:
Die Frage lautete wie folgt: Entspricht das aktuelle Angebot an rezyklierter Gesteinskörnung Ihrer Nachfrage für die Herstellung von R-Beton?

Betonhersteller



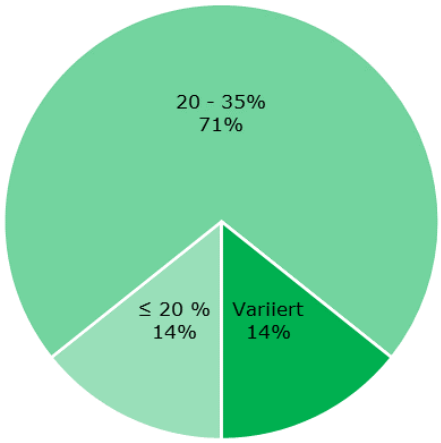
Abbruch-/ Bauschuttrecyclingunternehmen



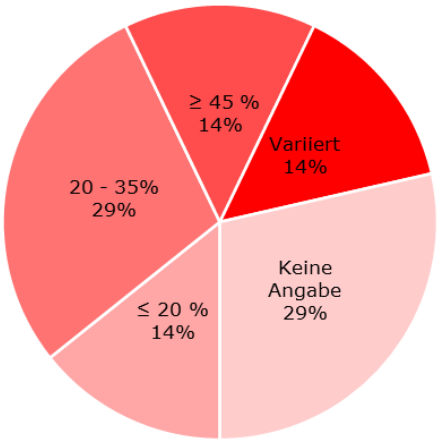
Es fällt auf, dass eine Diskrepanz zwischen Betonherstellern und Abbruchunternehmen besteht. Während 67 % der Betonhersteller einen Mangel an rezyklierter Gesteinskörnung zur Herstellung von R-Beton angeben, sagen rund 40 % der Abbruchunternehmer, dass ausreichend Angebot vorhanden ist. Innerhalb der Branchen gibt es ebenfalls differierende Angaben.

12. Durchschnittlicher Prozentsatz Anteil (0 %, ≤ 20 %, 20 – 35 %, 35 – 45 %, ≥ 45 %, variiert je nach Anforderungen, keine Angabe) an rezyklierter Gesteinskörnung in R-Beton:
Die Frage lautete wie folgt: Welchen Prozentsatz an rezyklierter Gesteinskörnung setzen Sie im Durchschnitt bei der Herstellung Ihres R-Betons ein?

Betonhersteller

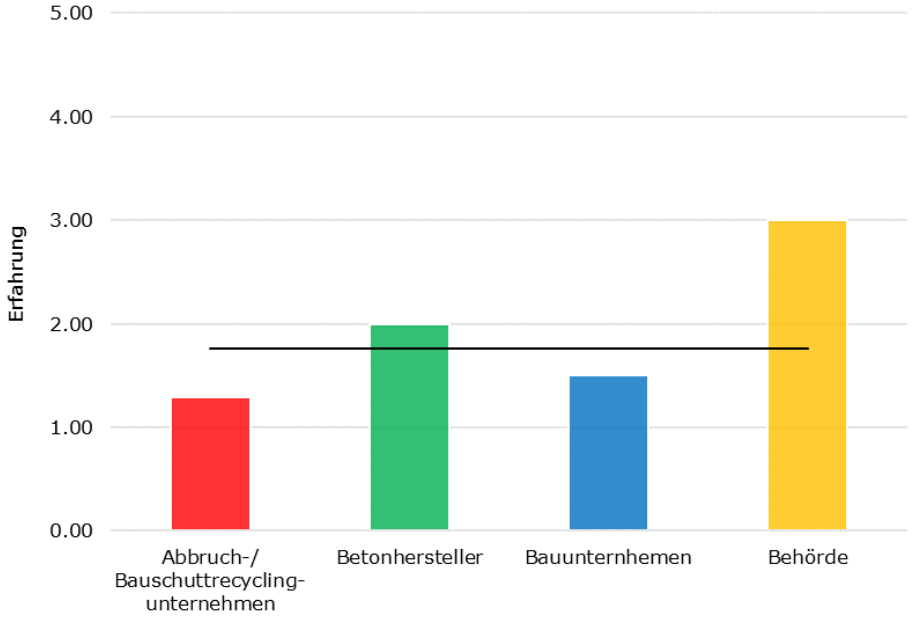


Abbruch-/Bauschuttrecyclingunternehmen



Es fällt auf, dass Betonhersteller im Allgemeinen zwischen 20 % und 35 % Gesteinskörnung durch rezyklierte Körnung ersetzen. Etwa 15 % der Abbruchunternehmer geben an, sogar ≥ 45 % zu ersetzen, was außerhalb der Norm liegt. Dies könnte auf ihre Beteiligung an Pilotprojekten zurückzuführen sein.

13. Erfahrung (0 ≙ keine Erfahrungen; 5 ≙ hohe Erfahrungen) mit dem Einsatz rezyklierter Gesteinskörnung im R-Beton:
Die Frage lautete wie folgt: Bewerten Sie Ihre Erfahrungen mit dem Einsatz von rezyklierter Gesteinskörnung im R-Beton.



Der Durchschnitt über alle Branchen hinweg beträgt 1,8. Es ist erwähnenswert, dass die Behörden hier die Erfahrung im Umgang mit R-Beton deutlich höher einschätzen als alle anderen Branchen.

Es ist wichtig zu erwähnen, dass die gestellte Frage lautete: "Bewerten Sie Ihre Erfahrungen mit dem Einsatz von rezyklierter Gesteinskörnung im R-Beton." Unklar ist, ob die Teilnehmenden ihre Antworten basierend auf ihren persönlichen Erfahrungen mit R-Beton oder auf allgemeinen Erfahrungen formulierten. In unserer Auswertung gehen wir davon aus, dass die Betonhersteller und Bauunternehmen ihre Antworten auf persönlichen Erfahrungen mit R-Beton basieren, während die Behörden eher allgemeine Erfahrungen reflektieren.

14. Technische Herausforderungen bei der Herstellung und Verwendung von rezyklierter Gesteinskörnung im R-Beton; Antworten sortiert nach Branchenzugehörigkeit aufgelistet:

Abbruch-/ Bauschuttrecyclingunternehmen:
- Festigkeiten
- Wasseranspruch
- Frost/ Frost-Tausalz
- Inhomogenität der rezyklierten Gesteinskörnungen → kein gleichbleibendes Qualitätsniveau
- Keine Zulassung von RC-Sand
- Differenzierung je nach Verwendungszweck

Betonhersteller:
- Wasseranspruch (insbesondere bei Typ 2)
- Inhomogenität der rezyklierten Gesteinskörnung → kein gleichbleibendes Qualitätsniveau
- Differenzierung je nach Verwendungszweck
- Einsatz von RC-Sanden
- Normative Hemmnisse

- Forderung nach zu hohen RC-Anteilen

Bauunternehmen:
- Wasseranspruch, erhöhter Fließmittelanteil
- Inhomogenität der rezyklierten Gesteinskörnung → kein gleichbleibendes Qualitätsniveau
- Normative Hemmnisse
- Fehlende Akzeptanz der Öffentlichkeit

Behörden:
- Inhomogenität der rezyklierten Gesteinskörnung → kein gleichbleibendes Qualitätsniveau
- Klassifizierung/ Sortierung der rezyklierten Gesteinskörnung
- Entfernung von Verunreinigung und Fremdstoffen
- Fehlende Akzeptanz der Öffentlichkeit

Über alle Branchen hinweg fällt auf, dass die vorherrschende technische Herausforderung in Bezug auf rezyklierte Gesteinskörnung die Inhomogenität ist. Dieser Aspekt erschwert die Aufrechterhaltung eines gleichbleibenden Qualitätsniveaus erheblich.

15. Relevante Vorschriften, Normen, Richtlinien und ihre größten Herausforderungen; Antworten sortiert nach Branchenzugehörigkeit aufgelistet:

Abbruch-/ Bauschuttrecyclingunternehmen:
- DIN 206
- DIN 1045-2
- DIN 4226-101/ 102
- DIN 12620

Betonhersteller:
- DAfStb-Richtlinie, rezyklierte Gesteinskörnung
- DAfStb, Alkali-Richtlinie
- DIN 1045-2
- DIN 4226-101
- DIN 12620

Bauunternehmen:
- DIN 1042-2

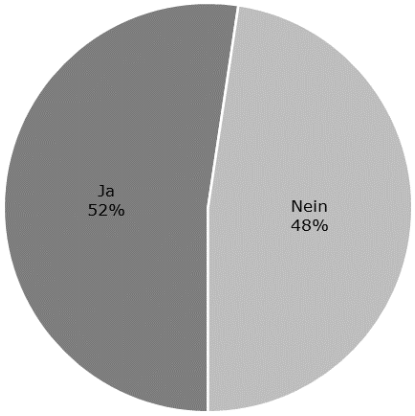
Behörden:
- Ersatzbaustoffverordnung
- Verfüll-Leitfaden

Herausforderungen:

- DAfStb-Richtlinie, rezyklierte Gesteinskörnung:
  - Festigkeitsbegrenzungen
  - Einschränkung von RC-Sand
- DIN 1045-2 (Aktuell):
  - Dokumentationspflichtig
- DIN 1045-2 (Neu):
  - Unverständlich
  - Regulierung der Feinanteile im RC-Sand auf 4 % → Mehraufwand
  - Mindestzementgehalt → Beton mit Typ 1 erzielt bei weniger Zement ebenso hohe Festigkeiten
- DIN 4226-101:

- Kein Bezug zwischen Herstellung und Ausführung, also Abbruchunternehmer und Betonhersteller

16. Sind Ihnen Fortbildungsangebote rund um das Thema Baustoffrecycling bekannt?



17. Bekannte Fortbildungsangebote rund um das Thema Baustoffrecycling; Antworten sortiert nach Branchenzugehörigkeit aufgelistet:

Abbruch-/ Bauschuttrecyclingunternehmen:
- Bundesvereinigung Recycling-Baustoffe (BRB)
- Bundesverband Sekundärrohstoffe und Entsorgung (BVSE)

Bauunternehmen:
- BRB
- BVSE
- Feess

Betonhersteller:
- Diverse Verbände

Behörden:
- Landesamt für Umwelt (LfU)
- Ressourceneffizienz-Zentrum Bayern (REZ)
- Baustoffrecycling Forum
- Bergbau-, Steine-, Erden-Tag
- Netzwerk Zirkuläres Bauen

18. Wünsche für Fortbildungsangebote im Bereich rezyklierte Gesteinskörnung und R-Beton; Antworten sortiert nach Branchenzugehörigkeit aufgelistet:

Abbruch-/ Bauschuttrecyclingunternehmen:
- Schulungen für Planer, Architekten und Statiker
- Fortbildungen für Laboranten
- Erfahrungsaustausch für Hersteller von RC-Baustoffen
- Schulung Betonherstellung
- Vorstellung der gängigen Normen

Betonhersteller:
- Schulung für Planer, Architekten und Statiker
- Fortbildung für die Verwendung rezyklierter Gesteinskörner des Typs 2

Bauunternehmen:
- Schulungen für Planer, Architekten und Statiker

Behörden:
- Allg. zugängliche Form/ Infomaterial für Interessierte
- Ingenieur-, Architektenkammer

19. Digitale Werkzeuge für die Koordination von Angebot und Nachfrage im Recyclingmaterialbereich:
Die Frage lautete wie folgt: Setzen Sie bereits digitale Werkzeuge ein, um Angebot und Nachfrage im Bereich der Recyclingmaterialien zu koordinieren? Falls ja, welche? Falls nein, welche digitalen Lösungen könnten Sie sich als sinnvoll vorstellen?

Keiner der Befragten setzt derzeit digitale Werkzeuge ein, jedoch besteht der Wunsch danach. Konkrete Vorschläge für digitale Werkzeuge wurden hierbei nicht genannt.

20. Kooperationsmöglichkeiten (z.B. mit Recyclern, Betonherstellern, Behörden, Forschungseinrichtungen) die zur Verbesserung des Baustoffkreislaufs beitragen?
Die Frage lautete wie folgt: Welche neuen Kooperationsmöglichkeiten (z.B. mit Recyclern, Betonherstellern, Behörden, Forschungseinrichtungen) würden Ihrer Meinung nach zur Verbesserung des Baustoffkreislaufs beitragen? Bitte erläutern Sie Ihre Vorschläge.

- Baustoffhersteller ↔ Forschungseinrichtungen: Erkunden der Machbarkeit
- Behörden ↔ Bauherren: Identifikation leicht umsetzbarer Bauteile
- Behörden ↔ Betonhersteller: Zulassung von vorgefertigten Korngemischen (z.B. 0/16 mm)
- Abbruchunternehmen ↔ Betonhersteller: Klare Kommunikation der Anforderungen an den Baustoff RC
- Erstellung einer Rohstoffstrategie basierend auf Daten zur regionalen Verwendung von Abbruchmaterial
- Wissensvermittlung zu Kreislaufwirtschaft und Nachhaltigkeit in Ausbildungsberufen und Studiengängen

21. Zusätzliche Anmerkungen, Anregungen oder Feedback:

- Keine LV-Texte kopieren, keine Sauberkeitsschicht mit C30/37
- Aufforderung zum Aufhören des "billigen" Bauens und zur ernsthaften Berücksichtigung von Kreislauffähigkeit und Nachhaltigkeit.

Wir möchten uns herzlich für Ihre Teilnahme, Ihr wertvolles Engagement und Ihre Bereitschaft bedanken, unsere Forschung zu diesem bedeutenden Thema zu unterstützen. Für etwaige Fragen oder weitere Anmerkungen stehen wir Ihnen gerne zur Verfügung. Sie können uns unter der E-Mail-Adresse johanna.zentner@hm.edu und andrea.kustermann@hm.edu erreichen.

LIST OF PARTICIPANTS

Event: Stoffkreislauf mineralischer Bauabfälle – Verwertung im R-Beton

Location & Date: Hochschule München, Karlstraße 6
12.12.2023

WP & Activity: A1.1

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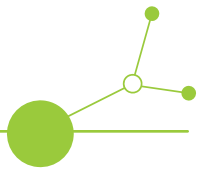
- All participants were live at the workshop at HM on 12.12.2023

Interreg CENTRAL EUROPE

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ReBuilt

D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction



Hungary
BURST
Mihály Kondacs, Balázs Kozák

v1.1
27.02.2024



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Summary

The Regional Workshop for circular and digital construction sector tool place in Hungary at the Hungarian Contemporary Architecture Centre. The mini conference and workshop was preceded with a morning session, a site visit at a renowned architecture office, Bánáti & Hartvig Architecture Office, that has already experience with circularity. The participants could learn, how the architecture office found their new home, that was refurbished based on the circularity principles, what challenges they had to face and how do they see the circularity in their works.

The afternoon session was a mini conference with few presentations a longer workshop in the relevant themes of the project.

The introductory presentations gave

- an overview about the current legislation and direction it is heading;
- an insight into the educative work of the Budapest University of Technology and Economics for the circular construction sector;
- an introduction of the ReBuilt project;
- an introduction of the Circularity Accelerator Programme of the World Green Building Council

Major take-aways of the afternoon workshop:

- Most universities provide architectural education, and they are key players in promoting a circular and digital approach to architecture, construction sector, therefore closer cooperation with them is required.
- Relevant laws have been codified in Hungary for the digital and circular construction sector, but the implementing regulations as still to be published in the upcoming month, in which details will be elaborated.
- There is a lack of awareness and understanding of the circular economy of demand side (users, investors).
- There is a lack of trust for secondary raw materials in general.
- The complexity of the circularity requires new skills too, capacity building for all participants and new kind of non-technical skills to plan and manage the construction and reconstruction processes in circularity.
- There is a general lack of skilled labour force in the construction sector.

The event results were communicated to the participants and to the stakeholders, and they will be further discussed at Central European level within the Central European Conference in Ljubljana, Slovenia.

1. Introduction

Deliverable D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction aims at collecting the findings of the regional workshops, that took place in all ReBuilt countries. It is a major step the workshops extend and verify the knowledge and information, that has been collected within the desktop research phase of the Activity 1.1. This way, the current status, gaps and potentials for circular and digital construction will be identified and summarized in programme area.

The results will feed into the First transnational central European circular and digital construction conference D.1.1.2. As a result of the initial mapping, regional workshop, transnational conference, a Conceptual note for activities needed for development of circular and digital construction (D1.1.3) will be developed. Furthermore, other work packages will build upon this task in WP1, WP2 and WP3.

2. Basic information about the workshop

Name of the event: *ReBuilt regional miniconference and workshop – Circular and digital construction in Hungary*

Type of event: stand along ReBuilt event

Date, time: *2024.01.18 10:00 – 16:00*

Location: *Budapest, Hungary*

Agenda of the event: Annex I.

Presentations available: Yes

Number of participants: *15*

Organizations registered and participated at the workshop:

- *Austrotherm Ltd.*
- *ÉMI Nonprofit Ltd.*
- *Budapest University of Technology and Economics Department of Building Materials and Civil Engineering*
- *ÉVOSZ*
- *Vas County Chamber of Construction*
- *Új vonal 3D Ltd.*
- *Hungarian Ministry of Energy National Waste Management Authority Department*
- *LCA Center Association*
- *ÉMI Nonprofit Ltd.*
- *Ministry of Construction and Urban Development, Department for the Construction Industry*
- *HuGBC*
- *Vas County Government Office*
- *BURST Nonprofit Ltd.*

3. ReBuilt focus of the event

Objective of the event was to gain knowledge about the current situation of the circular and digital construction in Hungary

The following pillars of assessment of the initial mapping were discussed at the event:

- Stakeholders mapping (public, private);
- Identification of relevant policies, strategies and legislation (e.g. waste management, construction, (bio)circular economy, digitalisation);
- Identification of good practices and innovations;
- Barriers, potentials, and social acceptance of circular construction;
- Education potential for circular economy, etc.

4. Stakeholders mapping

In addition to the general discourse session, we also dedicated a workshop exercise to identify additional stakeholders, grouping them according to different categories (governmental, civil and academic) and categories of interest and influence.

What were the outcome, findings of the workshop?

There are many uncharted organisations/companies in Hungary that has a lot to do with the interest perspective we approach the issue from. The list of stakeholders was updated as a result.

Conclusions, major findings about stakeholder mapping

- *Government stakeholders are highly dependent on the flexibility of the Hungarian regulation (regardless of the current state of EU rules)*
- *Civil society is diverse, we need to be precise in identifying the really important stakeholders*
- *Most universities provide architectural education, and we need to work closely with them to promote a circular and digital approach to architecture*

Please list the relevant identified stakeholders in your country according to the quintuple helix. Highlight their role in the stakeholder ecosystem

- *Governmental:*
  - *Contractors*
  - *Designers (all sectors)*
  - *Manufacturers of construction products*
  - *Ministries*
  - *Primary raw materials extractors/producers*
  - *Parliament*
  - *(Professional) authorities*

- *Asset managers*
- *Operators*
- *Municipalities*
- *Government agencies*
- *Recyclers*

- *Civil society:*
  - *Pool Group*
  - *KÉK*
  - *Blue Planet*
  - *Clean Air Action Group*
  - *LCA Center Association*
  - *HuGBC*
  - *ÉVOSZ*
  - *IPCC*
  - *Maltese Charity Service*
  - *Municipal angling associations*
  - *Humus Association*
  - *CECO*
  - *TÖOSZ*
  - *Éva Beleznay*
  - *Diána Ürge-Vorsatz*
- *Academia:*
  - *University of Miskolc*
  - *ÉMI Ltd.*
  - *Széchenyi University*
  - *University of Veszprém*
  - *University of Pécs*
  - *University of Debrecen*
  - *Lechner Knowledge Centre*
  - *BME*

5. Identification of relevant policies, strategies and legislation

Throughout the conference, major policies and strategies were mentioned:

What was the outcome of the discussion?

The framework Acts are already in place and following EU regulations and modern principles. However, without the exact implementation regulations, many participants were sceptical if they can be realized, because the previous Act was not bad either, but the detailed regulation gave room to loopholes.

Conclusions, major findings about relevant policies, strategies and legislation:

- Relevant laws have been codified in Hungary for the digital and circular construction sector, but the implementing regulations as still to be published in the upcoming month, in which details will be elaborated.

Please, list the key identified policies, strategies and legislation for e.g. waste management, construction, (bio)circular economy, digitalisation.

- National Construction Economy Strategy 2024-2028
- Act about public construction investments - Az állami építési beruházások rendjéről szóló 2023. évi LXIX. törvény
- Act about the Hungarian building industry - A magyar építészetről szóló 2023. évi C. törvény

6. Identification of good practices and innovations

Based on individual responses to one of the central questions of the project (Where is the transition process to digital and age-efficient construction now?), we mapped out what good practices and innovations are still needed in Hungary with a workshop exercise with sticky notes.

5 key issues and necessary steps identified to make progress:

1. Reducing material and resource consumption

- *Targeted research programmes, materials science*
- *Lack of incentives*
- *Mandatory carbon footprint calculation for buildings*
- *Negative externalities to be included in costs (missing element in assessing real social costs)*
- *VAT exemption for secondary raw materials*
- *Addressing the distribution of costs (legislator)*

2. Optimising the life cycle of material and product use

- *Optimisation based on LCA*

- *Building refurbishment vs demolition: mandatory assessment of the possibility of refurbishment, upgrading instead of demolition*
- *Imposing extra tax on new buildings*
- *Carbon-based product taxation*
- *Evaluation criteria for demolitions*
- *R&D*

3. Planning for reuse and waste elimination

- *Knowledge of innovative solutions, support for research, LCA-based renovation*
- *Review building codes to facilitate reuse,*
- *Module development and optimisation in BIM/CAD programmes*
- *Selective demolition, collection*
- *End of waste, separate collection, demolition*

4. Regeneration of nature

- *Preference for brownfield investments*
- *Compulsory afforestation of vacant plots*
- *Nature-based, low-tech positioning*
- *Increasing the role of biological activity as an aspect*
- *Showing good examples*

5. Social acceptance

- *Shaping perceptions*
- *Practical exercises, awareness raising, workshops*
- *Teaching environmental thinking and attitudes from kindergarten to university (in relation to the construction industry)*
- *Involving small communities*
- *Communication in plain language*

Conclusions, major findings about good practices and innovations

- *Much depends on the legislative environment*
- *Preference for brownfield investments is key to trigger innovation*
- *The future of construction will depend on the effective transfer of environmental thinking and attitudes*

Identified good practices and innovations:

- *Department of Innovation, ÉKM - Zoltán Kapros – highly experienced professional from the governmental sector*

- *BME Department of Building Materials and Civil Engineering: innovative and green building material development (straw thermal insulation, recycled aggregate concrete, CO2 sequestration in concrete)*
- *Energocell - glass foam production from waste glass*
- *Masuko Ltd. - The essence of the patent-protected technology is that any waste that can be shredded into granules can be used to make concrete, which can be used in many areas of the construction industry, such as road building, concrete element production, dam construction, etc. So even waste that cannot be used for other purposes can be turned into a marketable product, and the finished concrete product can be recycled infinitely.*
- *Thermo-block ("LEGO house") - Thermo-Block masonry units are similar in appearance to concrete formwork blocks, but they are made of polystyrene (Neopor F 2400 graphite material), which can be used to build nearly zero-energy houses, A+ energy class buildings, passive/active houses.*
- *Loam masonry panel (loam brick) - Loam is simple, locally quarried, durable, flexible, strong, non-degradable and not damaged by insects. The overhanging roofs of houses built from it not only provided protection from the summer heat and the scorching sun, but also protected the moisture-sensitive walls from rain.*
- *Amber Rec Ltd.*

7. Barriers, potentials, and social acceptance of circular construction

This topic was touched upon during the conversations, not in a specific workshop task.

Identified barriers:

- Lack of awareness and understanding of the circular economy of demand side (users, investors)
- Lack of trust for secondary raw materials in general (used ones)

Identified potentials: -

Conclusions, major findings about the social acceptance of circular construction:

- Trust and awareness for circular economy/construction and secondary raw materials need to be raised

8. Education potential for circular economy, etc

This pillar was touched upon briefly in the presentations and discussions during the workshop exercise that was based on the previous findings of another relevant EU-funded project, the ConstructSkills4LIFE. The participants had to reconsider themselves the results of the status quo analysis of the competency map for the white and the blue collared professionals required for circular construction sector transition, if they found them reasonable or could complement them. The participants found the status quo analysis reasonable, but had some complementary information.

Complementary information about white collared workforce:

- Have a significant role in refurbishment of the housing stock

- Growing importance of the related higher education programmes in field of economics
- EU taxonomy and ESG liabilities require new, not only technical skills.
- Growing importance of project management skills

Complementary information about blue-collared workforce:

- Major players are the Market, KÉSZ and Bayer Construct
- There is a clear shortage of skilled labour force in Hungary in the construction sector
- capacity building of the workforce for new technologies, aspects such as circularity, lifecycle is a real challenge as this group is not flexible. Burning issue: which existing skills could be developed further? How to wake interest for capacity building of the labour force?
- What do competencies do the construction leaders have, who steer the blue collared labour force?

9. Communication of the event

Please, describe how did you communicate before and after the event? Please, add poster, social media, website, newsletter etc. below.

- *We had 8 social media activities in total about the regional workshop in Hungary:*
  - *1 Facebook and 1 LinkedIn post about the announcement of the event*
  - *1 Facebook and 1 LinkedIn repost about the announcement of the event*
  - *1 Facebook and 1 LinkedIn post about the event*
  - *2 Facebook stories about the event*

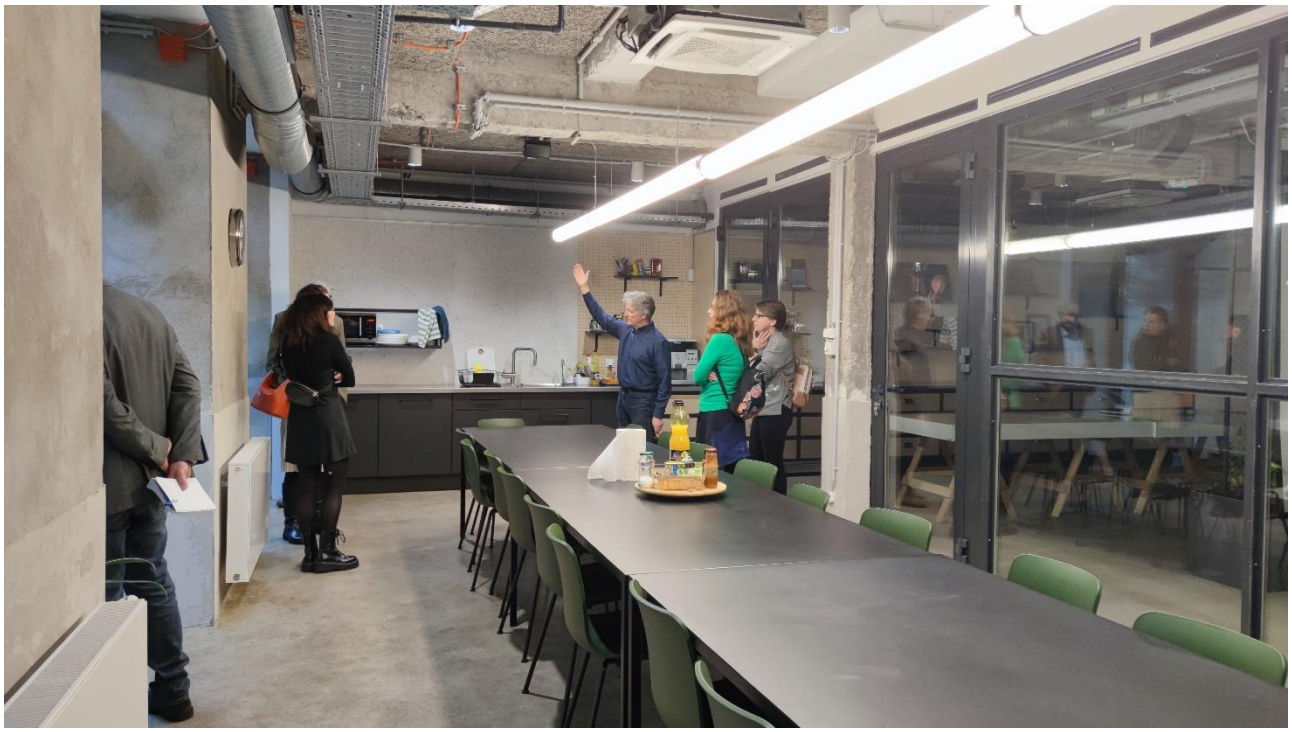
Did you prepare minutes, notes, photos, video or audio recording?

- *We prepared minutes and notes for internal use*

If yes, are they available internally, to the participants or publicly available? Which ones?

- *They are available only for internal use*

Please, upload here some photos about the event.




BURST



10. Any other relavant information to share

Conclusion of the morning site visit at the renowned Architecture Office, the Bánáti and Hartvig Architecture Firm's office that was reconstructed based on circular economy principles 2 years ago.

- There is hardly any demand for circular construction, if there is, then it is at least as costly as new construction (more expense on human resources, time consuming e.g. planning, but less on materials).
- Mostly banks spend on circularity. Their inspiration was a well-known Dutch Bank. They are in the forefront, however, greenwashing is present in building certification.
- Demand side and the general public shall be educated in this respect, because otherwise there will not be any intern demand for circular construction.
- They raise the circularity to their customers, however, when it comes to costs, they almost all the time withdraw or only minor ideas can be implemented from circularity.

Körforgásos és digitális építőipar Magyarországon

Hol állunk? Hogyan tovább?

ReBuilt projekt minikonferencia és műhelymunka

Időpont: 2024. január 18. 13:00 – 16:00

Helyszín: Kortárs Építészeti Központ (1111 Budapest, Bartók Béla út 10-12.)

Az eseményt moderálja: Beleznay Éva urbanista, építész, fenntarthatósági szakértő (Magyar Környezettudatos Építés Egyesülete)

Programtervezet

12:30 – 13:00 Érkezés: regisztráció és kávészünet

13:00 – 14:20 Minikonferencia

- Hol tart és merre halad a hazai a körforgásos és digitális építőipar jogszabályi környezete? – dr. Hegedűs Annamária, kormánytisztviselő, Építésgazdaságért Felelős Főosztály, Építésügyi és Közlekedési Minisztérium
- Felsőoktatás és a körforgásos, digitális építőipar – Dr. habil Alföldi György DLA, dékán, egyetemi tanár, Építészmérnöki Kar, Budapesti Műszaki és Gazdaságtudományi Egyetem
- ReBuilt projekt bemutatása – Kozák Balázs, projektmenedzser, BURST Nonprofit Kft.
- Körkörösség Akcelerátor Program Világ Zöld Építési Tanács program bemutatása – Huszár Daniella, szakmai koordinátor, Magyar Környezettudatos Építés Egyesülete

14:20 – 14:30 Technikai szünet

14:30 - 16:00 Műhelymunka

- Hol áll most az átállás folyamata a körforgásos és digitális építőiparra?
- Kik a legfontosabb érintettek és mi (lenne) a feladatuk?
- Jó gyakorlatok, innovációk itthon és a régióban
- Oktatás, képzés - hogyan jutunk el a célhoz?
- A körforgásos építőipar társadalmi elfogadottsága: korlátok, potenciálok

Délelőtti kísérő program

10:00 - 12:00 A körforgásos építészet gyakorlatának megismerése egy hazai példán keresztül: a Bánáti + Hartvig Építész Iroda helyszínbejárása és a munkáinak megismerése

A programváltozás jogát fenntartjuk.

D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction

Summary - by INFORDATA Partner (Italy)

Italy
Infordata Sistemi
Samo Miot
Version 1.1
06.03.2024

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Summary

In our recent workshop we delved into crucial aspects of sustainable practices and circular economy in the building industry. Throughout the event, we aimed to update stakeholders on the current legislative landscape and its existing gaps (eg. lack of rules to promote reuse of material in new ways), shedding light on areas that require attention and improvement. Exploring new approaches to enhance circularity emerged as a key theme, emphasising innovative strategies to minimise waste and maximise resource efficiency.

We also tackled the transformative power of digitalization in building trust within the realm of secondary raw materials. The integration of digital platforms and marketplaces has become a pivotal factor in streamlining processes, fostering transparency, and ultimately promoting the increased reuse of materials. Additionally, our discussions extended to the adoption of new technologies for recycling on construction sites. This exploration aimed to showcase advancements that can reshape and revolutionise our approach to waste management and sustainability within the industry.

In the spirit of collaboration and progress, our workshop served as a platform to exchange insights, explore opportunities, and collectively pave the way for a more sustainable future.

- Current Legislations about waste management in the construction sector and its gaps on reuse of recycled materials in new ways (eg. for urban furniture design)
- New Approaches to Boost Circularity
- Digitalisation for Increased Trust in Secondary Raw Materials - Digital Passport
- Utilisation of Marketplaces
- Promotion of Material Reuse
- Exploration of New Technologies for Recycling, including on Construction Sites

1. Introduction

Deliverable D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction aims at collecting the findings of the regional workshops that took place in all ReBuilt countries. It is a major step the workshops extend and verify the knowledge and information that has been collected within the desktop research phase of the Activity 1.1. This way, the current status, gaps and potentials for circular and digital construction will be identified and summarised in programme area.

The results will feed into the First transnational central European circular and digital construction conference D.1.1.2. As a result of the initial mapping, regional workshop, transnational conference, a Conceptual note for activities needed for development of circular and digital construction (D1.1.3) will be developed. Furthermore, other work packages will build upon this task in WP1, WP2 and WP3.

2. Basic information about the workshop

Name of the event: "Nuovi Approcci e Tecnologie per un'Edilizia Sostenibile, Digitalizzazione, Valorizzazione delle materie prime seconde, Biomateriali e Passaporto digitale" (New Approaches and Technologies for Sustainable Construction, Digitisation, Valorisation of Secondary Raw Materials, Biomaterials and Digital Passport)

Type of event: connected event

Date, time: 5 March 2024, 11:00 - 13:00

Location: online, on the Zoom platform

Agenda of the event:

1.Presentazione progetto ReBuilt (ReBuilt project presentation) - Marko Petelin, Infordata Sistemi

2.Normative sui materiali edili in Italia (Regulations on building materials in Italy) - Dr. Serena Pappalardo, Università IUAV

3.Nuove tecnologie per il recupero dei rifiuti da edilizia (New technologies for construction waste recovery) - Paolo Franceschetti, Veritas Spa

4.La gestione del trasporto Transfrontaliero dei rifiuti speciali (The Management of Transboundary Transport of Special Waste) - Borut Sardoč, SDGZ

5.Presentazione progetto Waste Design (Waste Design project presentation) - Dr. Serena Pappalardo, Università IUAV

6.Progetto Cinderela - Piattaforma CinderOSS (Cinderella Project - CinderOSS Platform) - Ronald Chenù Abente Acosta, Open Content

7.Progetto Retracking e Digitalizzazione Cantieri (Project Retracking and Site Digitisation) - Marko Petelin, Infordata Sistemi

8.Soluzioni software per cantieri (Software solutions for construction sites) - Mitja Petelin, Infordata Sistemi

Presentations available: Yes

Number of participants: 21

List of organisations, type of organisations listed:

At the workshop there were different organisations related to the organiser and some for the participants. Here we list the most relevant.

Organisation	Organisation type	Description	Stakeholder type (public/private)
Infordata Sistemi	SME	Rebuilt partner for digitalisation	PRIVATE
Open Content	SME	Rebuilt partner for digitalisation	PRIVATE
University IUAV	Higher education and research organisation	Faculty of Architecture	PUBLIC
SDGZ/URES	Business support organisation	Business support organisation	PRIVATE
VERITAS spa	Infrastructure and public service provider	Environmental and water services	PUBLIC
PSIT srl	SME	ICT solution provider	PRIVATE
Dremar Costruzioni Generali srl	SME	Building company	PRIVATE
Studio Geologico Paola Baronci	SME	Geologist	PRIVATE
PM Studio tecnico	self employed	Engineering firm	PRIVATE

3. ReBuilt focus of the event

Objective of the event:

The workshop aimed to show what technological solutions and opportunities construction companies can exploit to boost the use of recycled materials and drastically reduce the impact of waste in the environment in the coming years.

Initially, significant emphasis was placed on the topic of waste from the construction sector, focusing on the regulations governing them, their transportation, and recycling processes.

Subsequently, various technological and innovative solutions aimed at promoting the development of the circular economy in the construction industry were presented.

Overall, the workshop provided the audience with several insights that can be adopted to contribute to sustainable progress and responsible waste management in the construction sector.

Which pillars of assessment of the initial mapping were discussed:

- Stakeholders mapping (public, private);
- Identification of relevant policies, strategies and legislation (e.g. waste management, construction, (bio)circular economy, digitalisation);
- Identification of good practices and innovations;
- Barriers, potentials, and social acceptance of circular construction;
- Education potential for a circular economy, etc.

4. Stakeholders mapping

Please, describe the workshop activity about the stakeholder mapping such as methodology, activities, participant contribution etc. obtain information about the stakeholder mapping.

We have categorised stakeholders based on their field of work, operational scope, and corporate identity.

What were the outcome, findings of the workshop?

not applicable

Conclusions, major findings about stakeholder mapping

-

Please list the relevant identified stakeholders in your country according to the quintuple helix. Highlight their role in the stakeholder ecosystem.

-

5. Identification of relevant policies, strategies and legislation

Please, describe the workshop activity about the policy and legislation identification e.g. methodology, activities, participant contribution etc.

During the event, two speakers considered the topic of waste management in the construction sector. Dr. Pappalardo from IUAV University provided a detailed overview of the regulations concerning construction materials in Italy, including their classification and methods of disposal and recovery. On the other hand, Dr. Sardoč from SDGZ discussed the regulations governing the transportation of waste, both domestically and internationally, based on their classification.

What was the outcome of the discussion?

Dr. Sardoč highlighted the complexity and costliness of cross-border transport of construction waste, emphasising that currently, exporting such waste in limited quantities is not economically advantageous. This is due to the need to provide adequate financial guarantees, the costs associated with the process (including services like sworn translations), the time involved, and the bureaucratic complexity. Additionally, the widespread presence of construction waste management facilities in Italy further diminishes the economic feasibility of exporting such materials.

Conclusions, major findings about relevant policies, strategies and legislation:

- There are significant legislative gaps regarding the use of recycled materials in solutions beyond the construction industry, such as utilising waste materials for furniture production.

Please, list the key identified policies, strategies and legislation for e.g. waste management, construction, (bio)circular economy, digitalisation.

- Legislation on waste management:

Commission Decision 2000/532/EC on Waste (EU legislation)

Directive 2008/98/CE on Waste (EU legislation)

Legislative decree 152/2006 Environmental regulations (Italian legislation)

Regulation (EC) No 1013/2006 on Waste Shipment (EU legislation)

6. Identification of good practices and innovations

Please, describe the workshop activity about the good practices and innovations e.g. methodology, activities, participant contribution etc.

During the presentations, various topics were discussed, including new technologies for the recovery of construction waste, the Cinderela OSS platform, the project on urban eco-design, waste recycling management and material traceability, the Digital Product Passport and the Gaia-X framework.

What was the outcome of the discussion?

The outcome of these presentations could be an enhanced understanding and awareness of the latest technologies and initiatives in waste recovery and management within the construction sector. Attendees may gain insights into the listed topics. This knowledge could potentially inspire or inform future practices, policies, or innovations in the field of construction waste management and sustainability.

Conclusions, major findings about good practices and innovations

- In Italy, there are instances where legislation does not align with current trends in innovation, slowing down the adoption of circular solutions.

Please, list here the identified good practices and innovations, describe them briefly, why they are considered so, and give reference to them.

- **Project Cinderela - CinderOSS Platform**: Ronald Chenú Abente Acosta from Open Content pointed out that the Cinderela platform may play a significant role in optimising waste management processes in the construction industry, potentially improving resource utilisation and reducing environmental impact.

  More specifically, this platform operates as a circular business model. It encompasses a library providing information on the production and usage of circular construction materials made from waste. Additionally, it functions as a marketplace where businesses can engage in the buying and selling of waste or recycled secondary raw materials. Furthermore, it serves as a tool for identifying potential partners within the circular economy.

- **Digital Product Passport and Retracking**: Marko Petelin from Infordata Sistemi gave the audience some insights into the concept of Digital Product Passport (DPP) which is a traceability and data-sharing system using technologies like QR codes

and blockchain. Manufacturers can offer details on product durability, reusability, upgradeability, repairability, energy and resource efficiency, environmental impact, manufacturing practices, and other pertinent information based on the product category.

As an example, the Retracking project, where DPP was achieved by embedding RFID chips in recycled fibre-reinforced composite panels, was presented.

The speaker underscored the increasing emphasis on responsible waste disposal practices and the importance of tracking materials throughout their lifecycle for better environmental accountability.

- **Urban Eco-design**: Serena Pappalardo from IUAV University introduced the Interreg Project "Waste Design" which suggests a growing recognition of the importance of incorporating environmentally conscious and circular design principles into urban development, potentially leading to more sustainable and resilient cities.

  During her presentation, she elucidated the process leading to the creation of urban furnishings, following the Eco-design concept: from identifying the most suitable materials and processes for crafting urban furniture to the actual design and implementation of these furnishings. Additionally, she showcased some examples, such as benches crafted with concrete resin.

- **New Technologies for Recovery of Construction Waste**: Paolo Franceschetti from Veritas Spa highlighted the emergence of new technologies for efficient recovery of construction waste, indicating a positive trend toward more sustainable and environmentally friendly practices.

- **Gaia-X Framework**: Marko Petelin from Infordata Sistemi explained how the Gaia-x platform works and its possible contribution to making the construction industry more sustainable. Gaia-X is an initiative led by European industries with the aim of authoritatively and securely interconnecting company data. The framework is designed to ensure European digital sovereignty.

7. Barriers, potentials, and social acceptance of circular construction

Please, describe the workshop activity about the barriers, potential and social acceptance of circular construction e.g. methodology, activities, participant contribution etc.

Relevant outcome of the discussion:

From the speakers' speeches we can deduce that there is a strong interest in the concept of circular building.

As pointed out, the

The speakers themselves, mostly professionals in the field, pointed out the interest in circular construction of stakeholders from disparate backgrounds.

Identified barriers:

- Economic costs and bureaucratic challenges, in the case of some solutions (eg. transboundary waste transportation)
-
-

Identified potentials:

-
-
-

Conclusions, major findings about the social acceptance of circular construction:

-
-
-

8. Education potential for circular economy, etc

Please, describe the workshop activity about the education potential for circular economy e.g. methodology, activities, participant contribution etc.

Relevant outcome of the discussion:

The speakers' presentations and contributions describing various activities and best practices have significantly enriched the audience's understanding of the topic.

Which type of education and target groups were concerned? (e.g. higher education, vocational education, life-long learning, students, professionals, etc.)

The target groups concerned were professionals and managers.

What knowledge gaps, skills are missing for some specific groups?

1) Industry:

2) Government and Public servants:

   As already mentioned, legislation is not sufficiently sensitive to innovations that lead to circular solutions.

3) University & Vocational Training:

4) Architects and Investors

Conclusions, major findings about education potential:

-
-
-

9. Communication of the event

Total people engaged:

Mailing: 12,063

LinkedIn: 5,964

Facebook: 2,030

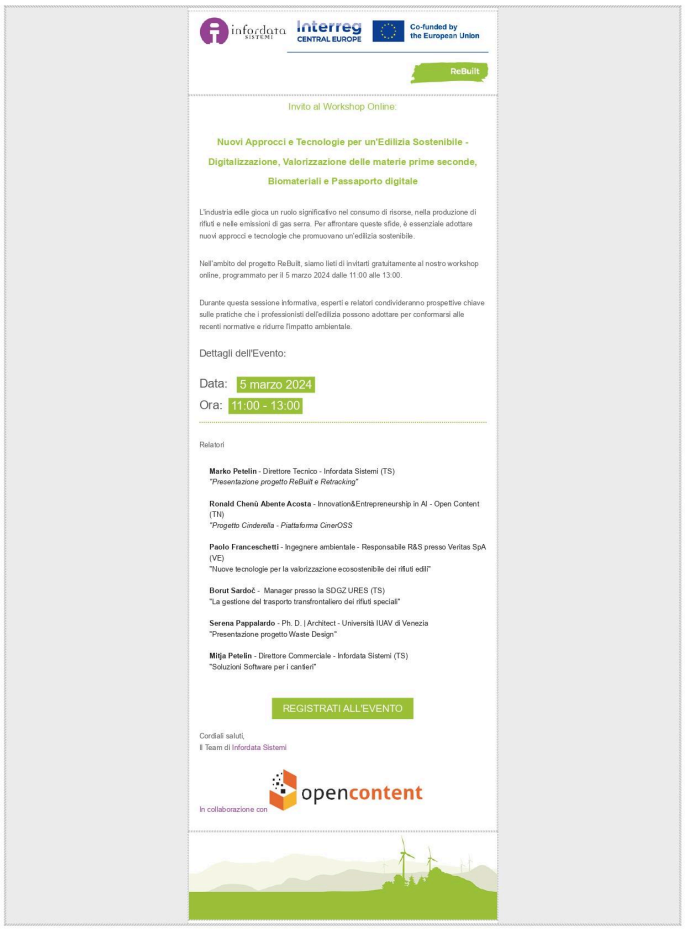
TOTAL: 20,057

We promoted the event as follows:

- Newsletter invitations were sent to 12,063 contacts, including stakeholders, construction companies, architects, and architectural design studios.

Here is the invitation layout:

Workshop-ReBuilt_mailing Invitation

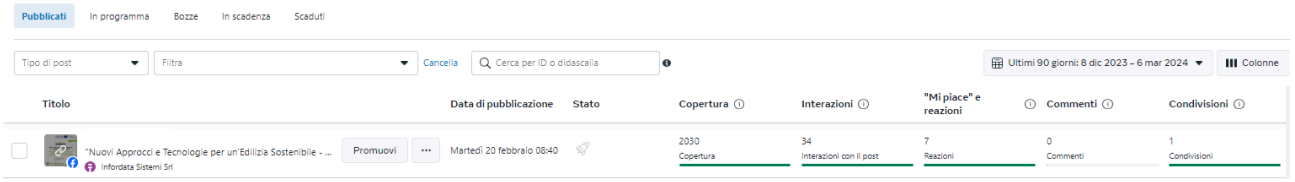


We also promoted the workshop on our Facebook and LinkedIn social media pages.

- FACEBOOK: social post on the Infordata Sistemi Facebook page. Mandatory subscription.



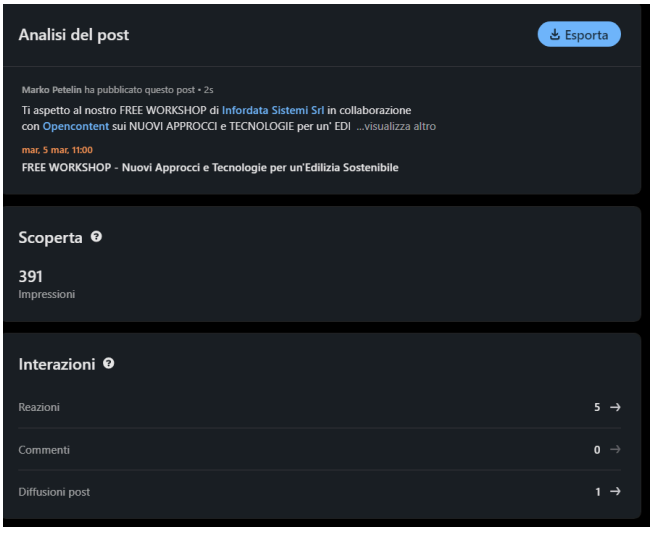
Results:



- LINKEDIN: Social invitation from Marko Petelin linkedin profile:



Results:



- LINKEDIN CAMPAIGN from the Infordata Sistemi page:

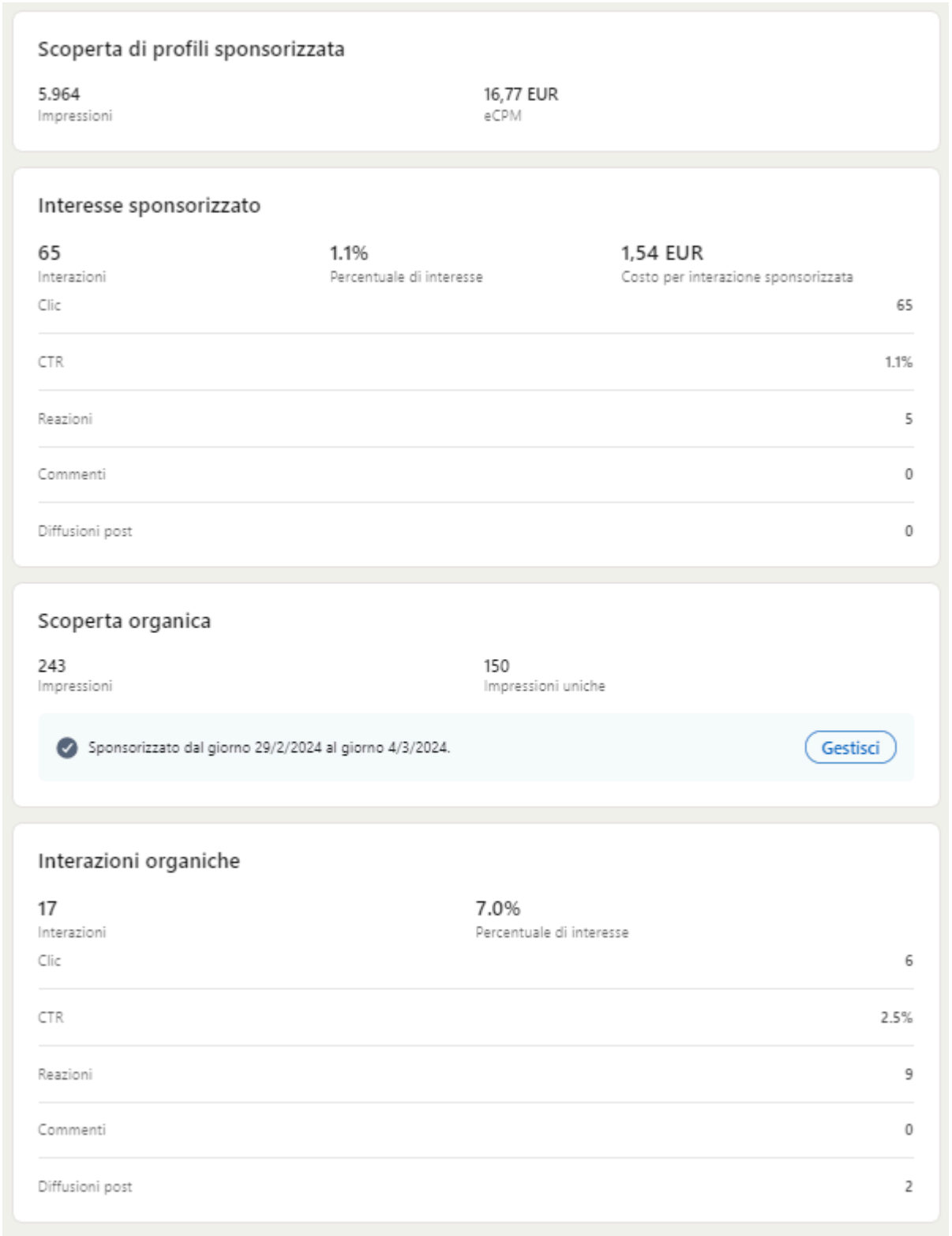


Results:

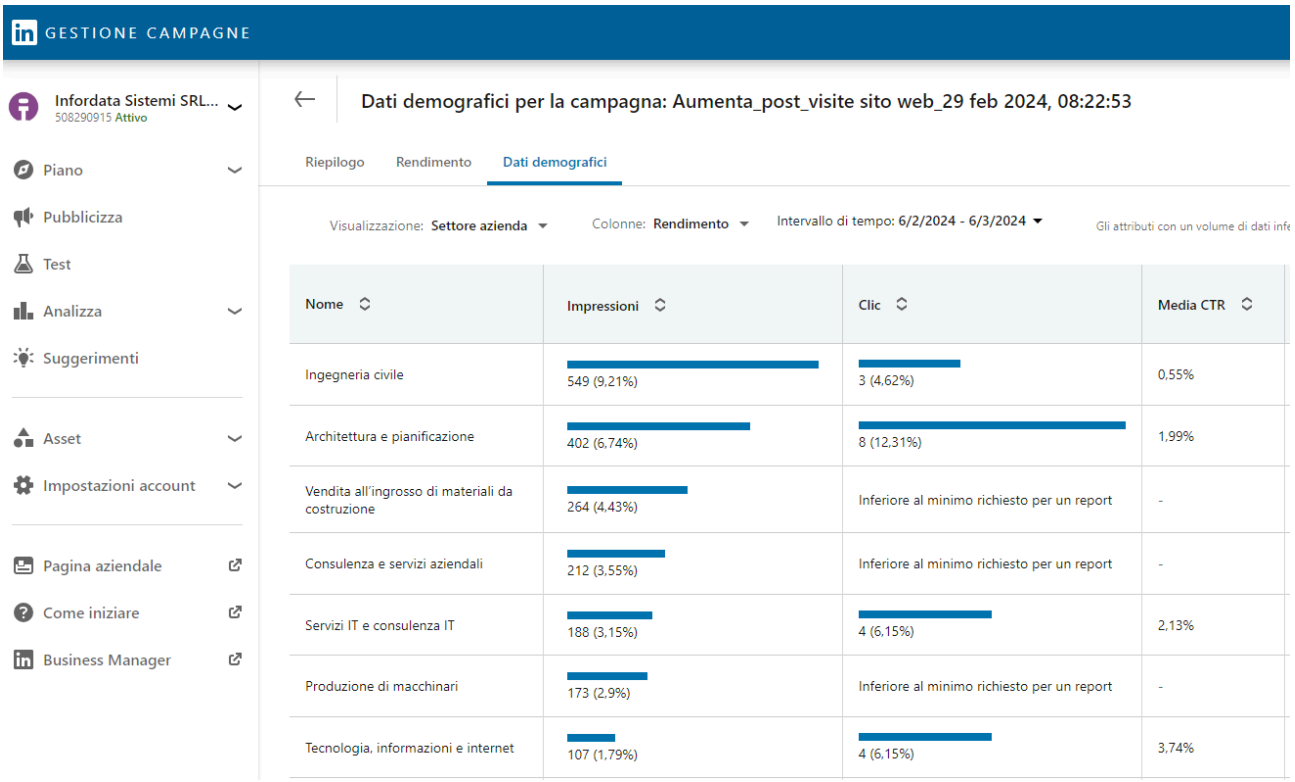
- total cost: 100 euro
- total impressions: 5,964

	Nome campagna	No/Si	Stato	Gruppo campagna	Spesa	Risultati principali	Costo per risultato	Impressioni
☐	Hai selezionato 1 campagna	-	-	-	100,00 €	-	-	5.964
☑	Aumenta_post_visite sito web_29 feb 2024, 08:22:53 ID: 293524733 · Contenuto sponsorizzato		Completata	Aumenta efficacia_post_interess...	100,00 €	65 *Interazioni*	1,54 €	5.964

Details:


Scoperta di profili sponsorizzata
5.964
Impressioni
16,77 EUR
eCPM
Interesse sponsorizzato
65
Interazioni
1.1%
Percentuale di interesse
1,54 EUR
Costo per interazione sponsorizzata
Clic 65
CTR 1.1%
Reazioni 5
Commenti 0
Diffusioni post 0
Scoperta organica
243
Impressioni
150
Impressioni uniche
Sponsorizzato dal giorno 29/2/2024 al giorno 4/3/2024.
Gestisci
Interazioni organiche
17
Interazioni
7.0%
Percentuale di interesse
Clic 6
CTR 2.5%
Reazioni 9
Commenti 0
Diffusioni post 2

Engineers and architects proved to be the most engaged target audience during the campaign.



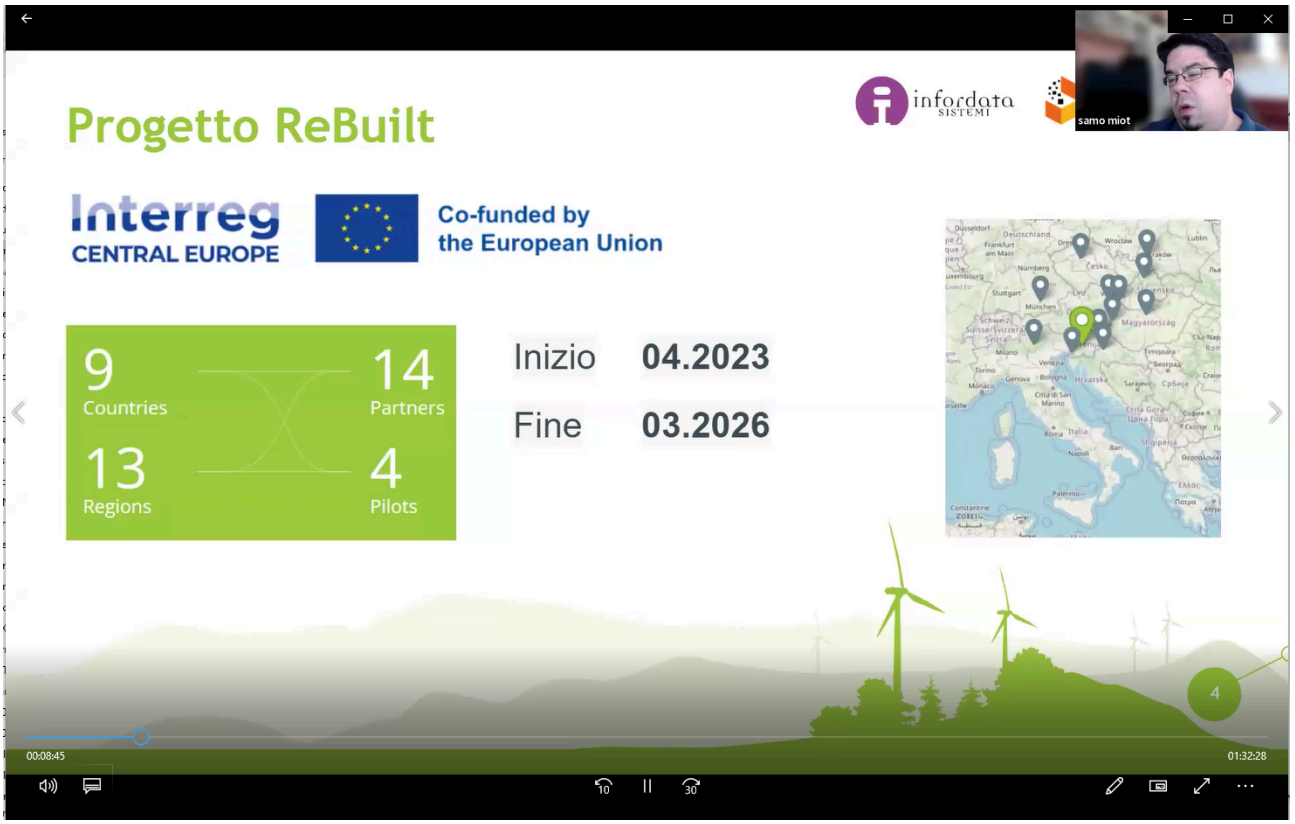
Nome	Impressioni	Clic	Media CTR
Ingegneria civile	549 (9,21%)	3 (4,62%)	0,55%
Architettura e pianificazione	402 (6,74%)	8 (12,31%)	1,99%
Vendita all'ingrosso di materiali da costruzione	264 (4,43%)	Inferiore al minimo richiesto per un report	-
Consulenza e servizi aziendali	212 (3,55%)	Inferiore al minimo richiesto per un report	-
Servizi IT e consulenza IT	188 (3,15%)	4 (6,15%)	2,13%
Produzione di macchinari	173 (2,9%)	Inferiore al minimo richiesto per un report	-
Tecnologia, informazioni e internet	107 (1,79%)	4 (6,15%)	3,74%

Entire video of the workshop (duration 1h38')

https://youtu.be/7eTt2Eys6vs

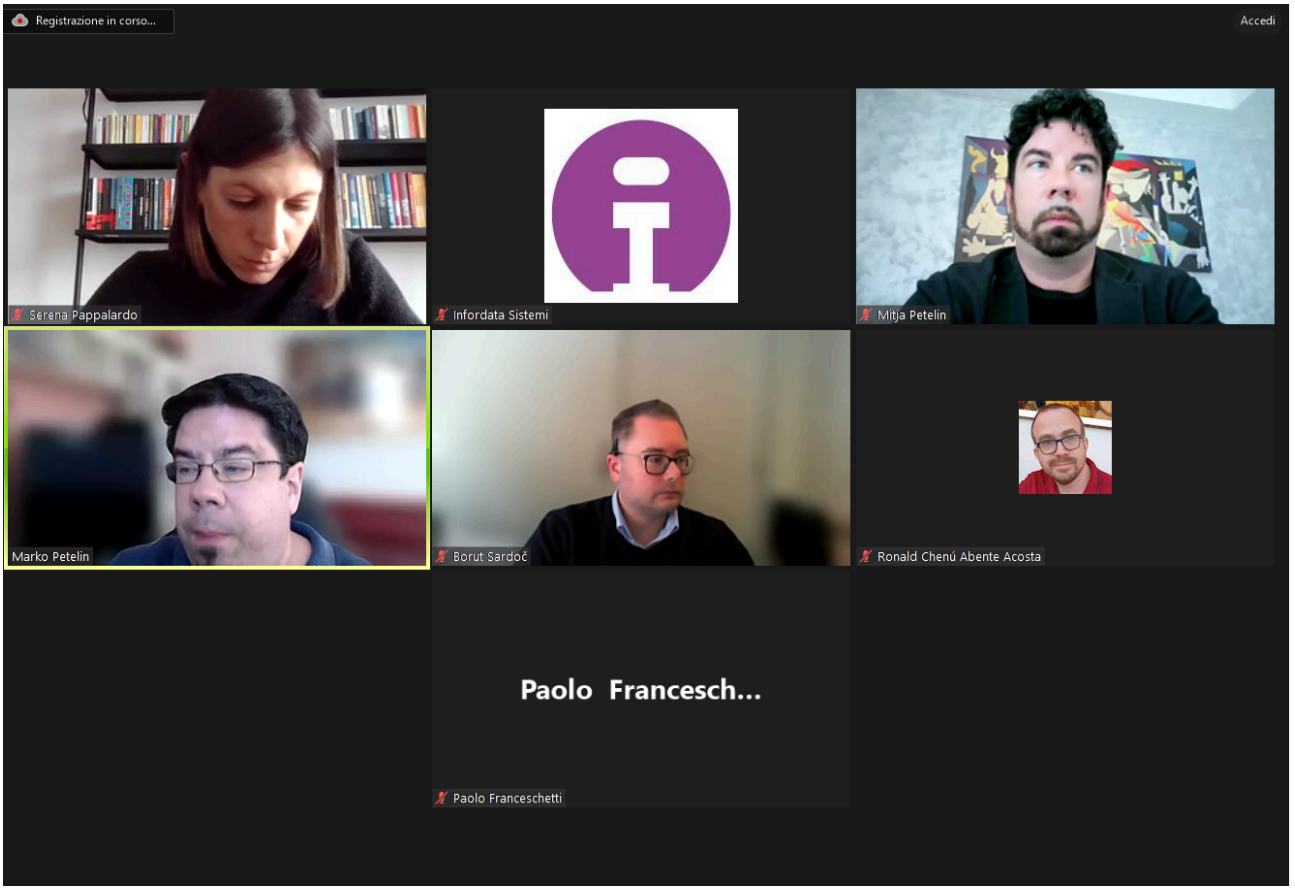
Here are some screenshots of the event.





_:

The speakers:




Serena Pappalardo
Interreg
CENTRAL EUROPE
ReBuilt
ECO DESIGN URBANO
Rebuilt
5 Marzo 2024
Serena Pappalardo
Università Iuav di Venezia
00:58:28
00:42:45


Paolo Franceschetti
Nuove tecnologie per riciclo
1. Separazione avanzata dei materiali: metodi meccanici, ottici e magnetici per separare i diversi materiali
2. Impianti di riciclo mobili
3. Tecnologie di riciclo avanzate: utilizzano processi chimici o termici per trasformare i rifiuti da edilizia in materiali da costruzione di nuova generazione (nuovo calcestruzzo)
4. Stampanti 3D per riciclo materiale edile
5. Monitoraggio e tracciabilità
00:33:10
01:08:03


Gestione dei rifiuti da costruzione e demolizione
deposito temporaneo nel cantiere
trasporto in conto proprio presso un centro di recupero autorizzato
affidamento del rifiuto ad un trasportatore autorizzato c/terzi
00:44:15
00:56:58


Mitja Petelin
La Gestione digitale del cantiere
• Safety & Security
• Pianificazione delle risorse umane
• Controllo dei beni strumentali
Calendario
giugno 2023
LUN
MAR
MER
GIO
VEN
APPROVED
DENIED
APPROVED
2
01:34:21
00:06:52

10. Any other relevant information to share

Interreg CENTRAL EUROPE

Co-funded by the European Union

ReBuilt

D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction

Poland
IETU
Marek Matejczyk

Version 1.0
01.03.2024

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9. Communication of the event....9
10. Any other relavant information to share....10

Summary

Workshop in Poland covering the analysis of six stages of the building life cycle (design of buildings, production of building materials, construction of buildings, operation of buildings, deconstruction and/or demolition of buildings, material recovery) in terms of horizontal issues:

- involved stakeholders,

  Based on IETU own data and suggestions from workshop participants regarding expanding the list of stakeholders, a list of stakeholders was created and presented in table "A1.1_Initial mapping template"

- political and legal conditions,

  General rules require the economical and sustainable use of resources - space, energy, water and primary raw materials, and indicate the priority of actions aimed at preventing the accelerated destruction of buildings, their adaptation or other means of reuse, and in the case where their liquidation cannot be avoided - the priority of recovery processes and recycling before disposal by other methods.

- acceptance of circular construction,

  None of the participants in the discussion claimed to be against the concept of circular construction. However, barriers to introducing this concept in practice were pointed out.

  Many factors influence the possibility of recovering building materials and elements from the dismantling and demolition of decommissioned buildings:

  - Environmental Regulations,
  - Demand and market value,
  - Safety Considerations,
  - Composition of building materials,
  - Condition of materials,
  - Availability and ease of dismantling,
  - Segregation and Sorting Processes,
  - Technological possibilities,
  - Logistics and Transportation.

- good practices and innovations,

  Examples of good practices and innovative approaches to the life cycle of buildings in Poland include:

  - thermal modernization of buildings and the use of renewable heat and energy sources,
  - renovation and adaptation of buildings for new purposes - reconstruction of facilities of high cultural and aesthetic value, changing the functions of civil and industrial facilities for other social purposes, adapting to generational changes (e.g. adaptation of kindergartens into nursing homes, schools for other public facilities - district clinics, offices, social premises),
  - construction waste, the generation of which could not be avoided, is a source of metal recovery, production of aggregates and levelling compounds,
  - selective collection of construction waste makes possible to increase the level of waste recovery and improve the quality of obtained secondary raw materials.

1. Introduction

Deliverable D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction aims at collecting the findings of the regional workshops, that took place in all ReBuilt countries. It is a major step the workshops extend and verify the knowledge and information, that has been collected within the desktop research phase of the Activity 1.1. This way, the current status, gaps and potentials for circular and digital construction will be identified and summarized in programme area.

The results will feed into the First transnational central European circular and digital construction conference D.1.1.2. As a result of the initial mapping, regional workshop, transnational conference, a Conceptual note for activities needed for development of circular and digital construction (D1.1.3) will be developed. Furthermore, other work packages will build upon this task in WP1, WP2 and WP3.

2. Basic information about the workshop

Name of the event:

Public consultations on the draft Waste Management Plan for the Silesian Voivodeship for 2023-2028 years (Pgows2028). Workshop with representatives of municipalities and entrepreneurs - ReBuilt thematic session.

Type of event: hybrid mode Rebuilt sessions

Date, time: July 27 and 28 and August 2 and 3, 2023; 1,5 hour

Location:

IETU Katowice, Poland

Agenda of the event:

1. Brief information about partners and project goals.
2. Task plan for achieving project goals.
3. Implementation conditions - waste streams, legal conditions.
4. Roles of stkeholders in project implementation, possibilities and expectations of cooperation.
5. Discussion focused on barriers and opportunities for project implementation.

Presentation available:

Yes

Number of participants:

210 participants in four sessions

List of organizations, type of organizations listed:

Representatives of public administration (municipalities and Marshall Office of Silesian Province). Companies providing services in the sector of waste treatment, research and development units, engineers, SME's.

Name of the event:

ReBuilt project workshops: "Barriers and opportunities for the development of digitally supported circular construction in Poland".

Type of event: hybrid mode Rebuilt workshop

Date, time: February 22, 2024, 2,5 hour

Location:

IETU Katowice, Poland

Agenda of the event:

1. Brief information about partners and project goals.
2. Task plan for achieving first part of project goals.
3. Project implementation conditions - waste streams, legal conditions.
4. Workshop covering the analysis of six stages of the building life cycle in terms of horizontal issues:
   - involved stakeholders,
   - political and legal conditions,
   - acceptance of circular construction,
   - good practices and innovations,
   - educational needs.
5. Summary and invitation to further cooperation and contacts.

Presentation available:

Yes

Number of participants: 31

List of organizations, type of organizations listed:

Representatives of public administration, water resources managers, companies providing services in the sector of waste treatment and real estate management, research and development units, SME's.

Appendices 1-5 contain reports on these events.

3. ReBuilt focus of the event

Objectives of the event:

During the workshops, we focused on obtaining information from participants and sparking a discussion about stakeholders of the circular economy in construction, programs and strategies as well as the state of law, examples of good practices and innovations, the level of awareness, education and social acceptance for the circular economy.

We assessed the information obtained according to the criteria of barriers and opportunities for the development of the circular economy in construction.

4. Stakeholders mapping

IETU has numerous contacts with potential stakeholders, as previously mentioned: representatives of public administration, water resources managers, companies providing services in the sector of waste treatment and real estate management, research and development units, SME's as well as clusters, hubs that operate within other projects and other entities financed as part of initiatives aimed at exchanging experiences, networking and international cooperation.

Of the over a thousand stakeholders we identified in the quintiple helix circles, we selected 385 directly involved in construction-related processes and procedures, the list of which we provided in the "A1.1_Initial mapping template" sheet. In addition to contact details, the sheet describes their role according to the quintuple helix.

We conducted the first four project meetings as part of consultations on the regional waste management plan. The list of invited parties included approximately 600 entities and people involved in the consultations. They had a very high turnout - over 200 people took part in total.

We invited 385 selected entities to the fifth workshop meeting. Unfortunately, the interest in this case was not so great. After postponing the date and sending approximately 800 additional invitations (IETU conducts monthly open seminars and the list of those invited to such seminars was used), we received over 30 applications, and 31 people took part.

Workshop covering the analysis of six stages of the building life cycle (design of buildings, production of building materials, construction of buildings, operation of buildings, deconstruction and/or demolition of buildings, material recovery) in terms of horizontal issues:

- **involved stakeholders,**
- political and legal conditions,
- acceptance of circular construction,
- good practices and innovations,
- educational needs.

During the first four meetings, suggestions were received regarding expanding the list of stakeholders, which were used to create a detailed letter submitted in a spreadsheet “A1.1_Initial mapping template" and used in the organization of the fifth meeting.

5. Identification of relevant policies, strategies and legislation

Workshop covering the analysis of six stages of the building life cycle (design of buildings, production of building materials, construction of buildings, operation of buildings, deconstruction and/or demolition of buildings, material recovery) in terms of horizontal issues:

- involved stakeholders,
- political and legal conditions,
- acceptance of circular construction,
- good practices and innovations,
- educational needs.

The strategic document in Poland is the Roadmap for the transformation towards a circular economy (CE).

The document adopted by the Council of Ministers of the Republic of Poland on October 10, 2019 is the result of the work of working groups operating in the Team for the Circular Economy and extensive public consultations. More than 100,000 people took part in them. 200 socio-economic partners, as well as representatives of government and local government administration.

The circular economy road map is a document containing a set of tools, not only legislative ones, aimed at creating conditions for the implementation of a new economic model in Poland. The proposed activities concern primarily analytical, conceptual, informational, promotional and coordination work in areas within the jurisdiction of individual ministries.

Chapter I "Sustainable industrial production" is intended to draw attention to the important role of industry in the Polish economy and new opportunities for its development.

Chapter II "Sustainable consumption" shows how much potential there is at this - so far often overlooked - stage of the life cycle.

Chapter III "Bioeconomy" concerns the management of renewable raw materials (the circular economy biological cycle), which in Polish reality have great potential.

Chapter IV "New business models" indicates the possibilities of reorganizing the functioning of various market participants based on the idea of circular economy.

Chapter V concerns the implementation and monitoring of circular economy.

The Circular Economy Road Map is one of the projects of the Strategy for Responsible Development.

Legal acts affecting the treatment of buildings and construction materials that can be reused or recovered include:

- Act on spatial planning
- Construction Law
- Waste Act
- Act on maintaining law and order in municipalities
- Environmental Law

- Water Law

and over hundred implementing regulations.

The manner and scope of their impact on the circular economy should be considered individually, depending on the specific case of activity.

General rules require the economical and sustainable use of resources - space, energy, water and primary raw materials, and indicate the priority of actions aimed at preventing the accelerated destruction of buildings, their adaptation or other means of reuse, and in the case where their liquidation cannot be avoided - the priority of recovery processes and recycling before disposal by other methods.

Moreover, several hundred technical and quality standards apply to the use of secondary raw materials, products containing them and the reuse of elements in construction.

IETU has developed a catalog of such regulations in force in the European Union, valid for 2022. This document can be updated and made available in this project if necessary.

6. Identification of good practices and innovations

Workshop covering the analysis of six stages of the building life cycle (design of buildings, production of building materials, construction of buildings, operation of buildings, deconstruction and/or demolition of buildings, material recovery) in terms of horizontal issues:

- involved stakeholders,
- political and legal conditions,
- acceptance of circular construction,
- good practices and innovations,
- educational needs.

Examples of good practices and innovative approaches to the life cycle of buildings in Poland include:

- thermal modernization of buildings and the use of renewable heat and energy sources,
- renovation and adaptation of buildings for new purposes - reconstruction of facilities of high cultural and aesthetic value, changing the functions of civil and industrial facilities for other social purposes, adapting to generational changes (e.g. adaptation of kindergartens into nursing homes, schools for other public facilities - district clinics, offices, social premises),
- construction waste, the generation of which could not be avoided, is a source of metal recovery, production of aggregates and levelling compounds,
- selective collection of construction waste makes possible to increase the level of waste recovery and improve the quality of obtained secondary raw materials.

7. Barriers, potentials, and social acceptance of circular construction

Workshop covering the analysis of six stages of the building life cycle (design of buildings, production of building materials, construction of buildings, operation of buildings, deconstruction and/or demolition of buildings, material recovery) in terms of horizontal issues:

- involved stakeholders,
- political and legal conditions,
- **acceptance of circular construction,**
- good practices and innovations,
- educational needs.

None of the participants in the discussion claimed to be against the concept of circular construction. However, barriers to introducing this concept in practice were pointed out.

Many factors influence the possibility of recovering building materials and elements from the dismantling and demolition of decommissioned buildings:

Environmental Regulations: Environmental regulations and policies relating to waste management and recycling may impact the decision-making process during dismantling and demolition. Compliance with waste disposal, hazardous materials and environmental regulations may impact the methods and practices used to recover materials. The waiting period for decisions and permits in general is also important. The intention to use extensive machinery may extend this period even further.

Demand and market value: The demand for recycled materials and their market value significantly influence the economic feasibility of recovery activities. Materials that are in high demand and that are valuable, such as metals and high-quality wood, are more likely to be recovered and are economically viable for recycling or resale.

Safety Considerations: Ensuring the safety of workers and the surrounding environment is of the utmost importance during dismantling and demolition. Safety protocols and procedures must be in place to reduce risks associated with hazardous materials, structural instability and workplace accidents.

Composition of building materials: The types of materials used in construction significantly affect their recovery. Materials such as concrete, steel, glass and wood are generally easier to recover and recycle due to their inherent properties and market demand.

Condition of materials: The condition of materials plays a major role in their recoverability. Well-maintained items in good condition are more likely to be recovered and reused or recycled. Materials that are damaged, corroded, degraded or contaminated have limited value

Availability and ease of dismantling: The availability of building elements and the ease of their disassembly affect the efficiency of material recovery. Parts that are easily accessible and can be dismantled without excessive effort or damage are more likely to be recovered intact.

Segregation and Sorting Processes: Effective segregation and sorting of materials during the dismantling process is essential to maximize recovery. Separating different types of materials on site allows for better management and recycling of materials, reducing pollution and improving their market value.

Technological possibilities: The availability and use of advanced materials recovery technologies influence the efficiency of the process. Innovative techniques such as automated demolition, automated sorting systems and advanced crushing and shredding technologies can increase recovery rates and reduce labor costs.

Logistics and Transportation: Efficient logistics and transportation systems are essential for effective material recovery. Proper planning and coordination of transport routes, logistics networks and material transport equipment streamlines the process and minimizes transport and storage costs.

The discussants drew attention to the need to comprehensively take into account these factors. They would enable stakeholders to increase their capacity to recover materials and components from demolished buildings, increasing resource efficiency and sustainability.

Actions need to be taken to engage local communities, stakeholders and industry partners more broadly, which could increase support for material recovery initiatives.

Spreading knowledge about the need and methods of conducting business by dismantling, demolition and recycling companies in cooperation with the community and conscious acceptance of rational activities of such entities can provide valuable resources and market opportunities for recovered materials.

8. Education potential for circular economy, etc

Workshop covering the analysis of six stages of the building life cycle (design of buildings, production of building materials, construction of buildings, operation of buildings, deconstruction and/or demolition of buildings, material recovery) in terms of horizontal issues:

- involved stakeholders,
- political and legal conditions,
- acceptance of circular construction,
- good practices and innovations,
- educational needs.

Despite the presentation of preliminary theses by the workshop leaders, no discussion on this topic was initiated.

9. Communication of the event

Events such as IETU workshops and seminars are announced on the Institute's public website.

Invitation notifications are sent to potential participants. Interested persons can find introductory information and the agenda on the event subpage and have the option to register in advance or until the event starts.

Information and link about the event is also posted on social media.

Local and hybrid sessions are recorded for the needs of the organizer and are not distributed.

Each event has a paper and/or electronic attendance list (Teams record), which is not distributed, but event participants, in addition to the voice conference call, can see the list of persons present and the video transmission on the electronic platform (during registration, participants agree to this).

10. Any other relavant information to share

As described earlier, there is not much interest in specialized issues of the circular economy.

That is why ReBuilt sessions were introduced to public meetings on waste management planning, which we knew would have a large number of interested parties due to their obligatory nature.

The submitted spreadsheet with stakeholder data can be used to send conference notices.

„Zwiększenie poziomu odzysku odpadów budowlanych poprzez ponowne użycie i wytwarzanie z nich materiałów budowlanych - zagadnienia prawne, organizacyjne i społeczne.”

Interreg CENTRAL EUROPE

Co-funded by the European Union

ReBuilt

Projekt ReBuilt:

Rozwój sektora budowlanego w Europie Środkowej w kontekście cyfryzacji i gospodarki o obiegu zamkniętym

Public consultations on the waste management plan for the Silesian Voivodeship for the years 2023-2028.

Meetings 1-4

IETU Katowice | 27,28 July & 2,3 August 2023

Marek Matejczyk
Mariusz Kalisz

Informacje o projekcie ReBuilt

Zamierzenia projektu ReBuilt

Budownictwo w dużym stopniu przyczynia się do zużycia zasobów, wytwarzania odpadów i emisji gazów cieplarnianych.
Przyjęcie praktyk cyrkularnych wspomaganych cyfrowo przyczyni się do zmniejszenia wpływu sektora na środowisko.
Projekt ReBuilt chce promować te podejścia w programie edukacyjnym i wdrażać nowe rozwiązania.
Partnerzy opracują również międzynarodową strategię budownictwa o obiegu zamkniętym wspomaganym cyfrowo, która opierać się będzie na ekologicznym oznakowaniu, kryteriach utraty statusu odpadu i zielonych zamówieniach publicznych.

Projekt otrzymał finansowanie w ramach instrumentu INTERREG Europa Środkowa, CE0100390 ReBuilt

2,40 m €
Budżet projektu

80%
of the Budget is funded by ERDF

9
Krajów

13
Regionów

14
Partnerów

4
Obszary pilotowe

Okres realizacji:
04.2023
03.2026

Partnerzy projektu ReBuilt

Lead Partner

Slovenian National Building and Civil Engineering Institute

Department for Materials

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Partner
Chamber of Commerce and Industry of Štajerska

Partner
Nigrad, civil engineering company, d.o.o.

Partner
Opencontent SCARL

Partner
INFORDATA SISTEMI SRL

Partner
Technical University of Vienna

Partner
POR Consult, Projects of Sustainable Development, d.o.o.

Partner
BURST Nonprofit Llc

Partner
Vas County Government Office

Partner
Institute of Construction and architecture, Slovak Academy of Sciences

Partner
Industry Innovation Cluster

Partner
The Institute for Ecology of Industrial Areas

Partner
Czech Green Building Council

Partner
Munich University of Applied Sciences MUAS

Grupy zadań w projekcie ReBuilt

WP1	**Zdolność do cyrkularnego budownictwa wspomaganego cyfrowo**
Act.1.1	Wstępne mapowanie interesariuszy i najnowocześniejszych sektorów budownictwa i sektorów zewnętrznych w Europie Środkowej
Act. 1.2	Opracowanie programu edukacyjnego/szkoleniowego w zakresie budownictwa cyrkularnego wspomaganego cyfrowo w Europie Środkowej
Act 1.3	Testowanie programu szkoleniowego w zakresie budownictwa cyrkularnego i wspomaganego cyfrowo — Fit for Circular and Digital Construction
Act 1.4	Transnarodowy kurs MOOC dotyczący budownictwa o obiegu zamkniętym wspomaganym cyfrowo w Europie Środkowej
WP2	**Opracowywanie i testowanie innowacyjnych rozwiązań dla budownictwa cyrkularnego wspieranego cyfrowo**
Act. 2.1	Innowacje i współpraca społecznościowa na rzecz budownictwa o obiegu zamkniętym wspomaganego cyfrowo
Act. 2.2	Skalowanie i testowanie produktów ekologicznych i biobetonu
Act. 2.3	Narzędzie do cyfryzacji łańcuchów wartości w obiegu zamkniętym z paszportami materiałowymi i cyfrowym rynkiem budownictwa o obiegu zamkniętym
Act. 2.4	Cykliczne łańcuchy wartości i modele biznesowe w sektorze budowlanym
Act. 2.5	Utworzenie Circular and Digital Construction Demo Center
WP3	**Opracowanie wspólnej strategii dla budownictwa cyrkularnego wspomaganego cyfrowo w Europie Środkowej**
Act. 3.1	Środki po stronie popytu w budownictwie o obiegu zamkniętym wspomaganym cyfrowo
Act. 3.2	Opracowanie Wspólnej Strategii Budownictwa cyrkularnego i wspomaganego cyfrowo w Europie Środkowej
Act. 3.3	Wdrożenie Regionalnych Centrów Budownictwa Cyrkularnego wspomaganego cyfrowo pod egidą Polityki Budownictwa Cyrkularnego w Europie Środkowej

Pierwsza grupa zadań w projekcie ReBuilt

WP 1:
Zdolność do cyrkularnego budownictwa wspomaganego cyfrowo

Pakiet zadaniowy skoncentrowany na podnoszeniu świadomości i budowaniu potencjału interesariuszy dla budownictwa o obiegu zamkniętym, w którym IETU dokona przeglądu i oceny stanu techniki w sektorze budowlanym w Polsce, w tym:

- oceny krajowego i ponadnarodowego ekosystemu innowacji dla zrównoważonej, cyfrowej gospodarki budowlanej o obiegu zamkniętym ukierunkowanej na ponowne wykorzystanie odpadów,
- identyfikacji dobrych praktyk, identyfikacji odpowiednich polityk, strategii i prawodawstwa,
- udzieli wsparcia w przygotowaniach do warsztatów i programów szkoleniowych w zakresie budownictwa cyrkularnego.

Druga grupa zadań w projekcie ReBuilt

WP2:
Opracowywanie i testowanie innowacyjnych rozwiązań dla budownictwa cyrkularnego wspomaganego cyfrowo

Pakiet zadaniowy obejmujący współdziałanie IETU w testowaniu innowacyjnych rozwiązań dla budownictwa cyrkularnego wspomaganego cyfrowo oraz ich wdrażaniu w polskich warunkach i lokalizacji językowej, w tym:

- wsparcie rozwoju paszportów materiałowych dla SRM i produktów opartych na SRM,
- wkład i wsparcie w przygotowaniu cyrkularnych łańcuchów wartości i modeli biznesowych,
- wsparcie i udział w szkoleniach stacjonarnych oraz współorganizacja wydarzeń związanych z realizacją pakietu zadań.

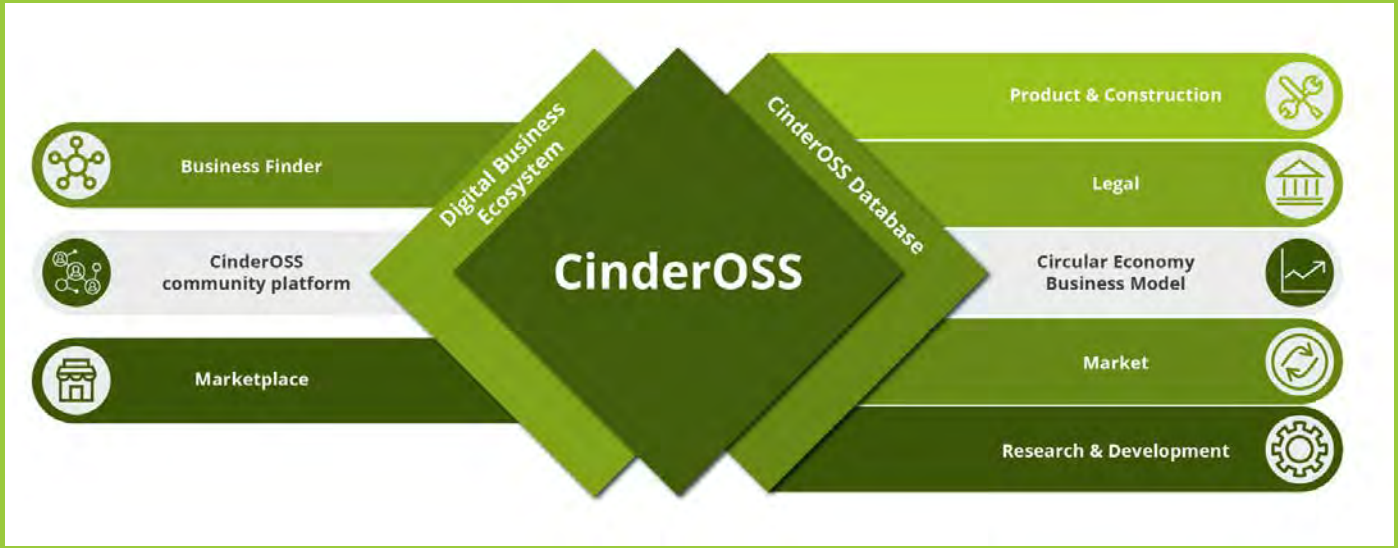
Trzecia grupa zadań w projekcie ReBuilt

WP3: Opracowywanie i testowanie innowacyjnych rozwiązań dla budownictwa cyrkularnego wspomaganego cyfrowo

Pakiet zadaniowy w którym IETU weźmie udział w przygotowaniu wspólnej strategii dla budownictwa cyrkularnego wspomaganego cyfrowo w regionie Europy Środkowej, biorąc udział w:

- analizie wąskich gardeł i barier,
- przygotowaniu wytycznych i poradników dotyczących prawa ochrony środowiska i prawa budowlanego dostarczając informacji dotyczących uregulowań w Polsce,
- opracowaniu propozycji działań popytowych w budownictwie o obiegu zamkniętym", w zakresie przygotowania wytycznych dla zielonych zamówień publicznych, jako jednego z najistotniejszych narzędzi przejścia do gospodarki o obiegu zamkniętym,
- opracowaniu wspólnych kryteriów utraty statusu odpadów dla wybranych strumieni odpadów we Wspólnej Strategii Cyrkularnego Budownictwa w Europie Środkowej,
- ocenie możliwości wdrożenia Circular Construction Hubs w polskich warunkach.

CinderOSS - cyfrowe wspomaganie gospodarki obiegowej w budownictwie



CinderOSS to istniejące i rozwijane środowisko cyfrowe, które wesprze rozwój modeli biznesowych o obiegu zamkniętym dostosowanych do warunków regionalnych/lokalnych wraz z informacjami o dostępności surowców wtórnych ze strumienia OBiR, dobrych praktykach ich stosowania, uwarunkowaniach prawnych i możliwości komunikacji z interesariuszami mającymi wpływ na domykanie obiegu rynkowego surowców i wyrobów budowlanych

Uwarunkowania realizacyjne

Stan gospodarki OBiR

Według KPGO 2028 w 2018 r. 96,4 % odpadów z budowy, remontów i demontażu obiektów budowlanych (OBiR) poddano odzyskowi, z czego 65 % w procesie R5 (recykling lub odzysk materiałów nieorganicznych).
Składowano 3,6 % OBiR (w tym odpady azbestowe).

Osiągnięty został z nadwyżką wymagany Dyrektywą 2008/98/UE poziom odzysku tych odpadów wynoszący 70 %

Według prognozy wytwarzania odpadów podanej w KPGO 2028 masa tych odpadów w 2028 r. może wynieść 31 mln Mg, a wskaźnikiem monitorowania właściwego postępowania z tymi odpadami powinien być osiągany poziom przygotowania do ponownego użycia, recyklingu oraz innych procesów odzysku OBiR.

Stan gospodarki OBiR

Masa wytwarzanych OBiR w Polsce (tys. Mg)

Lp	Kod odpadu	Nazwa odpadu	2014 r.	2018 r.
1	17 01	Odpady materiałów i elementów budowlanych (np. beton, cegły, płyty, ceramika)	3 685,6	4 578,7
2	17 02	Odpady drewna, szkła i tw. sztucznych	116,4	184,7
3	17 03	Mieszanki bitumiczne	261,3	324,7
4	17 04	Odpady i złomy metaliczne, stopy metali	1 744,8	3 110,4
5	17 05	Gleba i ziemia (w tym urobek z pogłębiania)	14 445,1	14 970,9
6	17 06	Materiały izolacyjne (w tym azbest)	161,4	255,7
7	17 08	Materiały budowlane zawierające gips	0,5	1,6
8	17 09	Inne odpady	127,2	278,4
		RAZEM	20 562,0	23 705,0

Stan gospodarki OBiR

W 2018 r. na terenie województwa śląskiego wytworzono ok. 358,7 tys. Mg OBiR należących do podgrupy 17 01. W tej grupie procesom odzysku R3, R5, R11, R12 i R13 poddano ponad 740,1 tys. Mg, natomiast procesom unieszkodliwiania D5, D10, D13 - 1,5 tys. Mg tych odpadów.

Najczęściej stosowany proces R5 stanowi odzysk w pracach związanych z utwardzaniem terenu i podbudową dróg i placów, wzmacnianiem skarp, w pracach niwelacyjnych, rekultywacji i tworzeniu warstw izolacyjnych na składowiskach.

W 2018 r. na terenie województwa śląskiego wytworzono ponad 1,4 mln Mg odpadów należących do podgrup od 17 02 do 17 09 (w tym 2/3 gleby i ziemi), z których większość poddano odzyskowi, a unieszkodliwianiu zaledwie 60,3 tys. Mg takich odpadów.

Zmiany w prawie

1 stycznia 2022 weszła w życie ustawa z 17 listopada 2021 o zmianie ustawy o odpadach oraz niektórych innych ustaw, która w odniesieniu do OBiR wprowadziła nowe uregulowania i od 2023 r:

- odpady powstałe podczas robót budowlanych nie są zaliczane do odpadów komunalnych,
- podmiot, który uzyskał decyzję administracyjną na prowadzenie robót budowlanych i rozbiórkowych, zobowiązany będzie wykazać sposób zagospodarowania odpadów i w sposób właściwy je ewidencjonować w BDO.

Zmiany w prawie

Od roku 2025 zaistnieje obowiązek selektywnego zbierania i odbierania odpadów OBiR (Rozdział 6a Ustawy) – co najmniej sześć frakcji:







Za nieselektywne zbieranie OBIR będą nakładane dotkliwe kary.

Prognoza oddziaływania na środowisko Projektu Planu gospodarki odpadami dla województwa śląskiego na lata 2023-2028

Lp.	Kategoria	Zidentyfikowane problemy (braki/potrzeby)	Przyjęte cele strategiczne	Proponowane kierunki działań
4.2.	Odpady z budowy, remontów i demontażu obiektów budowlanych i infrastruktury drogowej	• Pozostawianie odpadów z budowy, rozbiórki i demontażu obiektów budowlanych w miejscu ich wytworzenia. • Przekazywanie odpadów z budowy, rozbiórki i demontażu obiektów budowlanych nieuprawnionym podmiotom. • Porzucanie odpadów z budowy, rozbiórki i demontażu obiektów budowlanych w miejscach na ten cel nieprzeznaczonych celem zmniejszenia kosztów zagospodarowania wskazanych wyżej odpadów. • Niewystarczająca świadomość społeczna w zakresie zasadności selektywnego zbierania tej grupy odpadów.	• Uzyskanie poziomu przygotowania do ponownego użycia, recyklingu jak i innych form odzysku materiałów budowlanych i rozbiórkowych na poziomie minimum 70% wagowo. • Zwiększenie świadomości wśród inwestorów oraz podmiotów wytwarzających odpady z budowy, remontów i demontażu obiektów budowlanych oraz infrastruktury drogowej na temat należytego postępowania ze strumieniem tych odpadów, w szczególności w zakresie selektywnego zbierania oraz recyklingu.	• Rozbudowa infrastruktury do selektywnego tego rodzaju odpadów, • Kontynuacja prowadzenia kontroli podmiotów wytwarzających odpady z budowy, remontów i demontażu obiektów budowlanych oraz infrastruktury drogowej w zakresie należytego postępowania ze strumieniem ww. odpadów, • Działania informacyjno-edukacyjne na rzecz budowy świadomości wśród inwestorów oraz podmiotów wytwarzających odpady z budowy, remontów i demontażu obiektów budowlanych oraz infrastruktury drogowej w zakresie należytego postępowania ze strumieniem wskazanych wyżej odpadów, • Wprowadzenie systemu zachęt promującego wykorzystywanie materiałów z budowy, remontów i demontażu pochodzących z recyklingu.

Miejsce Projektu ReBuilt we wdrażaniu Pgowś 2028

Korzyści dla poszczególnych grup interesariuszy

Dla władz regionalnych / lokalnych

- rozwiązania dla osiągnięcia celów gospodarki o obiegu zamkniętym na poziomie lokalnym / regionalnym poprzez lepsze zarządzanie zasobami odzyskanymi ze strumieni OBiR

Dla organów rządowych

- wytyczne dotyczące wspólnej polityki wspierania modeli gospodarki o obiegu zamkniętym oraz stymulowania sektora budowlanego w celu walidacji ich innowacyjności i ekologicznej wartości dodanej dla konkretnych zastosowań

Dla jednostek badawczych

- dostarczy zbiór wyników badań dotyczących zrównoważonych materiałów budowlanych i zastosowań OBiR,
- dostarczy inspiracji do nowych badań w tej dziedzinie

Dla organów normalizacyjnych / certyfikujących

- określi specyfikacje wydajności materiałów konstrukcyjnych opartych na surowcach wtórnych (SRM),
- określi nowe sposoby testowania tych materiałów w oparciu o system weryfikacji technologii środowiskowych, aby udowodnić ich ekologiczną wartość dodaną w kontekście przydatności do określonego celu

Korzyści dla poszczególnych grup interesariuszy

Dla wytwórców odpadów, oraz przedsiębiorców przetwarzających odpady

- nowe, kreatywne opcje zarządzania strumieniami odpadów,
- interaktywna platforma do kojarzenia użytkowników odpadów i innych potencjalnych partnerów biznesowych jako narzędzie ułatwiające wdrożenie modelu biznesowego,
- opracowanie charakterystyki wybranych strumieni odpadów i ich ocenę jako materiału wejściowego do zastosowań budowlanych.

Dla przedsiębiorów budowlanych:

- modele biznesowe umożliwiające wykorzystanie lokalnie / regionalnie dostępnych materiałów odzyskanych ze strumieni odpadów miejskich jako materiałów wejściowych do produkcji i stosowania ekologicznych materiałów budowlanych,
- akcja informacyjna i promocja walorów stosowania tego modelu przez interesariuszy i decydentów jako narzędzia wdrażania koncepcji gospodarki o obiegu zamkniętym w sektorze budowlanym i gospodarkach lokalnych / regionalnych,
- dostarczanie wiedzy na temat najlepszych praktyk i istotnych dla rynku informacji na temat wykorzystania materiałów budowlanych opartych na surowcach wtórnych (SRM) w miejskich projektach budowlanych.

Najbliższe działania w projekcie ReBuilt

Uzyskanie omówionych korzyści we wdrażaniu Pgowś 2028 oraz uwzględnienie polskich realiów w środkowoeuropejskiej strategii budownictwa cyrkularnego wymaga wsparcia interesariuszy, a w szczególności Państwa, konsultujących plan regionalny w działaniach projektu poprzez:

- udział w warsztatach regionalnych projektu ReBuilt na przełomie września i października 2023, poświęconych mapowaniu aktualnego stanu, barier i potencjału rozwoju budownictwa cyrkularnego w regionie;
- udział w międzynarodowych warsztatach w listopadzie 2023 poświęconych ocenie potrzeb szkoleniowych i konsultacjom projektów programów szkoleniowych dla grup interesariuszy reprezentujących: władze lokalne, regionalne, krajowe; przemysł i MŚP; architektów, projektantów i inwestorów, ekspertów i naukowców oraz studentów - przyszłych ekspertów i decydentów w cyrkularnej branży budowlanej;
- udział w międzynarodowych warsztatach w listopadzie 2024, podczas których zostaną opracowane ramy wspólnej strategii budownictwa cyrkularnego wspomaganego cyfrowo w regionie Europy Środkowej.

Dziękuję za uwagę …
… i zapraszam do współpracy

Państwa opinie są ważne, Wasza pomoc i udział w realizacji projektu ReBuilt będą miały wpływ na treść propozycji wspólnej polityki rozwoju budownictwa cyrkularnego wspomaganego cyfrowo w Europie Środkowej

kontakt: m.matejczyk@ietu.pl

o projekcie: https://www.interreg-central.eu/projects/rebuilt/

Warsztaty:

„Bariery i szanse dla rozwoju wspomaganego cyfrowo budownictwa o obiegu zamkniętym w Polsce”

Prosimy o uwagi do przedstawionych dalej zagadnień także po warsztatach, przesyłając je na adres:

m.matejczyk@ietu.pl

Interreg CENTRAL EUROPE

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ReBuilt

Projekt ReBuilt:

Rozwój sektora budowlanego w Europie Środkowej w kontekście cyfryzacji i gospodarki o obiegu zamkniętym

Marek Matejczyk
Mariusz Kalisz

Warsztaty w formie hybrydowej odbyły się w IETU Katowice 22. lutego 2023

Warsztaty

Warsztaty:

„Bariery i szanse dla rozwoju wspomaganego cyfrowo budownictwa o obiegu zamkniętym w Polsce”

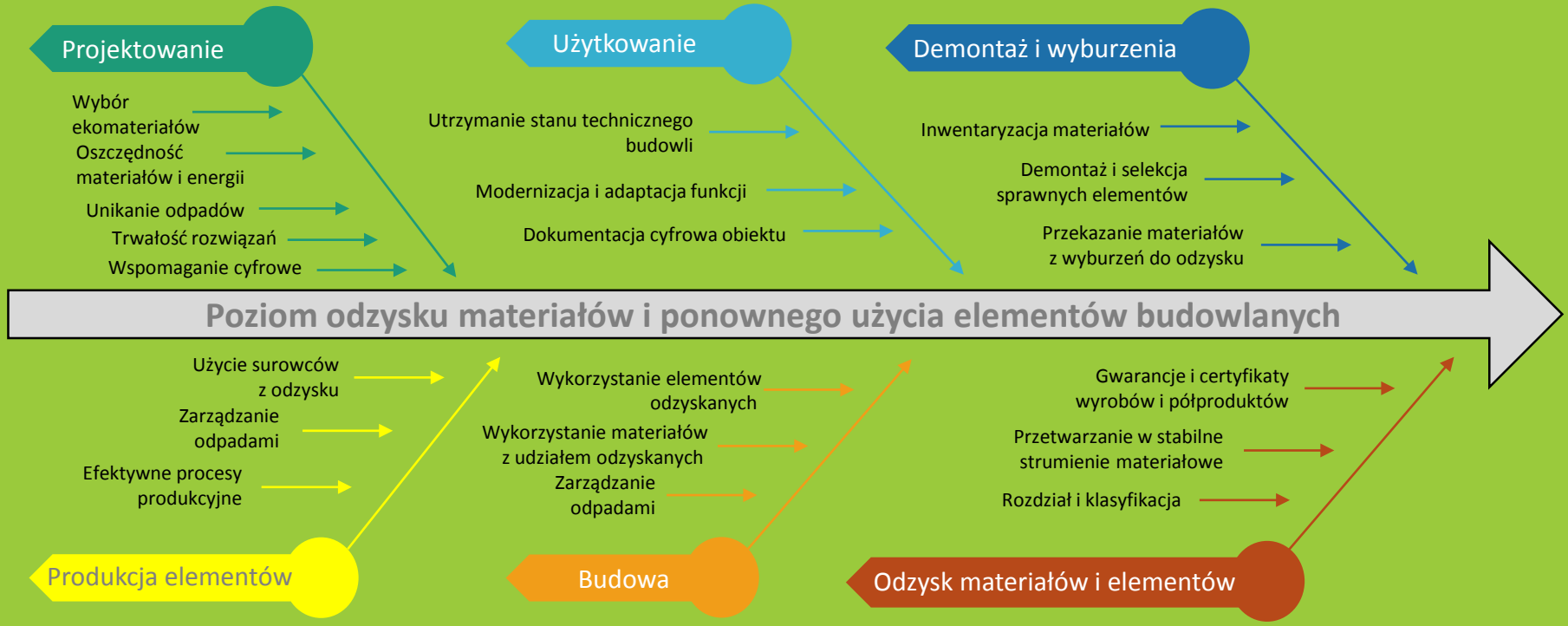
Celem warsztatów jest analiza czynników wpływających na wdrażanie zasad gospodarki obiegowej w polskim budownictwie.

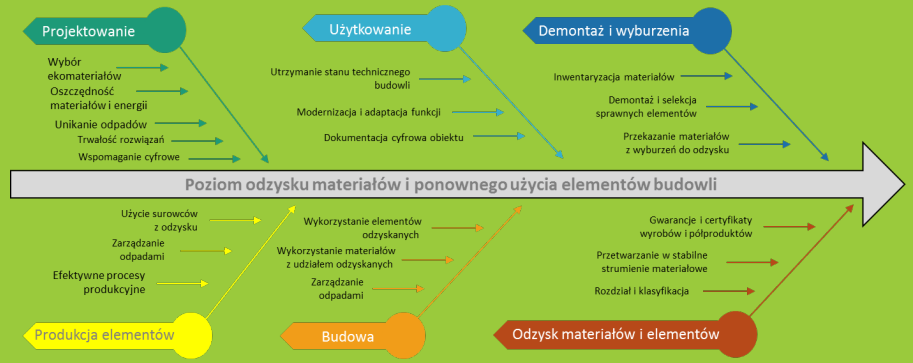
Analizę przeprowadzimy badając kolejne etapy cyklu życia budowli w zakresie zagadnień horyzontalnych:

- *Zaangażowani Interesariusze*
- *Polityki, strategie, akty prawne, normy*
- *Dobre praktyki i innowacje*
- *Akceptacja dla budownictwa cyrkularnego*
- *Potrzeby edukacyjne*

Bariery i szanse dla rozwoju wspomaganego cyfrowo budownictwa o obiegu zamkniętym w Polsce

Wstęp do analizy przyczynowo - skutkowej

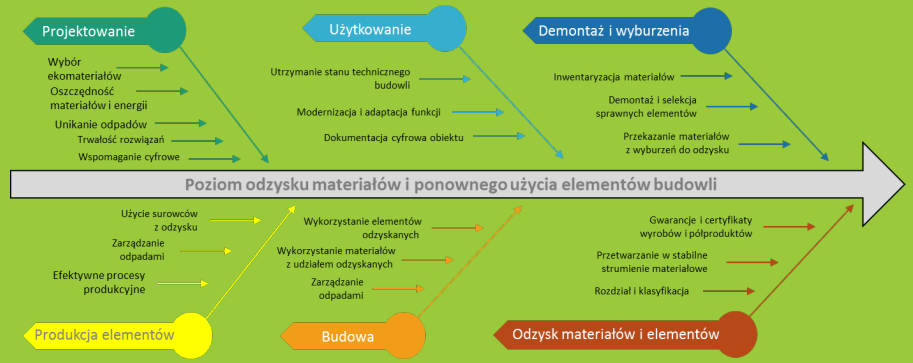




Zagadnienia horyzontalne:

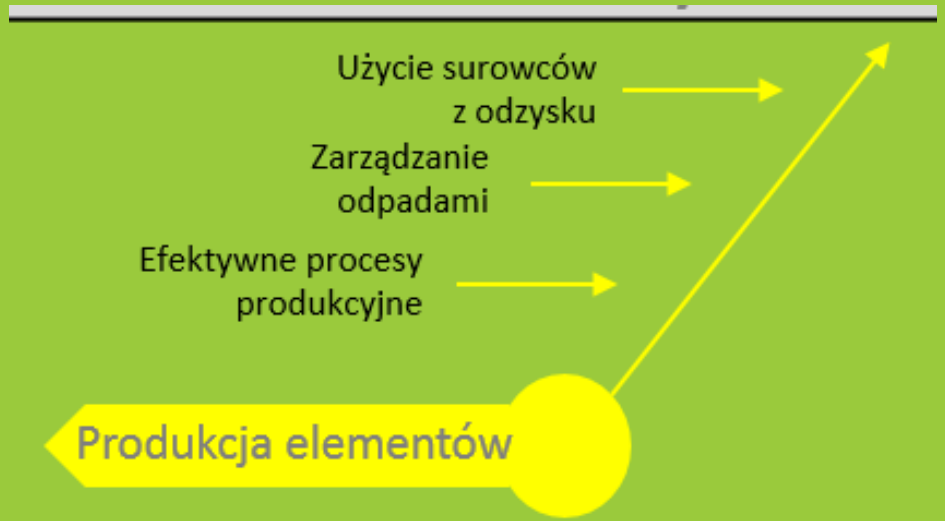
- Interesariusze
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- Akceptacja budownictwa cyrkularnego
- Dobre praktyki i innowacje
- Potrzeby edukacyjne

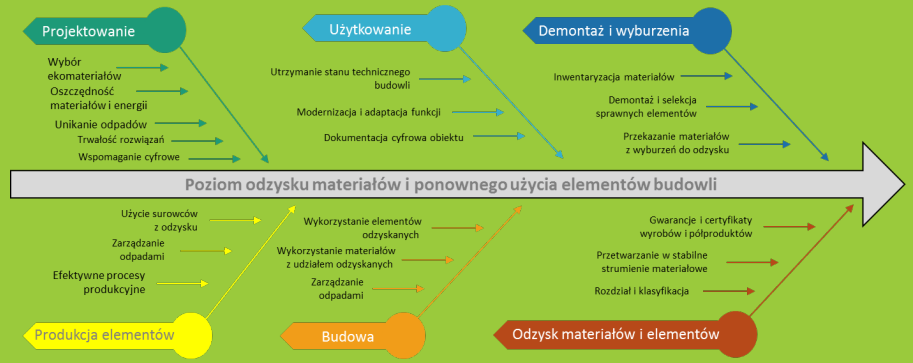




Zagadnienia horyzontalne:

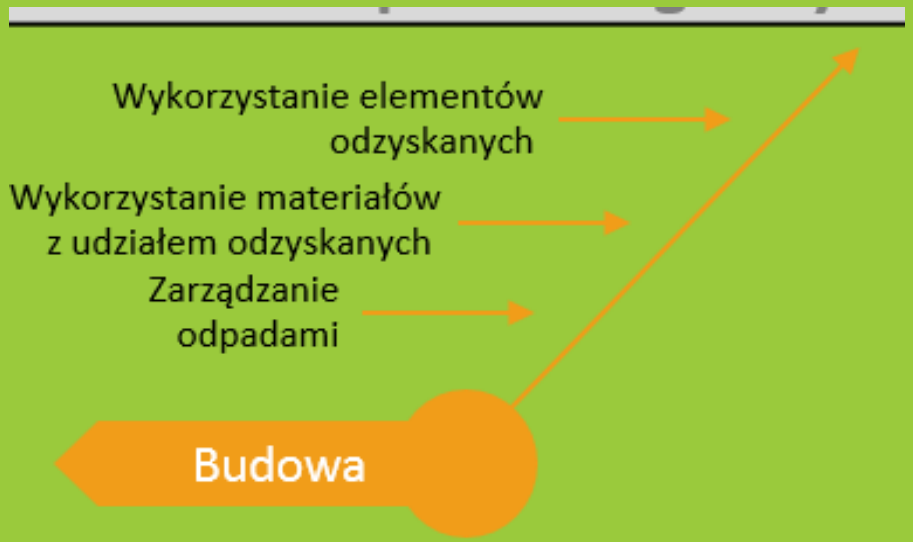
- Interesariusze
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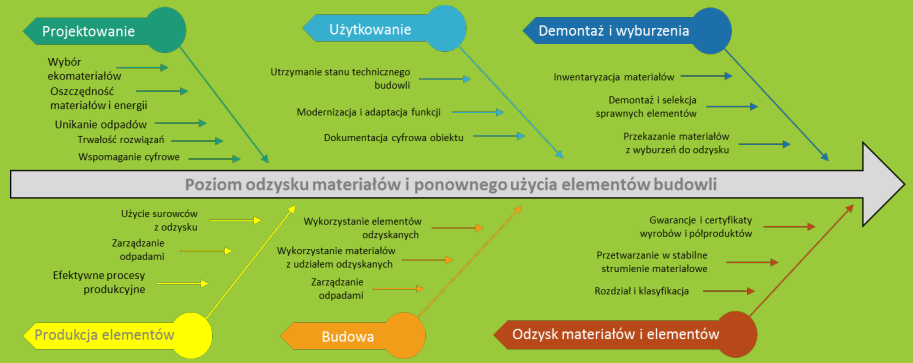




Zagadnienia horyzontalne:

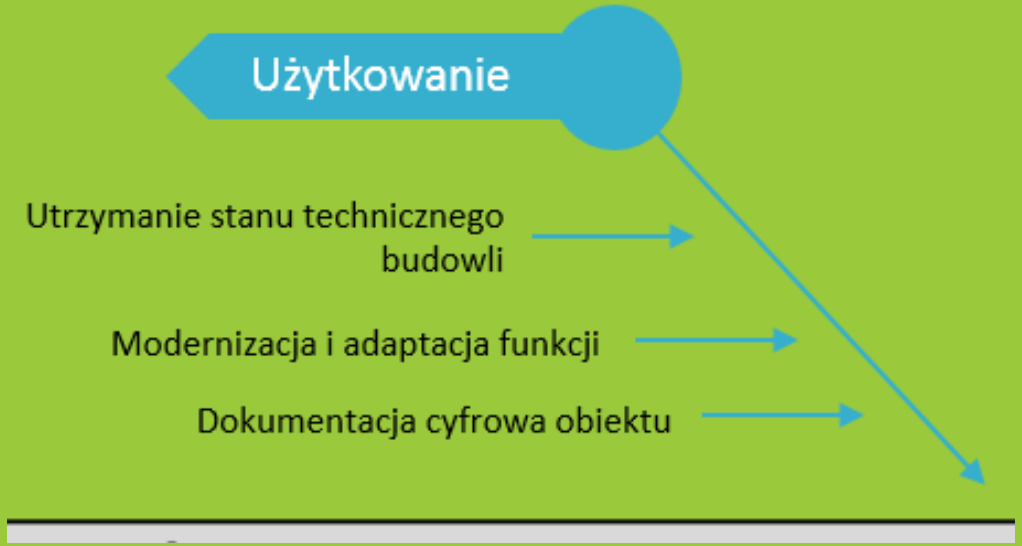
- Interesariusze
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- Akceptacja budownictwa cyrkularnego
- Dobre praktyki i innowacje
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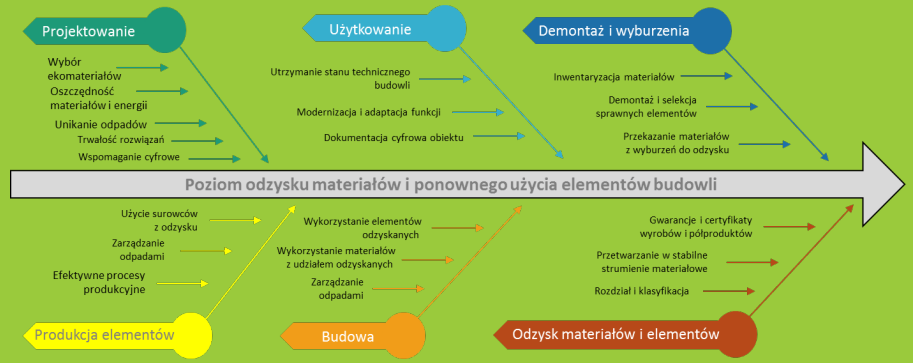




Zagadnienia horyzontalne:

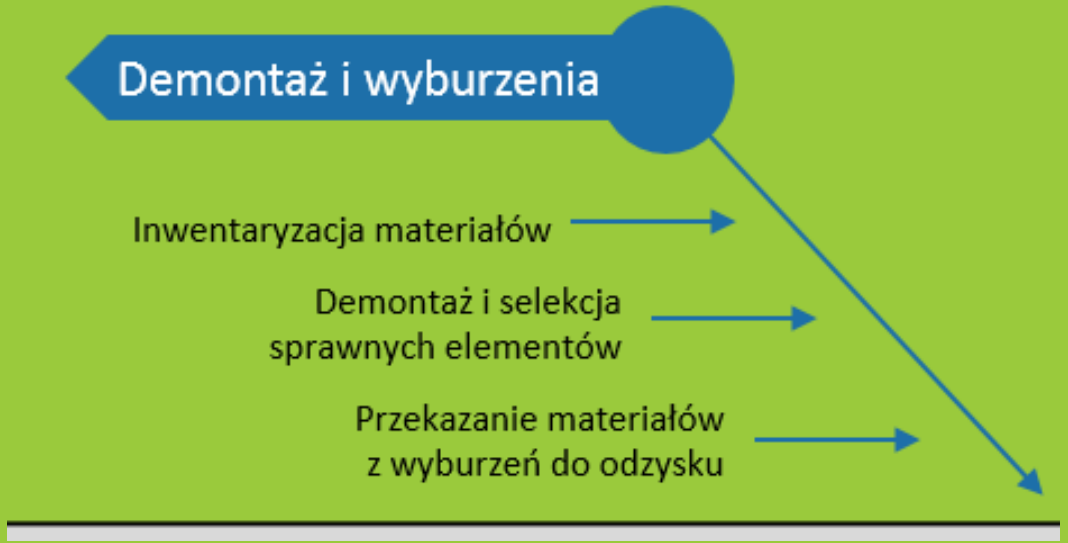
- Interesariusze
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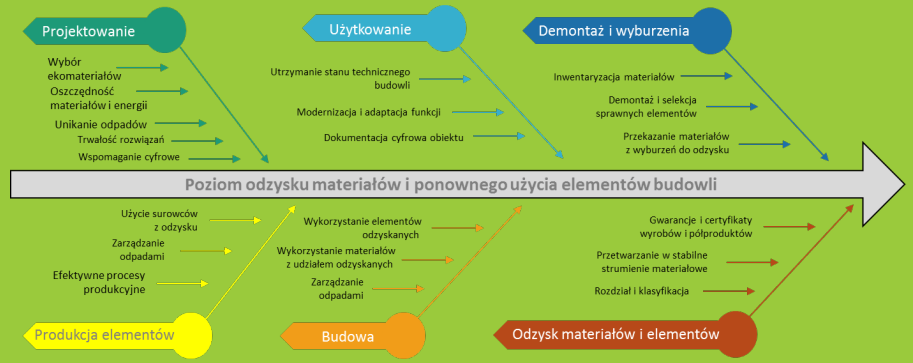




Zagadnienia horyzontalne:

- Interesariusze
- Polityki, strategie, akty prawne, normy
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Zagadnienia horyzontalne:

- Interesariusze
- Polityki, strategie, akty prawne, normy
- Akceptacja budownictwa cyrkularnego
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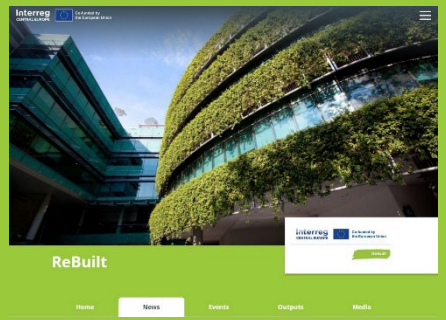


Dziękuję za udział w warsztatach …
… i zapraszam do dalszej współpracy

Szanowni Państwo, Wasza wiedza i opinie przekazywane podczas wydarzeń projektu ReBuilt będą miały wpływ na treść propozycji wspólnej polityki rozwoju budownictwa cyrkularnego wspomaganego cyfrowo w Europie Środkowej

kontakt: m.matejczyk@ietu.pl; m.kalisz@ietu.pl

o projekcie: https://www.interreg-central.eu/projects/rebuilt/



Event Report

Date(s)	Place	Partner	Role [1]
July 27, 2023	6-th Kossutha Street, 40-844 Katowice, Poland	PP-12 IETU Katowice	Organiser and event host, speaker, presentation conductor
Mode [2]	**Event type [3]**	**Other Partners involved**	**Role [4]**
Hybrid mode	Workshop	-	-

Event Name

Public consultations on the draft Waste Management Plan for the Silesian Voivodeship for 2023-2028 years (Pgows2028). Workshop with representatives of municipalities and entrepreneurs - ReBuilt thematic session.

Website	Topic / Sector
https://ietu.pl/konsultacje-spoleczne-projektu-planu-gospodarki-odpadami-dla-wojewodztwa-slaskiego-na-lata-2023-2028/	Public administration in waste management Recycling and processing of waste Circular Economy (CE) and it's support by CinderOSS Green Public Procurement (GPP) Extended Producer Responsibility (EPR)
People attending [5]	**Target Audience [6]**
51 persons in total: – 15 persons live, – 36 persons remotely by Teams platform	Representatives of public administration (municipalities and Marshall Office of Silesian Province). Companies providing services in the sector of waste treatment, research and development units, engineers, SME's. In total 51 persons present at ReBuilt session.
Pictures / videos / presentation [7]	**Folded leaflets / Brochures [8]**
Photographs: https://ietu.pl/zaproszenie-opiniowanie-i-konsultacje-spoleczne-projektu-planu-gospodarki-odpadami-dla-wojewodztwa-slaskiego-na-lata-2023-2028/ Presentation: https://ietu.pl/wp-content/uploads/2023/07/20230808-Pgwos28-Consultation-prezentacja-Interreg-ReBuilt.pdf	Non paper - project info on IETU WWW: https://ietu.pl/projekty_post/rebuilt-rozwoj-sektora-budowlanego-w-europie-srodkowej-w-kontekscie-cyfryzacji-i-gospodarki-o-obiegu-zamknietym/

Description / activities

The Institute for the Ecology of Industrial Areas (IETU) is preparing the Waste Management Plan for the Silesian Voivodeship for the fourth time.

During the public consultation stage of the draft Waste Management Plan for the Silesian Voivodeship for 2023-2028 (Pgowś2028), a series of workshops was held with representatives of municipalities and entrepreneurs.

This meeting was the first of four planned events aimed at reaching representatives of all 167 communes of the Silesian Voivodeship.

As part of the workshops in the thematic block: "Issues of recycling and reuse of waste in municipalities", a session was held: "Recovery of construction waste through the use and production of building materials from them - legal, organizational and social issues: ReBuilt Project".

This project presentation inform about partners, assumptions, tasks and work plan, potential applications of CinderOSS system, implementation conditions such as statistics and the current legal status of construction waste management and changes in the law in this area.

The main emphasis was placed on the possible benefits for individual stakeholder groups and an invitation to participate in the project workshops in 2023 and 2024, emphasizing the possibility of their influence on the shape of a common digitally supported circular construction strategy in Central Europe.

Reported by:

Marek Matejczyk

[1] Organiser, Speaker, Exhibitor, Participant, etc,
[2] In person or online
[3] Conference, Workshop, Fair, Meeting, Networking, etc.
[4] Co-Organiser, Speaker, Exhibitor, Participant, etc.
[5] Total people attending the event in a wide sense. This should give the idea of the event dimension
[6] This is the number of people who attended to Replan event or had direct contacts with the project
[7] Specify if and how are available
[8] Specify what material has been spread

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Event Report

Event Report

Date(s)	Place	Partner	Role [1]
July 28, 2023	6-th Kossutha Street, 40-844 Katowice, Poland	PP-12 IETU Katowice	Organiser and event host, speaker, presentation conductor
Mode [2]	**Event type [3]**	**Other Partners involved**	**Role [4]**
Hybrid mode	Workshop	-	-

Event Name

Public consultations on the draft Waste Management Plan for the Silesian Voivodeship for 2023-2028 years (Pgows2028). Workshop with representatives of municipalities and entrepreneurs - ReBuilt thematic session.

Website	Topic / Sector
https://ietu.pl/konsultacje-spoleczne-projektu-planu-gospodarki-odpadami-dla-wojewodztwa-slaskiego-na-lata-2023-2028/	Public administration in waste management Recycling and processing of waste Circular Economy (CE) and it's support by CinderOSS Green Public Procurement (GPP) Extended Producer Responsibility (EPR)
People attending [5]	**Target Audience [6]**
53 persons in total: – 15 persons live, – 38 persons remotely by Teams platform	Representatives of public administration (municipalities and Marshall Office of Silesian Province). Companies providing services in the sector of waste treatment, research and development units, engineers, SME's. In total 53 persons present at ReBuilt session.
Pictures / videos / presentation [7]	**Folded leaflets / Brochures [8]**
Photographs: https://ietu.pl/zaproszenie-opiniowanie-i-konsultacje-spoleczne-projektu-planu-gospodarki-odpadami-dla-wojewodztwa-slaskiego-na-lata-2023-2028/ Presentation: https://ietu.pl/wp-content/uploads/2023/07/20230808-Pgwos28-Consultation-prezentacja-Interreg-ReBuilt.pdf	Non paper - project info on IETU WWW: https://ietu.pl/projekty_post/rebuilt-rozwoj-sektora-budowlanego-w-europie-srodkowej-w-kontekscie-cyfryzacji-i-gospodarki-o-obiegu-zamknietym/

Description / activities

The Institute for the Ecology of Industrial Areas (IETU) is preparing the Waste Management Plan for the Silesian Voivodeship for the fourth time.

During the public consultation stage of the draft Waste Management Plan for the Silesian Voivodeship for 2023-2028 (Pgowś2028), a series of workshops was held with representatives of municipalities and entrepreneurs.

This meeting was the third of four planned events aimed at reaching representatives of all 167 communes of the Silesian Voivodeship.

As part of the workshops in the thematic block: "Issues of recycling and reuse of waste in municipalities", a session was held: "Recovery of construction waste through the use and production of building materials from them - legal, organizational and social issues: ReBuilt Project".

This project presentation inform about partners, assumptions, tasks and work plan, potential applications of CinderOSS system, implementation conditions such as statistics and the current legal status of construction waste management and changes in the law in this area.

The main emphasis was placed on the possible benefits for individual stakeholder groups and an invitation to participate in the project workshops in 2023 and 2024, emphasizing the possibility of their influence on the shape of a common digitally supported circular construction strategy in Central Europe.

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Marek Matejczyk

[1] Organiser, Speaker, Exhibitor, Participant, etc,
[2] In person or online
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[4] Co-Organiser, Speaker, Exhibitor, Participant, etc.
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[7] Specify if and how are available
[8] Specify what material has been spread

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Event Report

Event Report

Date(s)	Place	Partner	Role [1]
August 2, 2023	6-th Kossutha Street, 40-844 Katowice, Poland	PP-12 IETU Katowice	Organiser and event host, speaker, presentation conductor
Mode [2]	**Event type [3]**	**Other Partners involved**	**Role of other Partner [4]**
Hybrid mode	Workshop	-	-

Event Name

Public consultations on the draft Waste Management Plan for the Silesian Voivodeship for 2023-2028 years (Pgows2028). Workshop with representatives of municipalities and entrepreneurs - ReBuilt thematic session.

Website	Topic / Sector
https://ietu.pl/konsultacje-spoleczne-projektu-planu-gospodarki-odpadami-dla-wojewodztwa-slaskiego-na-lata-2023-2028/	Public administration in waste management Recycling and processing of waste Circular Economy (CE) and it's support by CinderOSS Green Public Procurement (GPP) Extended Producer Responsibility (EPR)
People attending [5]	**Target Audience [6]**
57 persons in total: – 20 persons live, – 37 persons remotely by Teams platform	Representatives of public administration (municipalities and Marshall Office of Silesian Province). Companies providing services in the sector of waste treatment, research and development units, engineers, SME's. In total 57 persons present at ReBuilt session.
Pictures / videos / presentation [7]	**Folded leaflets / Brochures [8]**
Photographs: https://ietu.pl/zaproszenie-opiniowanie-i-konsultacje-spoleczne-projektu-planu-gospodarki-odpadami-dla-wojewodztwa-slaskiego-na-lata-2023-2028/ Presentation: https://ietu.pl/wp-content/uploads/2023/07/20230808-Pgwos28-Consultation-prezentacja-Interreg-ReBuilt.pdf	Non paper - project info on IETU WWW: https://ietu.pl/projekty_post/rebuilt-rozwoj-sektora-budowlanego-w-europie-srodkowej-w-kontekscie-cyfryzacji-i-gospodarki-o-obiegu-zamknietym/

Description / activities

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During the public consultation stage of the draft Waste Management Plan for the Silesian Voivodeship for 2023-2028 (Pgowś2028), a series of workshops was held with representatives of municipalities and entrepreneurs.

This meeting was the third of four planned events aimed at reaching representatives of all 167 communes of the Silesian Voivodeship.

As part of the workshops in the thematic block: "Issues of recycling and reuse of waste in municipalities", a session was held: "Recovery of construction waste through the use and production of building materials from them - legal, organizational and social issues: ReBuilt Project".

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Marek Matejczyk

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Interreg CENTRAL EUROPE

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Event Report

Event Report

Date(s)	Place	Partner	Role [1]
August 3, 2023	6-th Kossutha Street, 40-844 Katowice, Poland	PP-12 IETU Katowice	Organiser and event host, speaker, presentation conductor
Mode [2]	**Event type [3]**	**Other Partners involved**	**Role of other Partner [4]**
Hybrid mode	Workshop	-	-

Event Name

Public consultations on the draft Waste Management Plan for the Silesian Voivodeship for 2023-2028 years (Pgows2028). Workshop with representatives of municipalities and entrepreneurs - ReBuilt thematic session.

Website	Topic / Sector
https://ietu.pl/konsultacje-spoleczne-projektu-planu-gospodarki-odpadami-dla-wojewodztwa-slaskiego-na-lata-2023-2028/	Public administration in waste management Recycling and processing of waste Circular Economy (CE) and it's support by CinderOSS Green Public Procurement (GPP) Extended Producer Responsibility (EPR)
People attending [5]	**Target Audience [6]**
49 persons in total: – 12 persons live, – 37 persons remotely by Teams platform	Representatives of public administration (municipalities and Marshall Office of Silesian Province). Companies providing services in the sector of waste treatment, research and development units, engineers, SME's. In total 49 persons present at ReBuilt session.
Pictures / videos / presentation [7]	**Folded leaflets / Brochures [8]**
Photographs: https://ietu.pl/zaproszenie-opiniowanie-i-konsultacje-spoleczne-projektu-planu-gospodarki-odpadami-dla-wojewodztwa-slaskiego-na-lata-2023-2028/ Presentation: https://ietu.pl/wp-content/uploads/2023/07/20230808-Pgwos28-Consultation-prezentacja-Interreg-ReBuilt.pdf	Non paper - project info on IETU WWW: https://ietu.pl/projekty_post/rebuilt-rozwoj-sektora-budowlanego-w-europie-srodkowej-w-kontekscie-cyfryzacji-i-gospodarki-o-obiegu-zamknietym/

Description / activities

The Institute for the Ecology of Industrial Areas (IETU) is implementing the Waste Management Plan for the Silesian Voivodeship for the fourth time.

During the public consultation stage of the draft Waste Management Plan for the Silesian Voivodeship for 2023-2028 (Pgowś2028), a series of workshops was held with representatives of municipalities and entrepreneurs.

This meeting was the fourth of four planned events aimed at reaching representatives of all 167 communes of the Silesian Voivodeship.

As part of the workshops in the thematic block: "Issues of recycling and reuse of waste in municipalities", a session was held: "Recovery of construction waste through the use and production of building materials from them - legal, organizational and social issues: ReBuilt Project".

The project presentation inform about partners, assumptions, tasks and work plan, potential applications of CinderOSS system, implementation conditions such as statistics and the current legal status of construction waste management and changes in the law in this area.

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Interreg CENTRAL EUROPE

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ReBuilt

Event Report

Event Report

Date(s)	Place	Partner	Role [1]
February 22, 2024	6-th Kossutha Street, 40-844 Katowice, Poland	PP-12 IETU Katowice	Organiser and event host, speaker, presentation conductor
Mode [2]	**Event type [3]**	**Other Partners involved**	**Role of other Partner [4]**
Hybrid mode	Workshop	-	-

Event Name

ReBuilt project workshops: "Barriers and opportunities for the development of digitally supported circular construction in Poland".

Website	Topic / Sector
https://ietu.pl/zaproszenie-na-warsztaty-rebuilt-22-02-2024/	Circular construction, Circularity in lifecycle of buildings, Preventing, Reusing, Recycling and processing of building waste
People attending [5] 31 persons in total: – 6 persons live, – 25 persons remotely by Teams platform	**Target Audience [6]** Representatives of public administration, companies providing services in the sector of construction, design and waste treatment, high school, research and development units, SME's.
Pictures / videos / presentation [7] Photographs: https://ietu.pl/zaproszenie-na-warsztaty-rebuilt-22-02-2024/ Presentation: https://ietu.pl/zaproszenie-na-warsztaty-rebuilt-22-02-2024/	**Folded leaflets / Brochures [8]** Non paper - project info on IETU WWW: https://ietu.pl/projekty_post/rebuilt-rozwoj-sektora-budowlanego-w-europie-srodkowej-w-kontekscie-cyfryzacji-i-gospodarki-o-obiegu-zamknietym/

Description / activities

Workshop covering the analysis of six stages of the building life cycle (design of buildings, production of building materials, construction of buildings, operation of buildings, deconstruction and/or demolition of buildings, material recovery) in terms of horizontal issues:

- involved stakeholders,
- political and legal conditions,
- acceptance of circular construction,

None of the participants in the discussion claimed to be against the concept of circular construction. However, barriers to introducing this concept in practice were pointed out. Many factors influence the possibility of recovering building materials and elements from the dismantling and demolition of decommissioned buildings:

  - Environmental Regulations,
  - Demand and market value,
  - Safety Considerations,
  - Composition of building materials,
  - Condition of materials,
  - Availability and ease of dismantling,
  - Segregation and Sorting Processes,
  - Technological possibilities,
  - Logistics and Transportation.

- good practices and innovations,

Reported by:

Marek Matejczyk

[1] Organiser, Speaker, Exhibitor, Participant, etc,
[2] In person or online
[3] Conference, Workshop, Fair, Meeting, Networking, etc.
[4] Co-Organiser, Speaker, Exhibitor, Participant, etc.
[5] Total people attending the event in a wide sense. This should give the idea of the event dimension
[6] This is the number of people who attended to Replan event or had direct contacts with the project
[7] Specify if and how are available
[8] Specify what material has been spread

Interreg CENTRAL EUROPE

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ReBuilt

D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction

Slovakia
ÚSTRACH SAV, Industry Innovation Cluster
Prof. Martin Palou, Peter Klamo

Version 1.0
25.01.2024



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7. Barriers, potentials, and social acceptance of circular construction....6
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Summary

Initial mapping in Slovakia was realized in close cooperation of both Slovak partners of ReBuilt project.

Partners from Slovakia organized two separate workshops, each one in different part of country.

First one was connected event with regular meeting Board of Director Association of construction entrepreneurs of Slovakia. This meeting was organized in Košice (second largest SK city) in eastern part of Slovakia on 22nd of January 2023. This workshop brought inputs and findings from business perspective of construction sector.

Second ReBuilt workshop was fully dedicated to project objectives. Event took place in Faculty of Civil Engineering on 25th January 2023 in Bratislava (western part of country). Agenda of this event cover all topics ReBuilt project.

Key findings:

- Missing clear national legislation framework for reusage of construction materials
- Missing national strategy for circular economy in construction sector
- No specialized training courses dealing with circular economy in construction sector

Institute of Construction and Architecture

INDUSTRY INNOVATION CLUSTER

1. Introduction

Deliverable D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction aims at collecting the findings of the regional workshops, that took place in all ReBuilt countries. It is a major step the workshops extend and verify the knowledge and information, that has been collected within the desktop research phase of the Activity 1.1. This way, the current status, gaps and potentials for circular and digital construction will be identified and summarized in programme area.

The results will feed into the First transnational central European circular and digital construction conference D.1.1.2. As a result of the initial mapping, regional workshop, transnational conference, a Conceptual note for activities needed for development of circular and digital construction (D1.1.3) will be developed. Furthermore, other work packages will build upon this task in WP1, WP2 and WP3.

2. Basic information about the workshops

Workshop No 1.

Name of the event: Board of Director Association of construction entrepreneurs of Slovakia

Type of event: connected event

Date, time: 10 AM, 22nd January 2024

Location: Košice

Agenda of the event: Introduction of goals and planed results of ReBuilt (beside of regular agenda of association). Call for cooperation with entrepreneurs from construction sector (large companies)

Presentations available: No

Number of participants: 11

List of organizations, type of organizations listed: enclosed as a attachment No. 1

Name of the event: 1. Slovak Workshop ReBuilt project.

Type of event: stand along ReBuilt event

Date, time: 9AM, 25th January 2024

Location: Bratislava, Faculty of Civil Engineering, Slovak University of Technology

Agenda of the event: enclosed as attachment No.2

Presentations available: Yes

Number of participants: 21

List of organizations, type of organizations listed: enclosed as attachment No.3

3. ReBuilt focus of the event

Objective of the events :

The first workshop was jointly organized by the Industrial Innovation Cluster and the Institute of Construction and Architecture of the Slovak Academy of Sciences at the regular meeting of the Directors Board of the Association of Construction Entrepreneurs of Slovakia. The presentation about the Rebuilts project was aimed at informing the representatives of construction entrepreneurs in Slovakia about digitalization, mapping especially the business potential of the construction sector.

The second workshop organized by both Slovakian partners (IIC and USTARCH) was held in Bratislava with the active participation of the Faculty of Civil Engineering from Slovak University of Technology. Two representatives of the Slovak Organisations related to construction sectors (Slovak Cement Association and Association of Construction Entrepreneurs of Slovakia) were invited with the presentations of their activities and their possible involvement in providing data about Cement Industry and construction business. The workshop aimed at material research, research, data collection, new technologies and materials and potential of training. The participants were PhD students, professors, researchers, constructors (Alas), national organizations. The main focus was to the presentation of the project Rebuilt, its objectives and mapping the main paths for the decarbonization of cement and construction industry. The Development of Low-Carbon Cement, the use of alternative fuels and raw materials in production of cement, carbon capture and storage/carbon capture and reuse (CCS/CCU), material research on specific concrete using supplementary cementitious materials (heavyweight concrete as shielding materials, self-compacting concrete) and recycled concrete made from recycled aggregates within the Circular Economy in Construction Industry were presented and discussed. Some interesting construction realisations using recycled concrete were presented.

4. Stakeholders mapping

Please, describe the workshop activity about the stakeholder mapping such as methodology, activities, participant contribution etc. obtain information about the stakeholder mapping.

The Wokshop program is closed:

Detailed information about the goals and activities of the ReBuilt project

Presentation by the President of Slovak Cement Association

Presentation of the President of Association of construction entrepreneurs of Slovakia

Presentation of two PhD students

Presentation of Ass. Prof. Hollý

What were the outcome, findings of the workshop?

The main outcome of the workshop was the information about the need of circular and digital economy in construction sector. Establishment of strong connection between business sector, research and educational institutes. The need to involve and activate state organizations to adopt a strategy and action plan for the circular economy in the construction industry.

Conclusions, major findings about stakeholder mapping

- Information about the activities of Association of construction entrepreneurs of Slovakia
- Information about the activities of Slovak Cement Association
- Presentation of construction with recycled concrete
- The need to consistently inform the entire construction ecosystem about the principles and policies of the circular economy
- Demand for training programs to educate construction professionals about new trends in recycling.

List of stakeholders is included in enclosed separate excel file: A1.1_Initial mapping template_SKfinal - IIC_USTRACH_

5. Identification of relevant policies, strategies and legislation

Please, describe the workshop activity about the policy and legislation identification e.g. methodology, activities, participant contribution etc.

Ing.Peter Klamo

Presentation by the President of Slovak Cement Association

Presentation of the President of Association of construction entrepreneurs of Slovakia

Presentation of two PhD students

Presentation of Ass. Prof. Hollý

What was the outcome of the discussion?

The lack of legislation on circular and digital construction at national level.

The need to establish an organization to coordinate the policy and legislation in circular and digital construction

Conclusions, major findings about relevant policies, strategies and legislation:

- Missing national strategy and policy about circular economy in construction sector
- construction as a sector must also be incorporated into other policies within the entire economy (cross sectors)

Please, list the key identified policies, strategies, and legislation for e.g. waste management, construction, (bio)circular economy, digitalisation.

- Digital transformation action plan of Slovakia for the years 2023-2026

- Waste management program of the Slovak Republic for the years 2021–2025

6. Identification of good practices and innovations

Please, describe the workshop activity about the good practices and innovations e.g. methodology, activities, participant contribution etc.

The successful use of recycled concrete in construction coupled with architectural design.

Martin Pribila Talpa House www.talpahouse.com

Talpa House, Faculty of Civil Engineering and Institute of Construction and architecture have provided good practices and innovations in realization of construction using recycled concrete with interesting architecture, education and material research.

What was the outcome of the discussion?

- Need to establish the kind of structures (construction) can use the recycled concrete.
- We have identified a great potential in the use of digitization to monitor the carbon footprint, but also in monitoring the recycling of building materials.

Conclusions, major findings about good practices and innovations

- It is possible to find individual examples of innovation, but there is a lack of systematicity.
- Entrepreneurs use a lot of new materials and technologies from the production of multinational manufacturers in which some of the elements of recycling have already been implemented.

Please, list here the identified good practices and innovations, describe them briefly, why they are considered so, and give reference to them.

Basic list is included in enclosed separate excel file: A1.1_Initial mapping template_SKfinal - IIC_USTRACH

7. Barriers, potentials, and social acceptance of circular construction

Please, describe the workshop activity about the barriers, potential and social acceptance of circular construction e.g. methodology, activities, participant contribution etc.

Relevant outcome of the discussion:

In this stage of mapping, we didn't search social aspects of circular economy.

8. Education potential for circular economy, etc

Please, describe the workshop activity about the education potential for circular economy e.g. methodology, activities, participant contribution etc.

Relevant outcome of the discussion:

The Workshop was held at the Faculty of Civil Engineering with the participation of PhD students from the Institute of Construction and Architecture. Two Ph.D. students presented the results of their research work on Self-Compacting Heavyweight Concrete with the aim of using recycled concrete aggregates. The discussion from the audience was mainly targeted at the circular and digital construction, the kind of data, and the means to collect them. The participants agreed that in the construction sector, all data from the production of cement (raw materials, fuel, equipment, reaction processes, etc.), preparation of concrete (cement, aggregates, chemicals, etc.), structures (types, durability, life cycle assessment, etc.,) to the impact on the environment should be identified, collected and summarized in the program area. From the scientific point of view, the discussion on material engineering, their processing, and properties.

The implementation of circular and digital economy in education is very topical and needs the involvement of teachers, new study programmes, popularisation activities, etc.

Which type of education and target groups were concerned? (e.g. higher education, vocational education, life-long learning, students, professionals, etc.)

Two types of education and target groups were concerned:

1.Postgradual students (5) from the Faculty of Civil Engineering and Institute of Construction and Architecture. Two of them had presentations. Unfortunately, at the same time, a seminar for PhD students was organized at the Faculty of Civil Engineering in Brno, Czech Republic.

2. Master students (3), one of which is dealing with the recycled concrete in the framework of his Diploma work and has expressed his will to join the implementation team of the project ReBuilt.

What knowledge gaps, skills are missing for some specific groups?

1) Industry:

The data are individually collected without shearing with other sectors, even if they belong to the same areas.

2) Government and Public servants:

The lack of a central organization for mapping

3) University & Vocational Training: circular and digital construction

Circular ang digital construction is not fully implemented in education program. However, some specific projects in different faculties and universities deal with circular and digital construction without explicitly naming them. Circular and digital construction is only one of the objectives of the projects they are solving.

4) Architects and Investors

Architects and investors did not participate in this workshop. However, we plan to organize the second workshop or participate in conferences and seminars organized by the Association of Construction Contractors of Slovakia (Betón), the Slovak Chamber of Architects, or the Slovak Chamber of Civil

Engineers to inform them and convince them of the merits of the project and the need to undertake cooperation.

Conclusions, major findings about education potential:

- Involvement of master and PhD students in the implementation of ReBuilt project
- Demand for training programs to educate construction professionals about new trends in recycling.

9. Communication of the event

Please, describe how did you communicate before and after the event? Please, add poster, social media, website, newsletter etc. below.

Did you prepare minutes, notes, photos, video or audio recording?

If yes, are they available internally, to the participants or publicly available? Which ones?

Photos from workshop organized in Bratislava






Data sharing – benefites for all participants

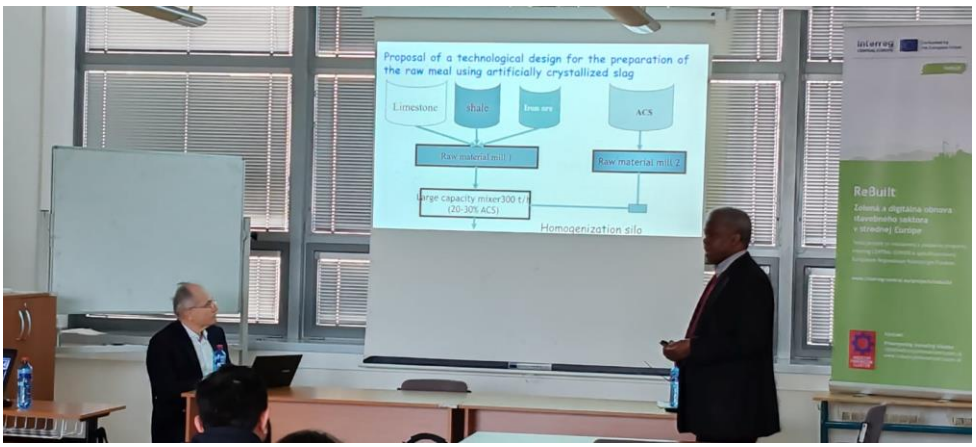









SCIENCE IS THE FUTURE
Institute of Construction and Architecture
Decarbonisation of the Cement and Construction Industry through the development of Novel Materials and Technology, Circular Economy
ReBuilt


Proposal of a technological design for the preparation of the raw meal using artificially crystallized slag
Limestone
shale
Iron ore
ACS
Raw material mill 1
Raw material mill 2
Large capacity mixer300 t/h (20-30% ACS)
Homogenization silo
ReBuilt





LIST OF PARTICIPANTS

Event: Board of Directors

Location & Date: Košice Slovakia, 22. January 2024

WP & Activity: A1.1_Initial mapping - IIC

N⁰	Name and Surname	Organisation	Contact	Signature
1	Peter Klamo	IIC	klamo.peter@iic.sk	
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11				

ReBuilt Workshop

Faculty of Civil Engineering
Bratislava 25.01.2024. Room C-0202

Co-funded by the European Union

ReBuilt

Institute of Construction and architecture, Slovak Academy of Sciences,
Industry Innovation Cluster, and
Faculty of Civil Engineering organize the first Wokshop ReBuilt project: Circular and Digital Renewal of Central Europe Construction and Building Sector CE0100390ReBuilt

Program

8.30-9.00: Registration

9.00: Opening: Peter Klamo

9.15: Presentation of the project: Martin Palou

9.45: President of the Association of Construction Entrepreneurs of Slovakia: Ing. Pavol Kováčik, PhD., MBA

10.00: President of the Association of the Slovak Cement Producers: Ing. Rudolf Mackovič

10.15: National representative of Interreg in Slovak Republic

10.30-11.00: Coffee break

11.00: Professional program

11.00: Industry Innovation Cluster ICC (Peter Klamo)

11.30: ÚSTARCH SAV (Martin Palou, Jana Čepčianska, Peter Czirák)

12.00: Faculty of Civil Engineering (Ivan Hollý, ...)

12.30: Lunch

13.30: Discussion

14.30: End

THE ORGANISATION'S LOGO

Institute of Construction and Architecture,
Slovak Academy of Sciences

Interreg CENTRAL EUROPE | Co-funded by the European Union

ReBuilt

LIST OF PARTICIPANTS

Event:

Location & Date: BRATISLAVA, 25. 01. 2024

WP & Activity:

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20	Martin Pribila	TulpaHouse	pribilam@gmail.com	
21				
22				
23				
24				

Interreg CENTRAL EUROPE

Co-funded by the European Union

ReBuilt

D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction

Slovenia

LP Slovenian National Building and Civil Engineering Institute,

PP2 Chamber of Commerce and Industry of Štajerska,

PP3 Nigrad, civil engineering company, d.o.o.

Dr. Alenka Mauko Pranjič, dr. Dragica Marinič, Ajda Pirš Zidar

Version 1.1

25.01.2024



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Summary

On 29. 9. 2023 LP1-ZAG and PP2-SGZ jointly prepared and organised an on-line event with the title The meaning of digitalisation in circular construction in Slovenia as part of the Interreg Central Europe ReBuilt project. LP1-ZAG invited experts from Slovenia working in circular and digital construction including legislation, education, good practices from industry, and activities on governmental level such as Deep demonstration project, managed together by the Slovenian government (Ministry for Environment, Climate and Energy) and KIC Climate.

The main aim of workshop was achieved: active involvement of different stakeholders in mapping good practices and barriers in circular and digital construction which will lead to future cooperation of strategic documents in the ReBuilt project for transition into circular and digital construction.

1. Introduction

Deliverable D.1.1.1 – Regional workshop for mapping of barriers and opportunities for circular and digital construction aims at collecting the findings of the regional workshops, that took place in all ReBuilt countries. It is a major step the workshops extend and verify the knowledge and information, that has been collected within the desktop research phase of the Activity 1.1. This way, the current status, gaps and potentials for circular and digital construction will be identified and summarized in programme area.

The results will feed into the First transnational central European circular and digital construction conference D.1.1.2. As a result of the initial mapping, regional workshop, transnational conference, a Conceptual note for activities needed for development of circular and digital construction (D1.1.3) will be developed. Furthermore, other work packages will build upon this task in WP1, WP2 and WP3.

2. Basic information about the workshop

Name of the event: **THE IMPORTANCE OF DIGITALISATION IN CROSS-CUTTING ENGINEERING IN SLOVENIA**

Type of event: **stand along ReBuilt event.**

Date, time: **29.09.2023, at 10:00 am**

Location: **Online workshop - MS Teams**

Agenda of the event:

TIME	THEME	SPEAKERS
10:00 - 10:10	Welcome and presentation of the programme ReBuilt workshops	ZAG and ŠGZ
10:10 - 10:25	Overview of legislation on circularity relevant for the construction sector in Slovenia	Chamber of Commerce and Industry of Slovenia - Antonija Božič Cerar
10:25 - 10:40	Digitalisation in circular construction Digital Materials Passport	Result d.o.o. - Boštjan Gomilšek
10:40 - 10:55	Good practices: Cinderela: CinderOSS platform	Slovenian National Building and Civil Engineering Institute: Dr Alenka Mauko Pranjić
10:55 - 11:10	Good practices: Building Materials Bank	Nigrad d.o.o. - Sergej Gutsmandl
11:10 - 11:25	Good practices: GIC Construction: Digitalisation of sustainable construction and circular economy	GIC Gradnje d.o.o. - Dr Tjaša Zupančič Hartner
11:25 - 11:40	The potential of the circular economy in Slovenia: A comprehensive Approach to multi-	University of Maribor, Faculty of Chemistry and Chemical Engineering Prof Dr Zorka Novak Pintarič, univ. dipl. ing. chem. tech.

TIME	THEME	SPEAKERS
	criteria decision-making and achieving sustainable solutions	
11:40 - 12:00	**Deep demonstration: systemic identification of measures for circular value chains in construction**	**Ministry of Environment, Climate and Energy - Jasmina Karba**
12:00 - 12:30	**Moderated discussion, questions, and moderated Q&A, closing discussion**	**Slovenian National Building and Civil Engineering Institute: Dr Dragica Marinič**

Presentations available: **Yes /No**

Number of participants: **35**

List of organizations, types of organisations listed: **local public authority, national public authority, infrastructure and (public) service provider, higher education and research organisations, SME, and business support organisations.**

Local public authority (Municipalities in Slovenia)

Regional public authority (Regional Development Agencies, Secondary construction Schools)

A national public authority (the Ministry for Environment, Climate and Energy, the Ministry for Economy, Tourism and Sport, the Ministry for Public Administration)

Sectoral agencies

Infrastructure and (public) services provider (company of investment management and development of infrastructure, etc.)

Interest groups including NGOs (Slovenian NGOs)

Higher Education and research organisations (different faculties of the University of Ljubljana and Maribor, Development and research institutions)

Enterprise, except SMEs (large Slovenian construction companies and also in the field of agriculture waste management)

SMEs (SMEs and micro companies in the construction and digital sector, recyclers, collectors, pre-treatment of waste, etc.)

Business support organisation (Chambers of Commerce and Industry of Slovenia and other chambers in Slovenia; GAIA-X at the Chamber of Commerce and Industry of Slovenia).

General public (experts on environment, circular economy, sustainable and circular construction, digitalisation, etc).

3. ReBuilt focus of the event

Objective of the event

The purpose of the workshop was to obtain additional information, knowledge, and first-hand experience from the participants, who are developing and co-shaping different areas of circular sustainable construction, supported by digital technologies. With their input, the ReBuilt project will be able to prepare the basis for the development of policies and national guidelines in this field for the whole of Central Europe

Which pillars of assessment of the initial mapping were discussed:

- Stakeholders mapping (public, private).
- **Identification of relevant policies, strategies, and legislation (e.g. waste management, construction, (bio)circular economy, digitalisation).**
- **Identification of good practices and innovations.**
- **Barriers, potentials, and social acceptance of circular construction.**
- **Education potential for circular economy, etc.**

4. Stakeholders mapping

Please, describe the workshop activity about the stakeholder mapping such as methodology, activities, participant contribution etc. obtain information about the stakeholder mapping.

Methodology, activities, participant contribution:

1. Joint preparation and organisation of the workshop: **LP1 ZAG and PP2 SGZ,**

2. Implementation method: **online professional workshop via MS Teams**

3. Date of the workshop: **29 September 2023**

4. Tasks of LP1 ZAG: **inviting experts - lecturers and partially providing information, conducting the workshop and participating in the workshop program (presentation of good practice)**

5. Tasks of PP2 ŠGZ / communication partner of the project: **implementation of information and communication activities.**

Both partners carried out the invitation of participants (according to a temporary agreement)

6. Selection of target groups for participation in the workshop: **structured based on the target groups listed in the project and the record of stakeholders in the field of circular construction, which was made in the framework of the mapping for activity A1.1 (coordinated by PP8 BURST), where they participated all Slovenian partners of the ReBuilt project (LP1, PP2, PP3).**

7. Inviting experts and designing the workshop program: **LP1 ZAG invited experienced experts who develop and co-design various circular and sustainable construction areas, with the support of digital technologies, to participate. A selection of experts from the fields of legislation, digitalisation,**

education, good practices in development and economy, and activities at the country level, such as the Deep demonstration example.

8. Discussion with the participants.

What were the outcome, findings of the workshop?

1.Based on the experts' ppt presentations and with the active participation of the participants in the discussion, a point of view was formed on how important it is for the development of Slovenia to contribute with various proposals to the creation of a strategic document in the field of digitalization and the transition to circular construction in Central Europe.

2. The participants knew that considering current circular and digital construction topics, the newly created strategic document would represent the basis for developing policies and national guidelines in the Interreg Central Europe region.

3. Shorter discussions took place after individual lectures and at the end of the workshop live and via MS Teams 'chat', which enabled us to communicate directly with the support of the workshop moderator.

3. Added value of the workshop: Based on a transitional agreement with the Chamber of Engineers of Slovenia, the participants, members of the chamber, received a certificate of participation and, at the same time, 1 point for ongoing professional training of authorized engineers.

Conclusions, major findings about stakeholder mapping

1. During the discussion at the workshop, the stakeholders found that **Slovenia had many good practices in the transition of construction to a circular economy. Also, digitalization is present, which is sometimes still feared due to a lack of knowledge and insufficiently developed competencies.**

2. Internal evaluation after the end of the workshop about stakeholders: **the decision to conduct the workshop online was meaningful and positive, given the time and place limitations of individual target groups in Slovenia (stakeholder mapping)**.

3. Stakeholders' proposals to prevent gaps and opportunities for circular and digital construction:

a) Connecting circular national and other projects relevant to circular construction

b) Digital practices / digital material passports and material banks/ will help us in mapping by including all target groups defined in the project.

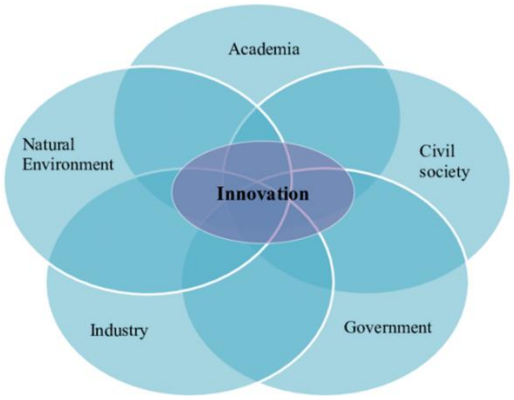
c) Necessary additional knowledge about the circular economy, circular construction, business models, and value chains

d) Current cooperation between stakeholders and actors in the circular economy / circular and digital construction is necessary for a green and sustainable Future.

Please list your country's relevant stakeholders according to the quintuple helix. Highlight their role in the stakeholder ecosystem.

Quintuple helix innovation model

(Source: Melona Stephens Balakrishnan, 2020)



In Slovenia, circular and digital construction stakeholders are typically identified and classified within the framework of the quintuple helix model. This model extends the traditional triple helix (government, industry, and academia) by adding two additional sectors: civil society and the environment. Each stakeholder is crucial in fostering innovation and sustainable development in the construction sector. Here's an overview of the identified stakeholders and their roles in the stakeholder ecosystem:

Government:

Regulatory Bodies: Government agencies and regulatory bodies set standards and regulations for sustainable construction practices and promote the adoption of digital technologies in the construction sector.

Funding Agencies: Government entities provide funding and incentives for research, development, and implementation of circular and digital construction practices.

Policy Makers: Policymakers develop strategies and policies to promote circular economy principles and digitalisation in construction, aiming to create an enabling environment for innovation and collaboration.

Industry:

Construction Companies: Companies in the construction sector adopt digital technologies such as Building Information Modeling (BIM) and innovative construction materials to improve efficiency and reduce waste (digital material passport, etc).

Technology Providers: Technology companies develop and provide digital solutions for construction, such as software for project management, virtual reality (VR) simulations, and Internet of Things (IoT) devices for smart buildings.

Material Suppliers: Suppliers of construction materials play a crucial role in promoting circularity by offering sustainable and recyclable materials for building projects.

Academia:

Research Institutions: Universities and research institutions conduct studies and research projects to advance knowledge and innovation in circular and digital construction practices.

Educational Programs: Academic institutions offer courses and training programs to educate future professionals in sustainable construction techniques, digital tools, and circular economy principles.

Civil Society:

NGOs and Advocacy Groups: Non-governmental organisations (NGOs) and advocacy groups raise awareness about the importance of sustainable construction practices and advocate for policies that support environmental conservation and social equity in the construction sector.

Community Stakeholders: Local communities and residents may participate in decision-making processes related to construction projects, providing valuable input on environmental and social impacts.

Environment:

Environmental Organizations: Organizations focused on environmental conservation work to minimise the ecological footprint of construction activities and promote the use of renewable resources and energy-efficient technologies.

Sustainability Consultants: Sustainability experts guide and support stakeholders in implementing environmentally friendly practices throughout the construction lifecycle.

The stakeholders collaborate and interact within the quintuple helix framework to drive innovation, promote sustainable development, and address challenges in the circular and digital construction sector. Their collective efforts contribute to transforming the construction industry towards a more resource-efficient and environmentally sustainable future – to build a new ecosystem.

5. Identification of relevant policies, strategies and legislation

Please, describe the workshop activity about the policy and legislation identification e.g. methodology, activities, participant contribution etc.

Methodology, activities, participant contribution

PPT presentation:

a) the representative of the Chamber of Commerce and Industry of Slovenia presented an overview of the legislation in the field of the circular economy relevant to the construction industry in Slovenia and, at the same time, at the EU level.

b) The representative of the company Result Ltd presented an overview of legislation, standardization, and digital material passport relevant to the circular and digital construction.

c) Discussion

Chronology of Slovenian and EU legislation on circularity and waste:

1. Waste Management Act (Ur. l. SRS, No. 8/1978) second paragraph of Article 6: "Waste management includes the return of waste to production processes and natural metabolism" Agreement on the foundations for the management and collection of useful waste and its processing into secondary raw materials (Ur. l. SFRJ, No. 26/1982) Rules on the handling of particular waste containing hazardous substances (Official Gazette of the SRS, No. 20/1986)

2. Waste Regulation (Official Gazette of the RS, No. 37/15 of 29 May 2015), update 2020 (Regulation on Amendments and Supplements to the Waste Regulation, Official Gazette of the RS, No. 129/20)
3. Environmental Protection Act -2 (Official Gazette of the RS, No. 44/22, update 2023, 2024
4. Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste

Slovenian legislation on digitalisation:

The structure of the Digital Slovenia 2030 strategy is aligned with the Digital Compass presented by the European Commission in March 2021, the accompanying policy programme "The Road to the Digital Decade" 2030, and the European Declaration on Digital Rights and Principles for the Digital Decade.

What was the outcome of the discussion?

1. **Legislation on SI and EU level (EC)**
2. **Status of by-product / Directive and SI National Environment Protection Act-2**

   A substance or object resulting from a production process the main purpose of which is not the production of that substance or object (hereinafter referred to as 'production residue'), is a product and not waste, subject to certain conditions
3. **End-of-waste status**

   The Commission shall monitor the establishment of national criteria for the end of waste status and evaluate the need to establish uniform criteria at the Community level. So far, standard criteria have been endorsed at the Community level for:

   - Waste iron, steel and aluminium.

   - Waste glass.

   - Waste copper.

   The latest amendment to the Waste Directive states that the Commission shall establish detailed criteria for applying the end-of-waste status for certain material streams. Specific criteria for end-of-waste status are foreseen, at least for aggregates, paper, tyres and textiles.

   The end of waste status can only be achieved if the substances or articles meet the relevant requirements applicable to products. The rules for end-of-waste status may be laid down in product-specific legislation.

4. **Important topics**

   Recycling of waste, reuse, waste backfilling, waste disposal, secondary raw materials, REACH.

5. **Digital material passport (ecosystem between stakeholders)**

   - Standardisation (gaps)

   - Platforms: Madaster, BAMB2020, RESTART, TRACE4EU, GAIA-X.

Conclusions, major findings about relevant policies, strategies, and legislation:

We learned about legislation in Slovenia and the EU related to the circular economy, construction, waste, recycling and other technological processes, and digitalisation in construction sector. We found that we are not sufficiently aware of all changes in legislation, and therefore, the individual target groups from the economy have challenges keeping abreast of changes in legislation, which in the field of construction and waste is complex and sometimes challenging to implement because of the strict requirements.

Please, list the key identified policies, strategies and legislation for e.g. waste management, construction, (bio)circular economy, digitalisation.

- Waste Management Act (Ur. l. SRS, No. 8/1978)
- Rules on the handling of particular waste containing hazardous substances (Official Gazette of the SRS, No. 20/1986)
- Waste Regulation (Official Gazette of the RS, No. 37/15 of 29 May 2015), update 2020 (Regulation
- on Amendments and Supplements to the Waste Regulation, Official Gazette of the RS, No. 129/20)
- Environmental Protection Act -2 (Official Gazette of the RS, No. 44/22, update 2023, 2024
- Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending
- Directive 2008/98/EC on waste
- Digital Slovenia 2030 strategy
- Digital Compass presented by the European Commission, 2021

6. Identification of good practices and innovations

Please, describe the workshop activity about the good practices and innovations e.g. methodology, activities, participant contribution etc.

4 different good practices were presented (PPT presentations)

1. **Platform CinderOSS as one-stop shop**, complete digital business environment which makes the use of SRM-based construction products, and it will be implemented in the ReBuilt project.
2. **Building Materials Bank is a new business model of:**

   -Stores or stocks of valuable materials that could be recovered. These materials could replace primary resources used in the construction, operation or renovation of buildings and other infrastructure (eliminating the need to extract primary resources).

   -Reconditioning: the technological process of separating valuable materials or building components from the building or assembly in which they were once incorporated or from waste to preserve or re-enhance their value.

   -Material recovery: the extraction of materials from existing infrastructure with a view to their reuse, recycling or biodegradation and the realisation of a technical or biological material loop.

   -Component harvesting: the extraction of composite materials from existing buildings or infrastructure with a view to their reuse or recycling and the realisation of a technical material loop.

3. **The digitalisation of sustainable construction and circular economy**

-Sustainable construction is a concept that brings together all stakeholders in value chains who share the same goals and values. Sustainability in the construction industry means considering the life cycle of buildings holistically and as a cycle.

-Enabling technologies are the tools, the tools for digitising processes, as the foundation for the transformation of the industry:

- ❖ BIM (Building Information Modelling)
- ❖ Big Data
- ❖ Internet of Things (IoT)
- ❖ Machine Learning (ML)
- ❖ Data Chaining (BlockChain)
- ❖ AR (Augmented Reality) and VR (Virtual Reality)
- ❖ AM (additive manufacturing)-additive technologies (3Dprint)

What was the outcome of the discussion?

Through the discussion, we found examples of good practices in the circular and digital construction field in Slovenia. However, additional knowledge, R&D, innovation, and financial support from the state are needed to accelerate the transition to a circular economy. The construction sector, a significant consumer of resources and energy and a waste generator should be addressed as a priority in an interdisciplinary manner. The construction sector is interlinked with various other sectors of the economy.

Conclusions, major findings about good practices and innovations

Individual examples of existing good practices motivate further integration and cooperation in the economy between SMEs and other companies, where further innovative projects, exchange and additional knowledge in the field of circularity and digitalisation in construction are needed.

Please, list here the identified good practices and innovations, describe them briefly, why they are considered so, and give reference to them.

1.Good practices: Cinderela: CinderOSS platform	Slovenian National Building and Civil Engineering Institute: Dr Alenka Mauko Pranjić
2. Good practices: Building Materials Bank	Nigrad d.o.o. – Sergej Gutsmandl
3. Good practices: GIC Construction: Digitalisation of sustainable construction and circular economy	GIC Gradnje d.o.o. – Dr Tjaša Zupančič Hartner

7. Barriers, potentials, and social acceptance of circular construction

Please describe the workshop activity about the barriers, potential and social acceptance of circular construction, e.g. methodology, activities, participant contribution, etc.

Methodology, activities, participant contribution:

PPT presentation of the Slovenian project Let's decarbonise Slovenia with the Deep Demonstration system transition mode.

It is a government project to support Slovenia in meeting its climate goals/only systemic actions can effectively support decarbonisation and systems transformation in the face of climate challenges; systemic innovation through the Deep Demonstration methodology in a co-creation process of Slovenian stakeholders and the EIT Climate KIC. Timeframe: Nov 2021 - June 2025. Financial resource: combined resources of the Climate Fund and the EIT Climate KIC

Deep demonstration: systemic identification of measures for circular value chains in construction	Ministry of Environment, Climate and Energy - Jasmina Karba

The relevant outcome of the discussion:

Slovenia, with its Deep Demonstration project, which includes the construction/built environment, is one of the change generators that stimulates the transition to circular and digital construction.

Identified potentials:

- Governmental support
- New knowledge and experiences
- Financial support
- Building capacities of public employees and other sectors

Conclusions, major findings about the social acceptance of circular construction:

- Awareness of the need to change the way the economy works, moving towards circular business models, especially in the field of circular and digital construction.
- Awareness that resources are limited, that a 'green' and 'circular' transformation of each one of us is needed to reduce our environmental impact, to contribute to more sustainable and green development in our region and at Interreg Central Europe level.

8. Education potential for circular economy

Please, describe the workshop activity about the education potential for circular economy e.g. methodology, activities, participant contribution etc.

Methodology, activities, participant contribution:

PPT presentation of the **The potential of circular economy education in Slovenia:**

A holistic approach for multi-criteria decision-making and achieving sustainable solutions

Formal education on the circular economy

-Green and Circular Economy, University of Primorska, Faculty of Management (MSc)

-Circular Economy, University of Ljubljana, Faculty of Economics (extra-curricular activity)

-Technologies and Innovations for the Circular Economy, University of Maribor, Faculty of Logistic

Relevant outcome of the discussion:

- New knowledge is essential for a new generation of engineers:
  a) multi-criteria decision making - circularity index (collaboration between company- local community-state)
  b) modelling, process optimisation
  c) Process-systems approach

Which type of education and target groups were concerned? (e.g. higher education, vocational education, life-long learning, students, professionals, etc.)

Higher education, vocational education, life-long learning, students, professionals.

What knowledge gaps, skills are missing for some specific groups?

1) Industry: knowledge in the field of circular economy, waste recycling, REACH, economic aspects of circularity, sustainability (LCA, BIM), the introduction of new green technologies, integration in the value chain, cooperation with knowledge institutions (RDI)

2) Government and civil servants: knowledge in the field of circular economy, which includes green public procurement connecting with other stakeholders

3) Universities and Vocational Training: knowledge with new methodological approaches /e.g. multi-criteria method, importance of the circular economy (LCA, BIM), economic effects, innovations - transfer of technologies to the economy - individual companies, joint research

4) Architects and investors: consideration of circular and sustainable laws of materials, connection with knowledge institutions

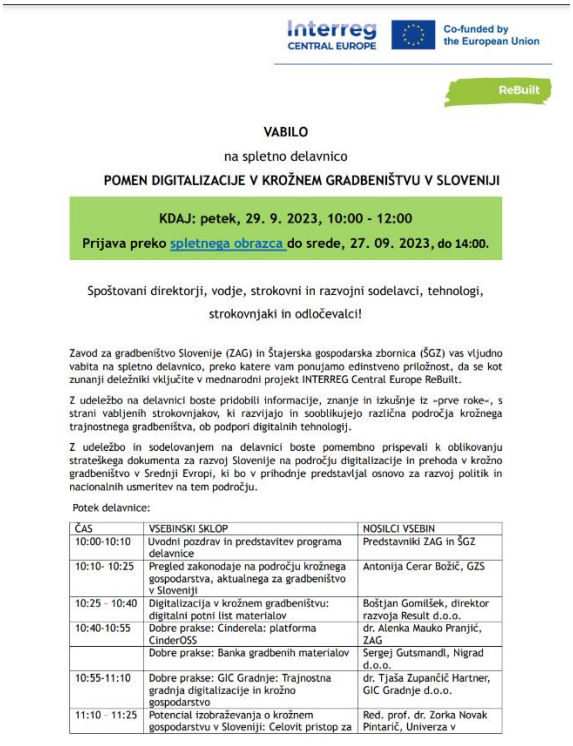
Conclusions, major findings about education potential:

- the existence of individual programs at individual faculties and other schools that offer knowledge in the field of the circular economy, including in the field of circular and digital construction.
- project cooperation, where representatives of the economy and educational institutions participate with new knowledge.
- Additional state support is needed to transfer knowledge among young people in secondary schools and various faculties.

9. Communication of the event

Please, describe how did you communicate before and after the event? Please, add poster, social media, website, newsletter etc. below.

The online workshop was promoted on social networks (LinkedIn, Facebook), the invitation was also published on the websites of ZAG and SGZ.



Interreg CENTRAL EUROPE Co-funded by the European Union

ReBuilt

VABILO

na spletno delavnico

POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI

KDAJ: petek, 29. 9. 2023, 10:00 - 12:00

Prijava preko spletnega obrazca do srede, 27. 09. 2023, do 14:00.

Spoštovani direktorji, vodje, strokovni in razvojni sodelavci, tehnologi, strokovnjaki in odločevalci!

Zavod za gradbeništvo Slovenije (ZAG) in Štajerska gospodarska zbornica (ŠGZ) vas vljudno vabita na spletno delavnico, preko katere vam ponujamo edinstveno priložnost, da se kot zunanji deležniki vključite v mednarodni projekt INTERREG Central Europe ReBuilt.

Z udeležbo na delavnici boste pridobili informacije, znanje in izkušnje iz »prve roke«, s strani vabljenih strokovnjakov, ki razvijajo in sooblikujejo različna področja krožnega trajnostnega gradbeništva, ob podpori digitalnih tehnologij.

Z udeležbo in sodelovanjem na delavnici boste pomembno prispevali k oblikovanju strateškega dokumenta za razvoj Slovenije na področju digitalizacije in prehoda v krožno gradbeništvo v Srednji Evropi, ki bo v prihodnje predstavljal osnovo za razvoj politik in nacionalnih usmeritev na tem področju.

Potek delavnice:

ČAS	VSEBINSKI SKLOP	NOSILCI VSEBIN
10:00-10:10	Uvodni pozdrav in predstavitev programa delavnice	Predstavniki ZAG in ŠGZ
10:10- 10:25	Pregled zakonodaje na področju krožnega gospodarstva, aktualnega za gradbeništvo v Sloveniji	Antonija Cerar Božič, GZS
10:25 - 10:40	Digitalizacija v krožnem gradbeništvu: digitalni potni list materialov	Boštjan Gomilšek, direktor razvoja Result d.o.o.
10:40-10:55	Dobre prakse: Cinderela: platforma CinderOSS	dr. Alenka Mauko Pranjić, ZAG
	Dobre prakse: Banka gradbenih materialov	Sergej Gutsmandl, Nigrad d.o.o.
10:55-11:10	Dobre prakse: GIC Gradnje: Trajnostna gradnja digitalizacije in krožno gospodarstvo	dr. Tjaša Zupančič Hartner, GIC Gradnje d.o.o.
11:10 - 11:25	Potencial izobraževanja o krožnem gospodarstvu v Sloveniji: Celovit pristop za	Red. prof. dr. Zorka Novak Pintarič, Univerza v



	večkriterijsko odločanje in doseganje trajnostnih rešitev	Mariboru, Fakulteta z kemijo in kemijsko tehnologijo
11:25 - 11:40	Deep demonstration: Sistemsko prepoznavanje ukrepov za krožno graditveno verigo vrednosti	Jasmina Karba, Ministrstvo za okolje, podnebje in energijo
11:40 -12:00	Moderirana razprava, vprašanja in odgovori, zaključna razprava	dr. Dragica Marinič, ZAG

Moderatorka delavnice: dr. Dragica Marinič, ZAG

Tehnična podpora: ŠGZ

Udeležba na delavnici je brezplačna.

Vljudno vabljeni!

Delavnica poteka v okviru projekta **ReBuilt: Krožna in digitalna prenova gradbenega sektorja v srednji Evropi**
Sofinanciranje: Interreg Central Europe
Več: https://www.interreg-central.eu/projects/rebuilt/

For the workshop, preliminary communication activities have been carried out:

- https://www.linkedin.com/feed/update/urn:li:activity:7112765835173113856
- https://www.facebook.com/ZAGLjubljana/posts/pfbid024DyaAHjH9AWp2QN6syKbQfBRojkQPve4nYgGjGuMwodwdRqnMvteawy6NTgrFF5Dl
- https://portal.zag.si/index.php?nav0=home&nav1=novice2&nav2=poglej&id=5135
- https://srip-krozno-gospodarstvo.si/category/dogodki/

- https://www.izs.si/izobrazevanja/zunanja-izobrazevanja/arhiv-zunanjihizobrazevanj/
- https://www.stajerskagz.si/pomen-digitalizacije-v-kroznem-gradbenistvu-vslovenij/

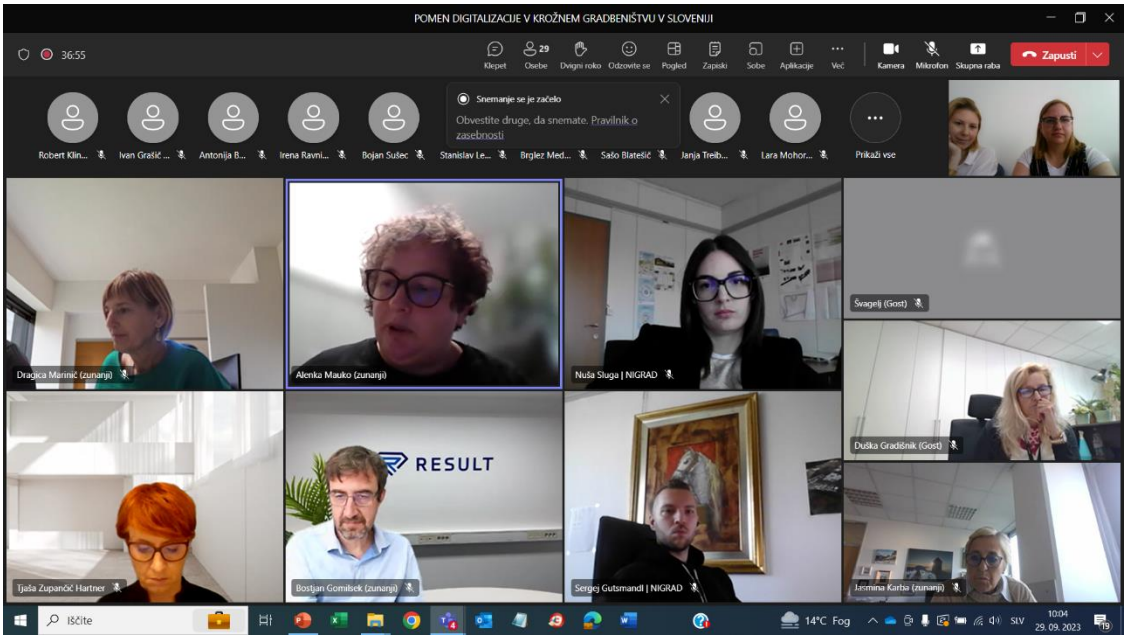
Did you prepare minutes, notes, photos, video or audio recording?

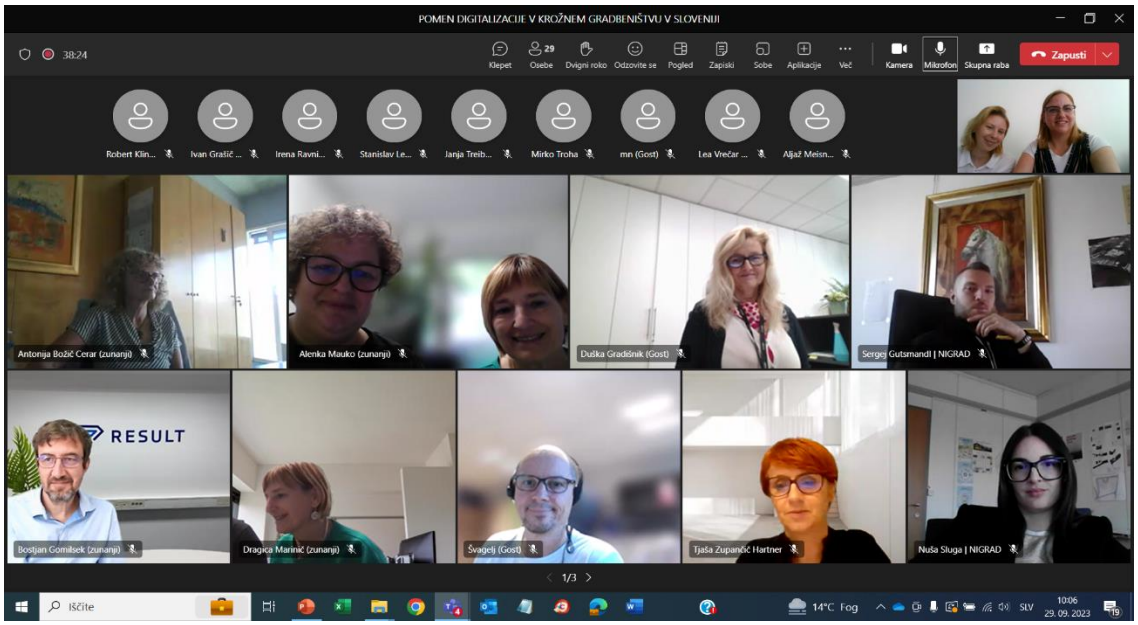
Yes, we have prepared minutes and audio recording.

If yes, are they available internally, to the participants or publicly available? Which ones?

They were only available to participants.

Please, upload here some photos about the event.





10. Any other relavant information to share

NA

ZAPISNIK

o spletni delavnici

POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI

z dne 29. 9. 2023, med 10:00-12:20

Zavod za gradbeništvo Slovenije (ZAG), LP1 in Štajerska gospodarska zbornica (ŠGZ), PP2 sta v skupni pripravi in organizaciji izvedla spletno strokovno delavnico Pomen digitalizacije v krožnem gradbeništvu v Sloveniji v okviru mednarodnega projekta INTERREG Central Europe ReBuilt, dne 29. 9. 2023, ki je potekala preko MS Teams.

V okviru LP1 ZAG je dr. Dragica Marinič izvedla aktivnosti vabljenja strokovnjakov – predavateljev in delno informiranja, PP2 ŠGZ pa je kot komunikacijski partner projekta izvedel aktivnosti informiranja in obveščanja ter tehnično podporo delavnice. Projektna managerka ReBuilt projekta dr. Alenka Mauko Pranjić je sodelovala v programu dobrih praks, Dragica Marinič pa kot moderatorka delavnice. Izbor ciljnih skupin za udeležbo na delavnici je bil strukturiran na osnovi ciljnih skupin, navedenih v projektu in evidenci deležnikov na področju krožnega gradbeništva, ki je bila izdelana v okviru mapiranja za aktivnost A1.1 (ki jo koordinira PP8 BURST), kjer so sodelovali vsi slovenski partnerji projekta ReBuilt (LP1, PP2, PP3 NIGRAD).

S to obliko izvedbe je bil dosežen cilj delavnice: z aktivnim sodelovanjem udeležencev v razpravi prispevati k oblikovanju strateškega dokumenta za razvoj Slovenije na področju digitalizacije in prehoda v krožno gradbeništvo v Srednji Evropi, ki bo v prihodnje predstavljal osnovo za razvoj politik in nacionalnih usmeritev na tem področju.

LP1 ZAG je k sodelovanju povabil izkušene strokovnjake, ki razvijajo in sooblikujejo različna področja krožnega in trajnostnega gradbeništva, ob podpori digitalnih tehnologij; in sicer na področjih zakonodaje, digitalizacije, izobraževanja, dobrih praks v razvoju in gospodarstvu ter aktivnosti na ravni države, kot je primer Deep demonstration.

Krajše razprave so potekale že po posameznih predavanjih in na koncu delavnice v živo in preko 'chat' MS Teams, ki nam je omogočil neposredno komunikacijo ob podpori moderatorke delavnice.
Ciljne skupine, katerih predstavniki so bili vabljeni in so se udeležili delavnice: resorna ministrstva, izobraževalni sektor, javne raziskovalne organizacije (fakultete) in druge javne razvojne agencije, gospodarstvo (podjetja), gospodarske zbornice (NVO) in posamezniki, delujoči na področju krožnega gospodarstva za gradbeni sektor.

Na osnovi prehodnega dogovora z Inženirsko zbornico Slovenije, so udeleženci, člani zbornice, prejeli potrdilo o udeležbi in hkrati 1 točko za stalno poklicno usposabljanje pooblaščenih inženirjev.
Po zaključku delavnice je potekala še interna evalvacija dogodka, kjer je bila ena od pomembnih ugotovitev, da je bila odločitev o poteku delavnice preko spleta smiselna in pozitivna glede na časovne in krajevne omejitve posameznih ciljnih skupin.
Na delavnici smo v diskusiji ugotovili, da imamo v Sloveniji veliko dobrih praks na področju prehoda gradbeništva v krožno gospodarstvo. Prav tako, da je prisotna tudi digitalizacija, do katere pa je včasih še vedno bojazen zaradi pomanjkanja znanja in premalo razvitih kompetenc.

Predlogi, ki so se oblikovali za preprečevanje vrzeli in za priložnosti za krožno in digitalno gradbeništvo:

1. Povezovanje krožnih nacionalnih in drugih projektov, ki so aktualni za krožno gradbeništvo
2. Digitalne prakse / digitalni potni listi materialov in banka materialov/ nam bodo v pomoč pri mapiranju z vključevanjem vseh cilnjih skupin, opredeljenih v projektu.
3. Potrebno dodatno znanje o krožnem gospodarstvu, krožnem gradbeništvu, poslovnih modelih, verigah vrednosti
4. Sodelovanje med akterji na krožnem gospodarstvu

Delavnica spada pod dosežek D1.1.1/Deliverable D1.1.1 Regional workshop for

mapping of barriers and opportunities for circular and digital construction/

Število registriranih: 37
Število udeležencev: 35

Za potrebe delavnice so bile izvedene predhodne komunikacijske aktivnosti:

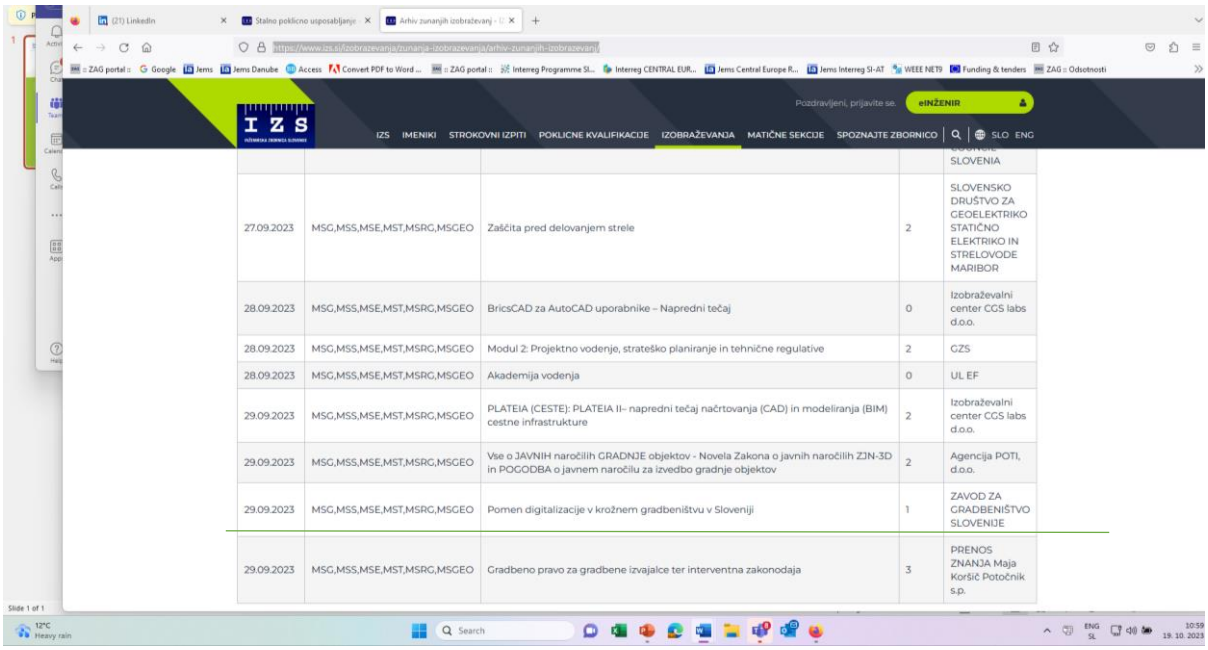
- https://www.linkedin.com/feed/update/urn:li:activity:7112765835173113856
- https://www.facebook.com/ZAGLjubljana/posts/pfbid024DyaAHjH9AWp2QN6syKbQfBRojkQPve4nYgGjGuMwodwdRqnMvteawy6NTgrFF5Dl
- https://portal.zag.si/index.php?nav0=home&nav1=novice2&nav2=poglej&id=5135
- https://srip-krozno-gospodarstvo.si/category/dogodki/
- https://www.izs.si/izobrazevanja/zunanja-izobrazevanja/arhiv-zunanjih-izobrazevanj/
- https://www.stajerskagz.si/pomen-digitalizacije-v-kroznem-gradbenistvu-v-sloveniji/

Priloge:

- Vabilo s programom,
- Pdf predstavitev vseh predavateljev
- Posnetek zaslona
- Lista prisotnosti / izpis iz MS Teams /

Zapisali:
Dragica Marinič, Alenka Mauko Pranjić, ZAG



Potek delavnice:

ČAS	VSEBINSKI SKLOP	NOSILCI VSEBIN
10:00-10:10	Uvodni pozdrav in predstavitev programa delavnice	Predstavniki ZAG in ŠGZ
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10:25 – 10:40	Digitalizacija v krožnem gradbeništvu: digitalni potni list materialov	Boštjan Gomilšek, direktor razvoja Result d.o.o.
10:40-10:55	Dobre prakse: Cinderela: platforma CinderOSS	dr. Alenka Mauko Pranjić, ZAG
	Dobre prakse: Banka gradbenih materialov	Sergej Gutsmandl, Nigrad d.o.o.
10:55-11:10	Dobre prakse: GIC Gradnje: Trajnostna gradnja digitalizacije in krožno gospodarstvo	dr. Tjaša Zupančič Hartner, GIC Gradnje d.o.o.
11:10 – 11:25	Potencial izobraževanja o krožnem gospodarstvu v Sloveniji: Celovit pristop za večkriterijsko odločanje in doseganje trajnostnih rešitev	Red. prof. dr. Zorka Novak Pintarič, Univerza v Mariboru, Fakulteta z kemijo in kemijsko tehnologijo
11:25 – 11:40	Deep demonstration: Sistemsko prepoznavanje ukrepov za krožno graditveno verigo vrednosti	Jasmina Karba, Ministrstvo za okolje, podnebje in energijo
11:40 -12:00	Moderirana razprava, vprašanja in odgovori, zaključna razprava	dr. Dragica Marinič, ZAG

Moderatorka delavnice: dr. Dragica Marinič, ZAG

Tehnična podpora: ŠGZ

Udeležba na delavnici je brezplačna.

Vljudno vabljeni!

Delavnica poteka v okviru projekta **ReBuilt: Krožna in digitalna prenova gradbenega sektorja v srednji Evropi**
Sofinanciranje: Interreg Central Europe
Več: https://www.interreg-central.eu/projects/rebuilt/



Interreg CENTRAL EUROPE

Co-funded by the European Union

ReBuilt

VABILO

na spletno delavnico

POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI

KDAJ: petek, 29. 9. 2023, 10:00 - 12:00

Prijava preko spletnega obrazca do srede, 27. 09. 2023, do 14:00.

Spoštovani direktorji, vodje, strokovni in razvojni sodelavci, tehnologi, strokovnjaki in odločevalci!

Zavod za gradbeništvo Slovenije (ZAG) in Štajerska gospodarska zbornica (ŠGZ) vas vljudno vabita na spletno delavnico, preko katere vam ponujamo edinstveno priložnost, da se kot zunanji deležniki vključite v mednarodni projekt INTERREG Central Europe ReBuilt.

Z udeležbo na delavnici boste pridobili informacije, znanje in izkušnje iz »prve roke«, s strani vabljenih strokovnjakov, ki razvijajo in sooblikujejo različna področja krožnega trajnostnega gradbeništva, ob podpori digitalnih tehnologij.

Z udeležbo in sodelovanjem na delavnici boste pomembno prispevali k oblikovanju strateškega dokumenta za razvoj Slovenije na področju digitalizacije in prehoda v krožno gradbeništvo v Srednji Evropi, ki bo v prihodnje predstavljal osnovo za razvoj politik in nacionalnih usmeritev na tem področju.

Potek delavnice:

ČAS	VSEBINSKI SKLOP	NOSILCI VSEBIN
10:00-10:10	Uvodni pozdrav in predstavitev programa delavnice	Predstavniki ZAG in ŠGZ
10:10- 10:25	Pregled zakonodaje na področju krožnega gospodarstva, aktualnega za gradbeništvo v Sloveniji	Antonija Cerar Božič, GZS
10:25 – 10:40	Digitalizacija v krožnem gradbeništvu: digitalni potni list materialov	Boštjan Gomilšek, direktor razvoja Result d.o.o.
10:40-10:55	Dobre prakse: Cinderela: platforma CinderOSS	dr. Alenka Mauko Pranjić, ZAG
	Dobre prakse: Banka gradbenih materialov	Sergej Gutsmandl, Nigrad d.o.o.
10:55-11:10	Dobre prakse: GIC Gradnje: Trajnostna gradnja digitalizacije in krožno gospodarstvo	dr. Tjaša Zupančič Hartner, GIC Gradnje d.o.o.
11:10 – 11:25	Potencial izobraževanja o krožnem gospodarstvu v Sloveniji: Celovit pristop za	Red. prof. dr. Zorka Novak Pintarič, Univerza v

	večkriterijsko odločanje in doseganje trajnostnih rešitev	Mariboru, Fakulteta z kemijo in kemijsko tehnologijo
11:25 – 11:40	Deep demonstration: Sistemsko prepoznavanje ukrepov za krožno graditveno verigo vrednosti	Jasmina Karba, Ministrstvo za okolje, podnebje in energijo
11:40 -12:00	Moderirana razprava, vprašanja in odgovori, zaključna razprava	dr. Dragica Marinič, ZAG

Moderatorka delavnice: dr. Dragica Marinič, ZAG

Tehnična podpora: ŠGZ

Udeležba na delavnici je brezplačna.

Vljudno vabljeni!

Delavnica poteka v okviru projekta **ReBuilt: Krožna in digitalna prenova gradbenega sektorja v srednji Evropi**
Sofinanciranje: Interreg Central Europe
Več: https://www.interreg-central.eu/projects/rebuilt/



ZAVOD ZA GRADBENIŠTVO SLOVENIJE
SLOVENIAN NATIONAL BUILDING AND CIVIL ENGINEERING INSTITUTE
ŠTAJERSKA GOSPODARSKA ZBORNICA

Interreg CENTRAL EUROPE
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ReBuilt

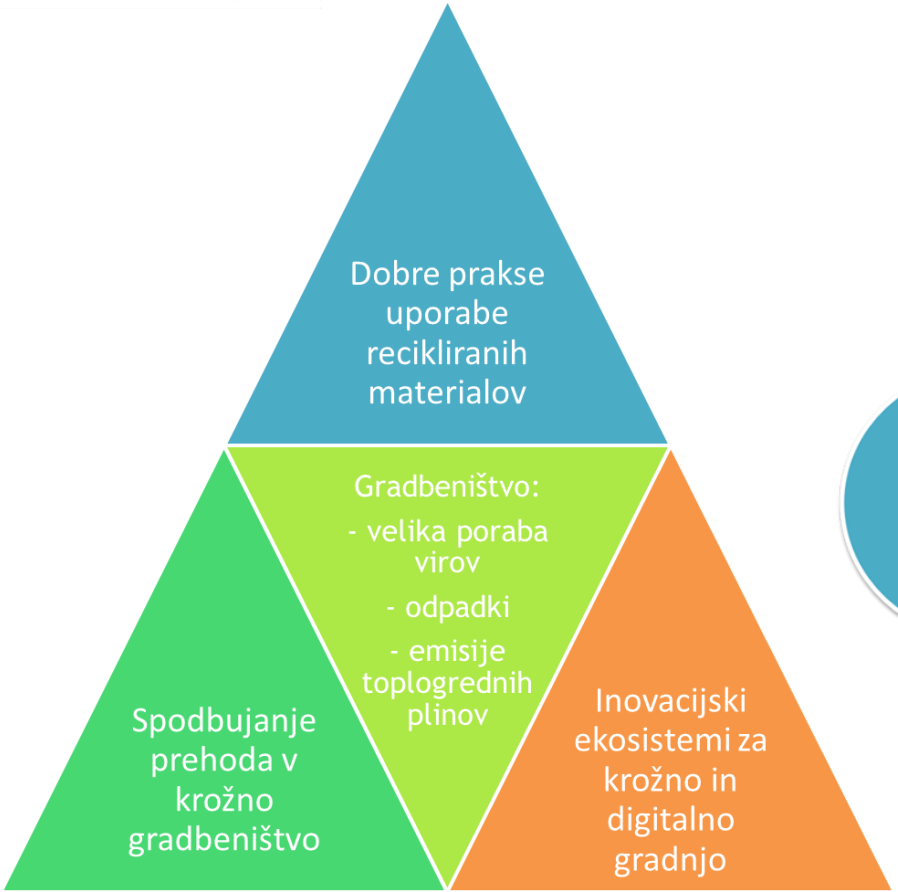
POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI

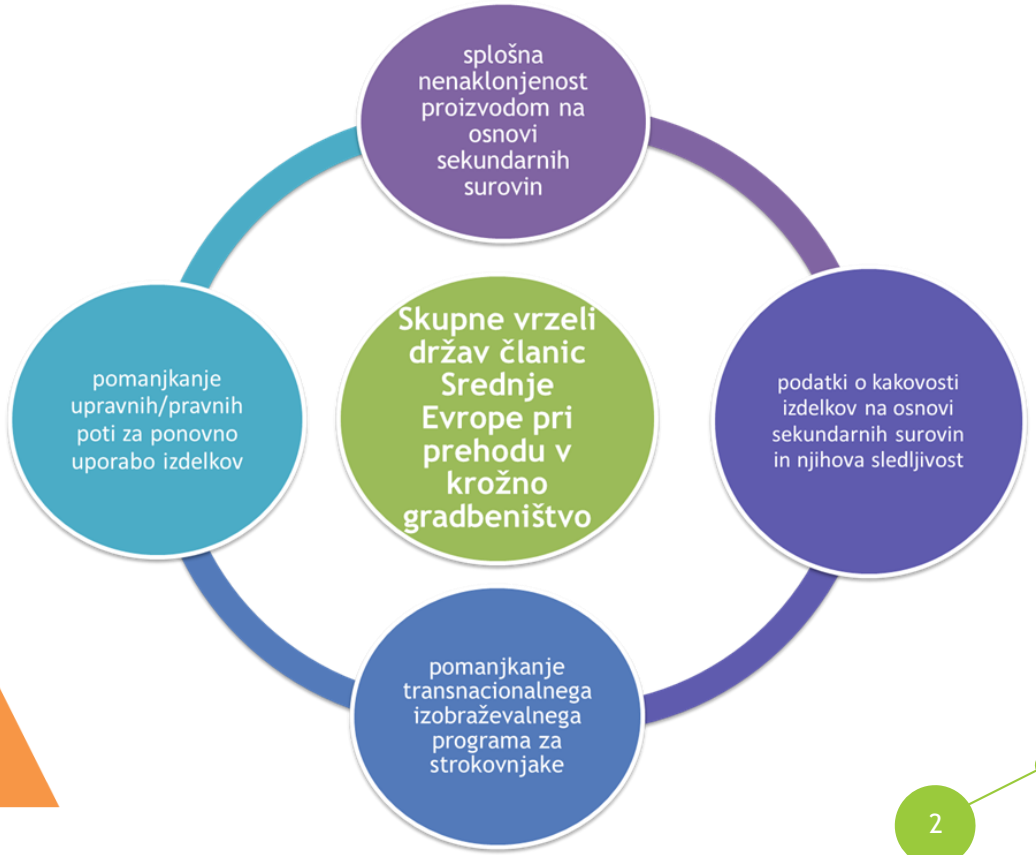
Projekt ReBuilt: Krožna in digitalna prenova gradbenega sektorja v Srednji Evropi

Vodja projekta: dr. Alenka Mauko Pranjić, ZAG

Spletna delavnica: MS Teams, 29. 09. 2023

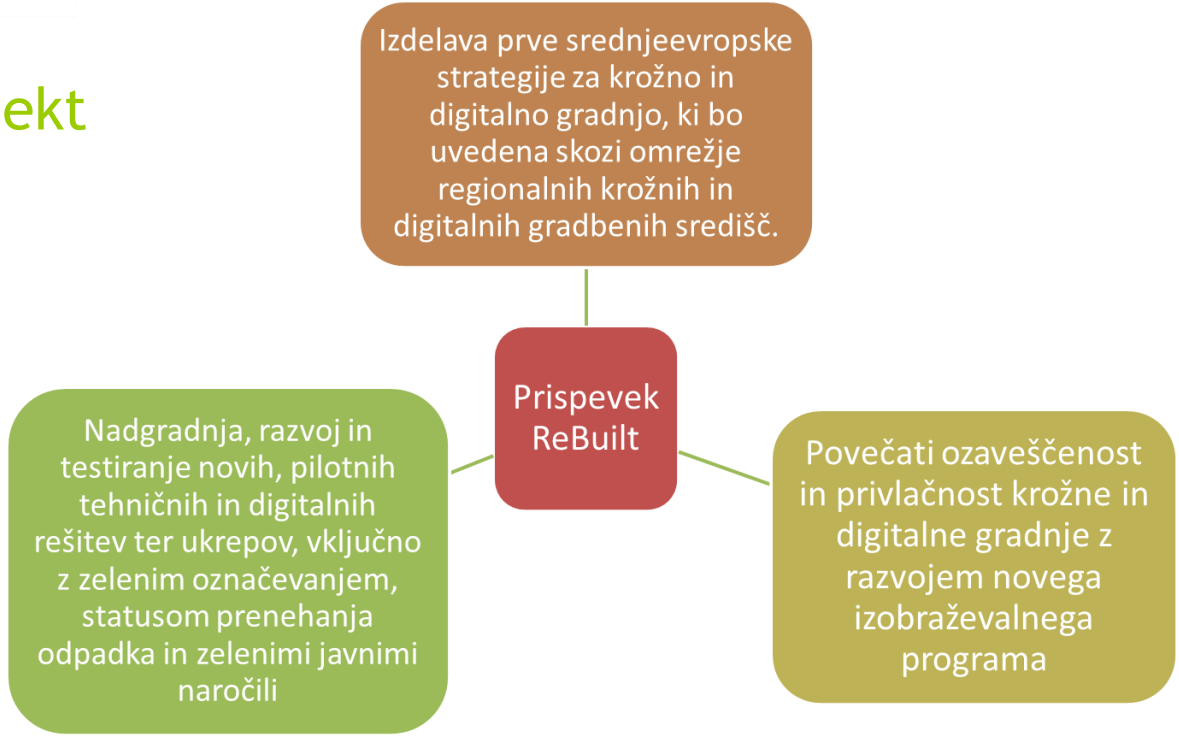
Dragica Marinič
Zavod za gradbeništvo Slovenije (ZAG)


Dobre prakse uporabe recikliranih materialov
Gradbeništvo:
- velika poraba virov
- odpadki
- emisije toplogrednih plinov
Spodbujanje prehoda v krožno gradbeništvo
Inovacijski ekosistemi za krožno in digitalno gradnjo

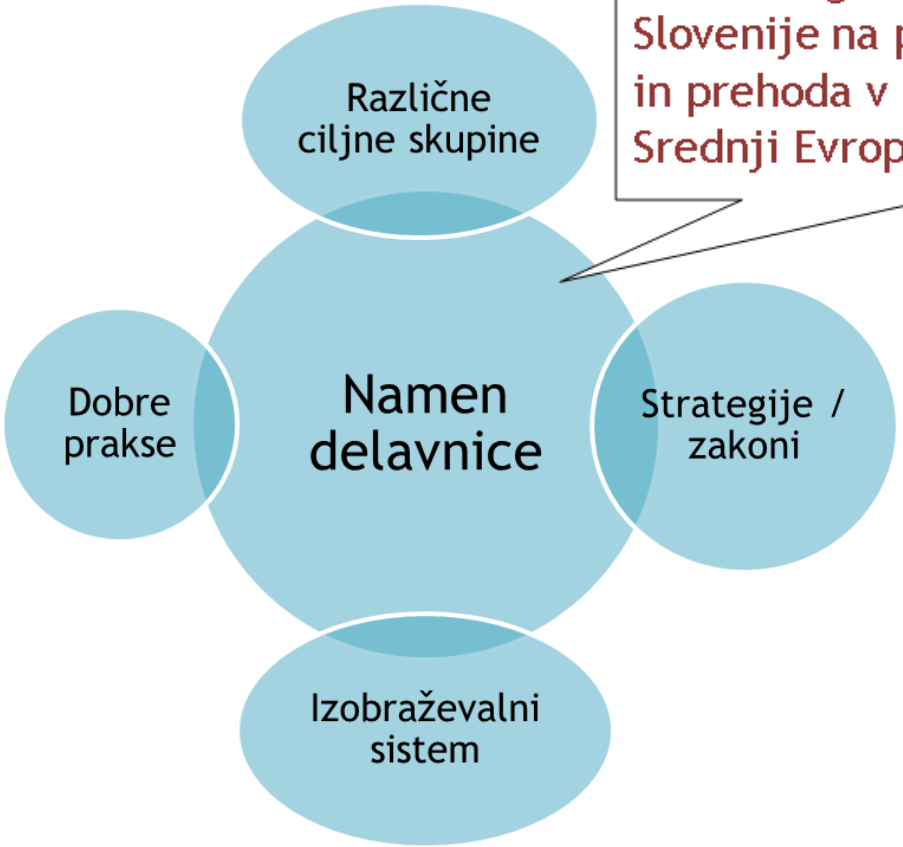

splošna nenaklonjenost proizvodom na osnovi sekundarnih surovin
podatki o kakovosti izdelkov na osnovi sekundarnih surovin in njihova sledljivost
pomanjkanje transnacionalnega izobraževalnega programa za strokovnjake
pomanjkanje upravnih/pravnih poti za ponovno uporabo izdelkov
Skupne vrzeli držav članic Srednje Evrope pri prehodu v krožno gradbeništvo

ZAG ZAVOD ZA GRADBENIŠTVO SLOVENIJE | SLOVENIAN NATIONAL BUILDING AND CIVIL ENGINEERING INSTITUTE

ReBuilt projekt



Prispevati k oblikovanju strateškega dokumenta za razvoj Slovenije na področju digitalizacije in prehoda v krožno gradbeništvo v Srednji Evropi.



Potek delavnice

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11:40- 11:55	Potencial izobraževanja o krožnem gospodarstvu v Sloveniji: Celovit pristop za večkriterijsko odločanje in doseganje trajnostnih rešitev	Red. prof. dr. Zorka Novak Pintarič, Univerza v Mariboru, Fakulteta z kemijo in kemijsko tehnologijo
11:55 - 12:20	Moderirana razprava, vprašanja in odgovori, zaključna razprava	dr. Dragica Marinič, ZAG

Inženirska zbornica Slovenija: za člane

Pooblaščeni in nadzorni inženirji za udeležbo na spletni delavnici pridobijo **1 kreditno točko iz izbirnih vsebin** skladno s Splošnim aktom o stalnem poklicnem usposabljanju pooblaščenih inženirjev. Udeležencem bodo izdana potrdila o udeležbi.

Potrdilo o udeležbi izda ZAG (ne IZS):

- spletna prijava- ime / priimek / identifikacijska številka člana IZS, prisotnost ves čas trajanja spletnega izobraževanja;
- članom IZS ni potrebno vlagati vlog za dodelitev kreditnih točk, vlogo odda ZAG organizator v roku 14 dni;
- pripis točk: avtomatično.

ZAVOD ZA GRADBENIŠTVO SLOVENIJE
SLOVENIAN NATIONAL BUILDING AND CIVIL ENGINEERING INSTITUTE

HVALA ZA POZORNOST!



dr. Alenka Mauko Pranjić, ZAG
alenka.mauko@zag.si

dr. Dragica Marinič, ZAG
dragica.marinic@zag.si

Povezava:
https://www.interreg-central.eu/projects/rebuilt/

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Pregled zakonodaje na področju krožnega gospodarstva, aktualnega za gradbeništvo v Sloveniji



Splet | 29 September 2023

Antonija Božič Cerar
Gospodarska zbornica Slovenije

NEKOČ …

- Zakon o ravnanju z odpadki (Ur.l. SRS, št. 8/1978)
  - drugi odstavek 6. člena:

„Ravnanje z odpadki obsega vračanje odpadkov v proizvodne procese in naravna presnavljanja“

- Dogovor o temeljih za urejanje in zbiranje koristnih odpadkov in njihove predelave v sekundarne surovine (Ur. l. SFRJ, št. 26/1982)
- Pravilnik o ravnanju s posebnimi odpadki, ki vsebujejo nevarne snovi (Ur.l. SRS, št. 20/1986)

STRANSKI PROIZVOD - DIREKTIVA

Države članice določijo ukrepe, ki zagotavljajo, da je možno snov ali predmet, ki nastane pri proizvodnem procesu, katerega glavni namen ni proizvodnja te snovi ali predmeta, opredeliti kot stranski proizvod in ne kot odpadek, če so izpolnjeni sledeči pogoji:

(a) nadaljnja uporaba snovi ali predmeta je zagotovljena;

(b) snov ali predmet se lahko neposredno uporabi brez kakršne koli nadaljnje obdelave, razen običajnih industrijskih postopkov;

(c) snov ali predmet se proizvaja kot sestavni del proizvodnega proces; in

(d) snov ali predmet izpolnjuje zahteve določene s predpisi, ki urejajo proizvode, varstvo okolja in varovanje človekovega zdravja, njegova nadaljnja uporaba pa ne bo škodljivo vplivala na okolje in človekov zdravje.

V zadnji spremembi direktive o odpadkih je zapisano, da Komisija sprejme izvedbene akte s katerimi določi podrobna merila za uporabo statusa stranskega proizvoda, pri čemer bi morala nameniti prednost ponovljivim praksam industrijske simbioze

PRENEHANJE STATUSA ODPADKA - DIREKTIVA

Države članice določijo ukrepe, ki zagotavljajo, da odpadki po izvedenem postopku reciklaže ali druge vrste predelave niso več opredeljeni kot odpadki, če so izpolnjeni sledeči pogoji

a) snov ali predmet se običajno uporablja za določene namene

(b) za snov ali predmet obstaja trg ali povpraševanje;

(c) snov ali predmet izpolnjuje tehnične zahteve za določene namene ter izpolnjuje zahteve obstoječe zakonodaje in standarde, ki veljajo za proizvode; in

(d) uporaba snovi ali predmeta ne bo povzročila splošnega škodljivega vpliva na okolje in zdravje ljudi.

Pogoji po potrebi vključujejo mejne vrednosti za onesnaževala in upoštevajo vse možne škodljive okoljske vplive snovi ali predmeta.

PRENEHANJE STATUSA ODPADKA - DIREKTIVA

Komisija spremlja določevanje nacionalnih meril o prenehanju statusa odpadka, in vrednoti potrebo po oblikovanju enotnih tovrstnih meril na ravni Skupnosti. Do zdaj so bila potrjena enotna skupna merila na ravno Skupnosti za:

- Odpadno železo, jeklo in aluminij
- Odpadno steklo in
- Odpadni baker

V zadnji spremembe direktive o odpadkih je zapisano, da Komisija določi podrobna merila za uporabo prenehanje statusa odpadka za nekatere snovne tokove. Specifična merila za prenehanje statusa odpadka so predvidena vsaj za agregate, papir, pnevmatike in tekstil.

Prenehanje statusa odpadka je lahko doseženo le, če snovi ali predmeti izpolnjujejo ustrezne zahteve, ki veljajo za proizvode. Pravila za prenehanje statusa odpadka se lahko določijo v posebni zakonodaji za proizvode.

ZAKON O VARSTVU OKOLJA - 2

- **Odpadek** je vsaka snov ali predmet, ki ga imetnik zavrže, namerava zavreči ali mora zavreči.

- **Predelava odpadkov je postopek**, katerega glavni rezultat je, da se odpadki koristno uporabijo v okviru dejavnosti posamezne osebe ali v gospodarstvu kot celoti, tako da nadomestijo druge materiale, ki bi se sicer uporabili za izpolnitev določene funkcije, ali tako da so odpadki pripravljeni za izpolnitev te določene funkcije.

- **Snovna predelava odpadkov** je postopek predelave odpadkov, razen energetske predelave odpadkov in postopkov predelave odpadkov v materiale, ki se bodo uporabili kot gorivo ali druga sredstva za pridobivanje energije. Snovna predelava odpadkov med drugim vključuje pripravo odpadkov za ponovno uporabo, recikliranje odpadkov in zasipanje z odpadki

- **Recikliranje odpadkov** je postopek predelave odpadkov, v katerem se odpadni materiali predelajo v proizvode, materiale ali snovi za prvotni namen ali druge namene, ter vključuje tudi predelavo organskih snovi, ne vključuje pa energetske predelave odpadkov in postopkov predelave odpadkov v materiale, ki se bodo uporabili kot gorivo ali za zasipanje z odpadki.

ZAKON O VARSTVU OKOLJA - 2

- **Zasipanje** z odpadki je postopek predelave odpadkov, v katerem se primerni nenevarni odpadki uporabijo za namene pridobivanja zemljišč na območjih izkopavanja ali za namene gradbenih posegov pri urejanju zemeljskega površja. Odpadki, uporabljeni za zasipanje, morajo nadomestiti neodpadne materiale, biti morajo primerni za prej omenjene namene in omejeni na količino, nujno potrebno za uresničitev teh namenov, ter ne smejo poslabšati kakovosti okolja.

- **Odstranjevanje** odpadkov je postopek, ki ni predelava odpadkov, tudi če je sekundarna posledica postopka pridobivanje snovi ali energije

STRANSKI PROIZVODI: ZVO-2

Snov ali predmet, ki nastane pri proizvodnem procesu, katerega glavni namen ni proizvodnja te snovi ali predmeta (v nadaljnjem besedilu: ostanek proizvodnje), je stranski proizvod in ne odpadek, če so izpolnjeni naslednji pogoji:

- nadaljnja uporaba tega ostanka proizvodnje je zagotovljena in ne le mogoča,
- ta ostanek proizvodnje se lahko neposredno uporabi brez kakršne koli nadaljnje obdelave, razen običajnih industrijskih postopkov, ta ostanek proizvodnje se proizvaja kot sestavni del proizvodnega procesa in
- ta ostanek proizvodnje izpolnjuje zahteve, določene za njegovo uporabo s predpisi, ki urejajo proizvode, kemikalije, varstvo okolja in varovanje človekovega zdravja, nadaljnja uporaba tega ostanka proizvodnje pa ne bo škodljivo vplivala na okolje in zdravje ljudi.
- Za specifične ostanke proizvodnje, za katere so z izvedbenim predpisom EU določena podrobna merila za enotno uporabo pogojev iz prejšnjega odstavka, so pogoji izpolnjeni, če so izpolnjene zahteve iz izvedbenega predpisa EU.

Za ostanke proizvodnje, za katere z izvedbenim predpisom EU ni določenih podrobnih meril za enotno uporabo pogojev iz prvega odstavka tega člena, lahko **Vlada predpiše podrobna merila** za uporabo pogojev iz prvega odstavka tega člena. O tem uradno obvesti Evropsko komisijo v skladu s predpisom EU, ki določa postopek za zbiranje informacij na področju tehničnih predpisov in pravil za storitve informacijske družbe.

STRANSKI PROIZVODI: ZVO-2

V predpisu iz prejšnjega odstavka Vlada določi tudi:

1. način izpolnjevanja predpisanih podrobnih meril,
2. dokazila, s katerimi proizvajalci ostanka proizvodnje izkazujejo izpolnjevanje podrobnih meril,
3. postopek preverjanja izpolnjevanja predpisanih podrobnih meril,
4. način vodenja dokumentacije o izpolnjevanju predpisanih podrobnih meril in
5. način vodenja in čas hrambe evidence o namenu in načinu uporabe stranskega proizvoda

Uredba za uporabo ostankov, odpadkov v gradbeništvu..?

SMERNICE EU

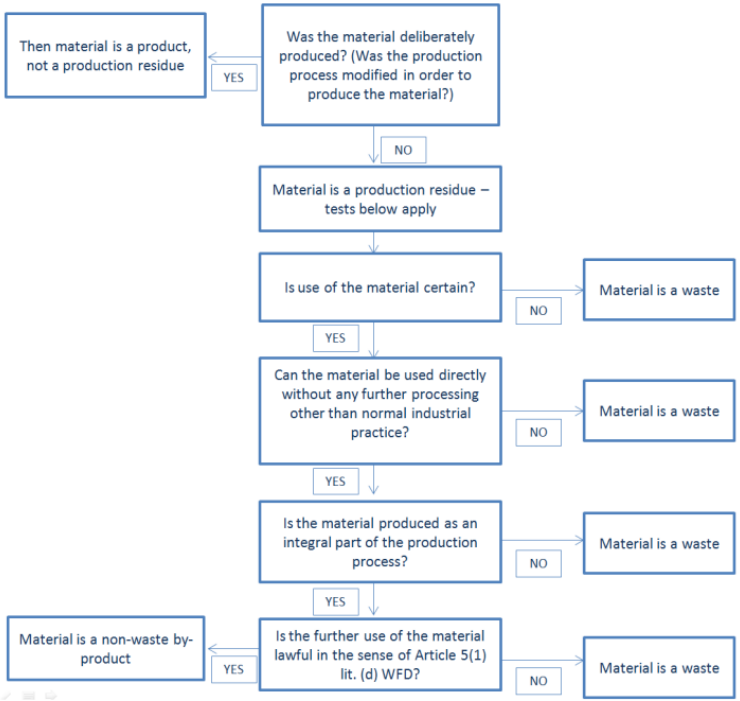


Figure 1: Decision tree for determining whether a material is a by-product [28]

STRANSKI PROIZVOD – UREDBA O ODPADKIH

(1) Snov ali predmet, ki nastane pri proizvodnem procesu, katerega glavni namen ni proizvodnja te snovi ali predmeta (v nadaljnjem besedilu: ostanek proizvodnje), je stranski proizvod in ne odpadek, če so izpolnjeni naslednji pogoji:

1. nadaljnja uporaba tega ostanka proizvodnje je zagotovljena in ne le mogoča;
2. ta ostanek proizvodnje se lahko neposredno uporabi brez kakršne koli nadaljnje obdelave, razen običajnih industrijskih postopkov;
3. ta ostanek proizvodnje se proizvaja kot sestavni del proizvodnega procesa in
4. ta ostanek proizvodnje izpolnjuje zahteve, določene za njegovo uporabo s predpisi, ki urejajo proizvode, kemikalije, varstvo okolja in varovanje človekovega zdravja, nadaljnja uporaba tega ostanka proizvodnje pa ne bo škodljivo vplivala na okolje in zdravje ljudi.

(2) Snov ali predmet iz prejšnjega odstavka ni ostanek proizvodnje, če bi proizvajalec lahko proizvedel glavni proizvod brez proizvodnje te snovi ali predmeta, vendar se je odločil nasprotno. Snov ali predmet iz prejšnjega odstavka prav tako ni ostanek proizvodnje, če je proizvajalec namerno spremenil proizvodni proces tako, da ima ta snov ali predmet posebne tehnične lastnosti.

STRANSKI PROIZVOD – UREDBA O ODPADKIH

(3) Šteje se, da je pogoj iz 1. točke prvega odstavka tega člena izpolnjen, če:

1. za ostanek proizvodnje dolgoročno obstaja trg in
2. je ostanek proizvodnje dejansko uporaben in se tudi uporabi v celoti,
3. se ostanek proizvodnje pred nadaljnjo uporabo ne skladišči dlje kot 18 mesecev.

(4) Imetnik ostanka proizvodnje dokazuje izpolnjevanje pogoja iz 1. točke prvega odstavka tega člena **s pogodbo** z nadaljnjim uporabnikom o prodaji tega stranskega proizvoda ali s strokovno analizo trga, iz katere je razvidno, da ima ta stranski proizvod dolgoročno zagotovljeno trženje.

(5) Šteje se, da je pogoj iz 2. točke prvega odstavka tega člena izpolnjen, če so **običajni industrijski postopki**, ki jih je treba izvesti za neposredno uporabo ostanka proizvodnje, sestavni del proizvodnega procesa iz 3. točke prvega odstavka tega člena, ne glede na to, ali se ti postopki izvedejo v proizvodni enoti proizvajalca ali uporabnika ostanka proizvodnje ali druge osebe, ki zanj izvede te postopke.

(6) **Med običajne industrijske postopke** iz prejšnjega odstavka se štejejo spiranje, sušenje, homogenizacija, nadzor nad kakovostjo ali drugi industrijski postopek, ki je potreben zaradi spremembe velikosti ali oblike materiala, homogenizacije ali vsebnosti vlage, ne štejejo pa se postopki, ki se izvedejo zaradi izločitve neželenih ali nevarnih snovi od ostanka proizvodnje.

STRANSKI PROIZVOD – UREDBA O ODPADKIH

(7) Imetnik ostanka proizvodnje dokazuje izpolnjevanje pogoja iz petega odstavka tega člena s **tehnično dokumentacijo o proizvodnem procesu** (tehnološko shemo proizvodnega procesa), iz katere je razvidno, da so običajni industrijski postopki iz prejšnjega odstavka sestavni del tega proizvodnega procesa.

(8) Šteje se, da je pogoj iz 3. točke prvega odstavka tega člena izpolnjen, če je iz tehničnih značilnosti proizvodnega procesa razvidno, da se ta ostanek proizvodnje proizvaja kot sestavni del proizvodnega procesa.

(9) Šteje se, da je pogoj iz 4. točke prvega odstavka tega člena izpolnjen, če uporaba tega ostanka proizvodnje ni prepovedana ter so izpolnjene zahteve in predpisani pogoji za dajanje proizvoda na trg iz:

1. predpisov, ki urejajo splošno varnost **proizvodov**, in predpisov, ki urejajo tehnične zahteve za proizvode in gradbene proizvode, če zahteve iz teh predpisov veljajo za ta ostanek proizvodnje,
2. predpisov, ki urejajo **varstvo okolja in varovanje človekovega zdravja**, ter
3. Uredbe (ES) št. 1907/2006 Evropskega parlamenta in Sveta z dne 18. decembra 2006 o registraciji, evalvaciji, avtorizaciji in omejevanju **kemikalij** (REACH)

(10) Imetnik ostanka proizvodnje mora ministrstvu ali pristojnemu inšpektorju predložiti dokazila o izpolnjevanju pogojev iz prvega odstavka tega člena, če to zahteva ministrstvo ali inšpektor

PRENEHANJE STATUSA ODPADKA: ZVO-2

(1) Odpadki prenehajo biti odpadki, ko so reciklirani ali drugače predelani in če so izpolnjeni ti pogoji:

1. predelano snov ali predmet je treba **uporabiti za specifične namene,**
2. za predelano snov ali **predmet obstaja trg ali povpraševanje**, razen ko predelovalec odpadkov predelano snov ali predmet uporabi sam,
3. predelana snov ali predmet izpolnjuje tehnične zahteve za specifične namene ter zadosti predpisom in standardom, ki se **uporabljajo za proizvode**, razen v primeru zasipanja, in
4. uporaba predelane snovi ali predmeta **ne bo škodljivo vplivala na zdravje ljudi in okolje** ter ne bo poslabševala kakovosti okolja.

(2) Merila za uporabo pogojev iz prejšnjega odstavka se določijo s predpisom Vlade, z uredbo EU ali z okoljevarstvenim dovoljenjem iz 110. ali 126. člena tega **zakona za vsak primer posebej**

Predelovalec, ki: prvič uporablja predelano snov ali predmet, ki je prenehal biti odpadek in ni bil dan na trg, ali prvič da predelano snov ali predmet na trg po tem, ko je ta prenehal biti odpadek, zagotovi, da predelana snov ali predmet izpolnjuje zahteve iz predpisov, ki urejajo **kemikalije, in predpisov, ki urejajo proizvode**, pri čemer morajo biti pogoji iz prvega odstavka 28. člena tega zakona izpolnjeni prej, preden se za predelano snov ali predmet začnejo uporabljati predpisi o kemikalijah in proizvodih

PRENEHANJE STATUSA ODPADKA: UREDBA O ODPADKIH

(1)Odpadkom preneha status odpadka **po končanju recikliranja ali drugačne predelave**, in če so izpolnjeni pogoji iz zakona, ki ureja varstvo okolja, ter merila na podlagi teh pogojev, pri čemer se v primeru, ko merila niso določena s posebnim **predpisom, izdanim na podlagi zakona**, ki ureja varstvo okolja, ali na podlagi **izvedbenega predpisa Evropske unije, določijo za vsak primer predelave** odpadkov v predelano snov ali predmet **posebe**j.

(2) Ministrstvo v okoljevarstvenem dovoljenju iz prvega odstavka 38. člena te uredbe, poleg vsebine iz 41. člena te uredbe, za vsak primer predelave odpadkov in za vsako predelano snov ali predmet določi merila za prenehanje statusa odpadka po postopku v skladu z zakonom, ki ureja varstvo okolja, in v skladu s tem členom.

(3) Ministrstvo v okoljevarstvenem dovoljenju iz prvega odstavka 38. člena te uredbe poleg ostalih meril iz prejšnjega odstavka določi tudi nabor onesnaževal in dopustne vsebnosti teh **onesnaževal v izlužkih predelane snovi ali predmeta, če bosta uporabljena v zunanjem okolju in izpostavljena atmosferskim vplivom** ter imata lastnost izluževanja.

PRENEHANJE STATUSA ODPADKA: UREDBA O ODPADKIH

(4) **Analizo izlužkov** iz prejšnjega odstavka na zahtevo vlagatelja vloge za **izdajo okoljevarstvenega dovoljenja** iz prvega odstavka 38. člena te uredbe izdela oseba z akreditacijo po SIST EN ISO/IEC 17025 na podlagi analize izlužkov izhodiščnih parametrov ali izhodiščnih in dodatnih izhodiščnih parametrov, določenih v Prilogi 5, ki je kot priloga sestavni del te uredbe, ter v skladu z navodili za določitev onesnaževal, ki so določene v Prilogi 5 te uredbe.

(5) Za spremljanje **izlužkov** onesnaževal **za čas nameščanja ali vgradnje hidravlično vezane predelane snovi ali predmeta v zunanje okolje ali hidravlično nevezane predelane snovi ali predmeta, ki ga vgrajuje predelovalec odpadkov sam,** ministrstvo v okoljevarstvenem dovoljenju iz prvega odstavka 38. člena te uredbe na podlagi predloga za spremljanje vsebnosti onesnaževal v izlužkih predelane snovi ali predmeta določi **obveznost izvajanja analiz izlužkov enkrat letno.**

(6) Če se v primeru iz prejšnjega odstavka v enem koledarskem letu namesti ali vgradi več kot 5.000 ton predelane snovi ali predmeta, je treba za vsakih nadaljnjih 5.000 ton nameščene ali vgrajene predelane snovi ali predmeta izdelati še po eno analizo izlužka.

Ne glede na prejšnji stavek se v primeru, da se v enem koledarskem letu namesti ali vgradi več kot 60.000 ton predelane snovi ali predmeta, izdela največ 12 analiz izlužka letno, pri čemer se analize enakomerno razporedijo čez koledarsko leto. Vzorčenje predelane snovi ali predmeta za namen izdelave analize izlužkov se izvede po začetku nameščanja ali vgradnje predelane snovi ali predmeta v zunanje okolje, in sicer na lokaciji nameščanja ali vgradnje **po 48 urah** po izvedenem nameščanju ali vgradnji predelane snovi ali predmeta v zunanje okolje.

PRENEHANJE STATUSA ODPADKA: UREDBA O ODPADKIH

(7) Predlog za spremljanje vsebnosti onesnaževal v izlužkih predelane snovi ali predmeta v času vgradnje ali nameščanja v zunanje okolje izdela oseba iz četrtega odstavka tega člena na zahtevo vlagatelja vloge za izdajo okoljevarstvenega dovoljenja iz prvega odstavka 38. člena te uredbe.

Če oseba iz četrtega odstavka tega člena na podlagi analize izlužkov ugotovi, da posamezni parameter onesnaževal iz Priloge 5 te uredbe ne presega 30 % od dopustnih vsebnosti onesnaževal glede na lastnosti predelane snovi ali predmeta in glede na območje, na katero se nanašajo dopustne vsebnosti onesnaževal iz Priloge 5 te uredbe, lahko predlaga opustitev spremljanja vsebnosti določenih onesnaževal v izlužkih predelane snovi ali predmeta.

Če nobeden od parametrov onesnaževal iz Priloge 5 te uredbe ne presega 30 % od dopustnih vsebnosti onesnaževal glede na lastnosti predelane snovi ali predmeta in glede na območje, na katero se nanašajo dopustne vsebnosti onesnaževal iz Priloge 5 te uredbe, pa lahko namesto predloga za spremljanje vsebnosti onesnaževal v izlužkih predelane snovi ali predmeta izdela mnenje, v katerem navede in utemelji, da spremljanje izlužkov onesnaževal v času vgradnje ali nameščanja v zunanje okolje ni potrebno.

(8) Analiza izlužkov iz četrtega odstavka tega člena in predlog za spremljanje vsebnosti onesnaževal v izlužkih predelane snovi ali predmeta ali mnenje iz prejšnjega odstavka tega člena morata biti priložena vlogi za izdajo okoljevarstvenega dovoljenja.

PRENEHANJE STATUSA ODPADKA: UREDBA O ODPADKIH

(9) Predelovalec lahko **proda ali preda predelano snov ali predmet**, ki mu je status odpadka prenehal na podlagi prvega odstavka tega člena in gre za **hidravlično nevezano snov** ali predmet novemu lastniku le v primeru, če iz analize izlužka iz četrtega odstavka tega člena in mnenja iz šestega odstavka tega člena izhaja, da nobeden od parametrov ne presega dopustne vsebnosti onesnaževal iz Priloge 5 te uredbe glede na lastnosti predelane snovi ali predmeta in glede na območje, na katero se nanašajo dopustne vsebnosti onesnaževal iz Priloge 5 te uredbe.

(10) Predelovalec lahko predelano snov ali predmet, ki mu je status odpadka prenehal na podlagi prvega odstavka tega člena in gre za **hidravlično vezano snov ali predmet**, proda ali preda novemu lastniku le, če iz analize izlužka iz četrtega odstavka tega člena in mnenja iz šestega odstavka tega člena izhaja, da nobeden od parametrov ne presega 30 % od dopustne vsebnosti onesnaževal iz Priloge 5 te uredbe glede na lastnosti predelane snovi ali predmeta in glede na območje, na katero se nanašajo dopustne vsebnosti onesnaževal iz Priloge 5 te uredbe.

(11) V primeru iz devetega in prejšnjega odstavka tega člena mora predelovalec odpadkov novemu lastniku predati tudi kopijo okoljevarstvenega dovoljenja, v katerem je določeno območje, na katero se nanašajo dopustne vsebnosti onesnaževal iz Priloge 5 te uredbe glede na lastnosti predelane snovi ali predmeta in na katerem je dopustna vgradnja predelane snovi ali predmeta, skupaj s kopijo analize izlužka in mnenja.

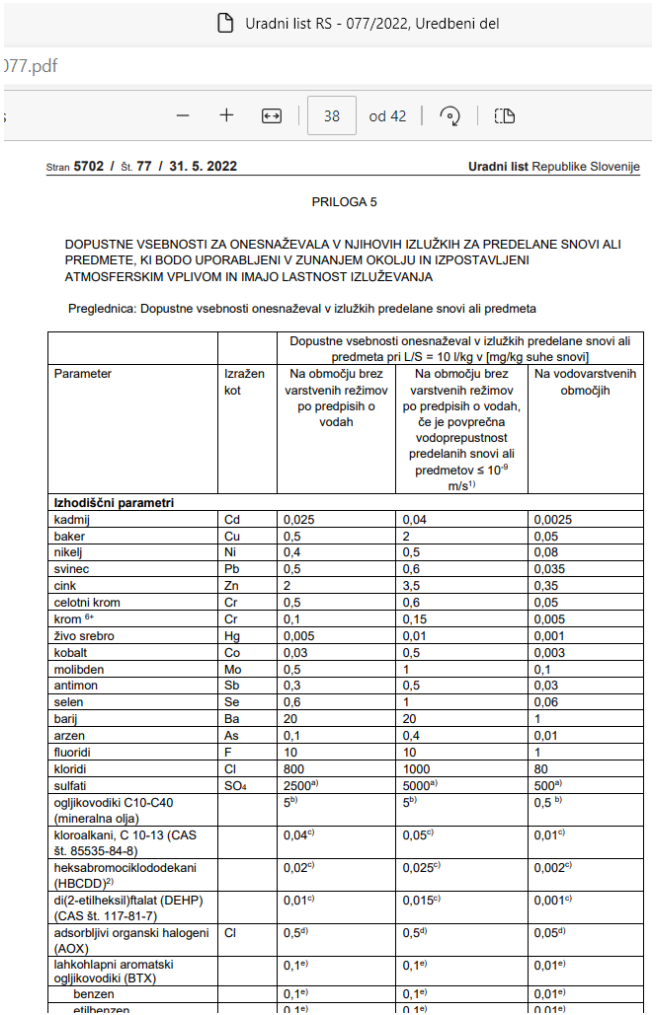
PRENEHANJE STATUSA ODPADKA: UREDBA O ODPADKIH

(12) V primeru iz devetega in desetega odstavka tega člena mora analize izlužkov predelane snovi ali predmeta **zagotavljati predelovalec odpadkov**, pri čemer se smiselno uporabljajo določbe četrtega do šestega odstavka tega člena in Priloge 5 te uredbe.

(13) **Če predelovalec proda ali preda** predelano snov ali predmet v skladu s prejšnjim odstavkom, **novemu lastniku ni treba izvajati analize izlužkov vgrajene predelane snovi ali predmeta** iz četrtega odstavka tega člena.

(14) Na območjih, ki so s predpisom Vlade Republike Slovenije (v nadaljnjem besedilu: Vlada) določena kot degradirano okolje, se lahko v zunanje okolje nameša ali vgrajuje predelane snovi in predmete le v primeru, če takšno nameščanje ali vgradnja predstavlja ukrep za izboljšanje kakovosti degradiranega okolja, določen s programom ukrepov za izboljšanje kakovosti okolja na tem območju, ki ga v skladu z zakonom, ki ureja varstvo okolja, pripravita Vlada in občina, na območju katere se nahaja degradirano območje.

V primeru iz prejšnjega stavka je za onesnaževala iz Priloge 5 te uredbe, zaradi katerih je območje določeno kot degradirano, potrebno izvajati analizo izlužkov iz četrtega odstavka tega člena ne glede na to, ali presegajo ali ne presegajo 30 % od dopustnih vsebnosti onesnaževal glede na lastnosti predelane snovi ali predmeta in glede na območje, na katero se nanašajo dopustne vsebnosti onesnaževal iz Priloge 5 te uredbe.



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PRILOGA 5

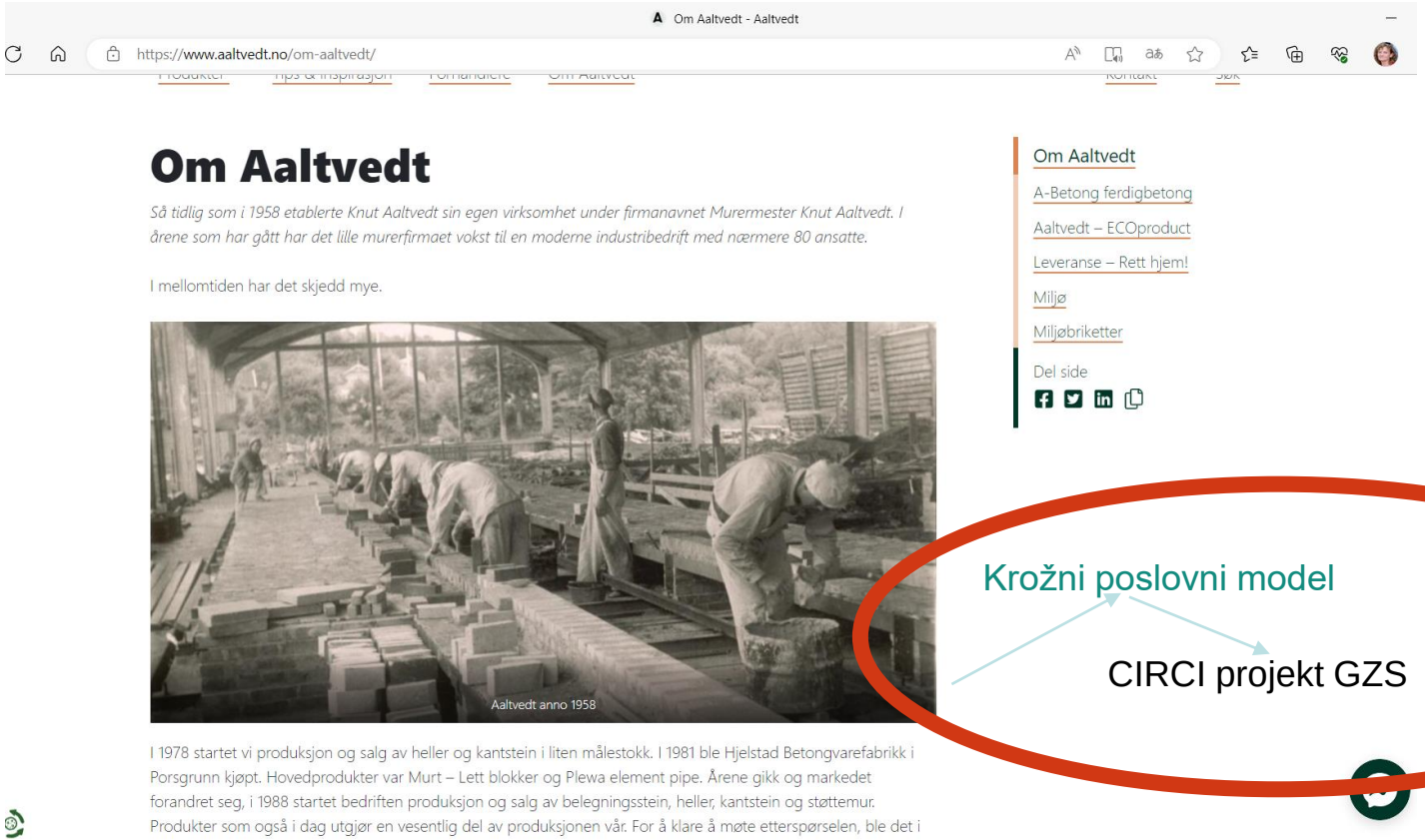
DOPUSTNE VSEBNOSTI ZA ONESNAŽEVALA V NJIHOVIH IZLUŽKIH ZA PREDELANE SNOVI ALI PREDMETE, KI BODO UPORABLJENI V ZUNANJEM OKOLJU IN IZPOSTAVLJENI ATMOSFERSKIM VPLIVOM IN IMAJO LASTNOST IZLUŽEVANJA

Preglednica: Dopustne vsebnosti onesnaževal v izlužkih predelane snovi ali predmeta

		Dopustne vsebnosti onesnaževal v izlužkih predelane snovi ali predmeta pri L/S = 10 l/kg v [mg/kg suhe snovi]		
Parameter	Izražen kot	Na območju brez varstvenih režimov po predpisih o vodah	Na območju brez varstvenih režimov po predpisih o vodah, če je povprečna vodoprepustnost predelanih snovi ali predmetov ≤ 10^{-9} m/s[1)]	Na vodovarstvenih območjih
Izhodiščni parametri				
kadmij	Cd	0,025	0,04	0,0025
baker	Cu	0,5	2	0,05
nikelj	Ni	0,4	0,5	0,08
svinec	Pb	0,5	0,6	0,035
cink	Zn	2	3,5	0,35
celotni krom	Cr	0,5	0,6	0,05
krom $^{6+}$	Cr	0,1	0,15	0,005
živo srebro	Hg	0,005	0,01	0,001
kobalt	Co	0,03	0,5	0,003
molibden	Mo	0,5	1	0,1
antimon	Sb	0,3	0,5	0,03
selen	Se	0,6	1	0,06
barij	Ba	20	20	1
arzen	As	0,1	0,4	0,01
fluoridi	F	10	10	1
kloridi	Cl	800	1000	80
sulfati	SO_4	2500[a)]	5000[a)]	500[a)]
ogljikovodiki C10-C40 (mineralna olja)		5[b)]	5[b)]	0,5 [b)]
kloroalkani, C 10-13 (CAS št. 85535-84-8)		0,04[c)]	0,05[c)]	0,01[c)]
heksabromociklododekani (HBCDD)[2)]		0,02[c)]	0,025[c)]	0,002[c)]
di(2-etilheksil)ftalat (DEHP) (CAS št. 117-81-7)		0,01[c)]	0,015[c)]	0,001[c)]
adsorbljivi organski halogeni (AOX)	Cl	0,5[d)]	0,5[d)]	0,05[d)]
lahkohlapni aromatski ogljikovodiki (BTX)		0,1[e)]	0,1[e)]	0,01[e)]
benzen		0,1[e)]	0,1[e)]	0,01[e)]
etilbenzen		0,1[e)]	0,1[e)]	0,01[e)]

Prenehanje statusa odpadka: uredba o odpadkih, priloga 5

AALTVEDT NORVEŠKA



Krožni poslovni model

CIRCI projekt GZS

SMERNICE O ODPADKIH IN PREDELANIH SNOVEH



REACH - ZAHTEVE

- Zahteve REACH glede snovi, zmesi in izdelkov ne veljajo za odpadke
- Ko iz odpadka nastane snov, zmes ali izdelek je treba preveriti morebitne zahteve REACH
  - So bile snovi, zmesi ali izdelki registrirani, v procesu predelave je nastala ista snov, ki je bila registrirana, primer jeklo iz starega železa, kjer ni potrebna registracija
  - Snovi z neznano ali spremenljivo sestavo „UVCB“, kjer je potrebna registracija nastale žlindre ali pepelov
- Nečistoča – nenamerna sestavina navzoča v proizvedeni snovi, ki presega 20% w/w

- Primer: Recovered paper Recovered paper mainly consists of cellulose pulp. EINECS identifies cellulose pulp as follows: "The fibrous substances obtained from the treatment of lignocellulosic substances (wood or other agricultural fiber sources) with one or more aqueous solutions of pulping and/or bleaching chemicals. Composed of cellulose, hemi-cellulose, lignin, and other minor components. The relative amounts of these components depend on the extent of the pulping and bleaching processes." (EINECS number 265-995-8). **Cellulose pulp is listed in Annex IV, and consequently, exempted from registration, downstream user and evaluation obligations.** Recovered paper may contain other constituents such as pigments, inks, glues, fillers etc. Regarding the recovery and recycling process, constituents that have no specific function in the material (cellulose pulp), can therefore be considered as impurities (see section 2.2.4). Recovered paper consisting exclusively of cellulose pulp with impurities without specific function in the material will therefore be exempt from registration, downstream user and evaluation obligations

Hvala za pozornost!



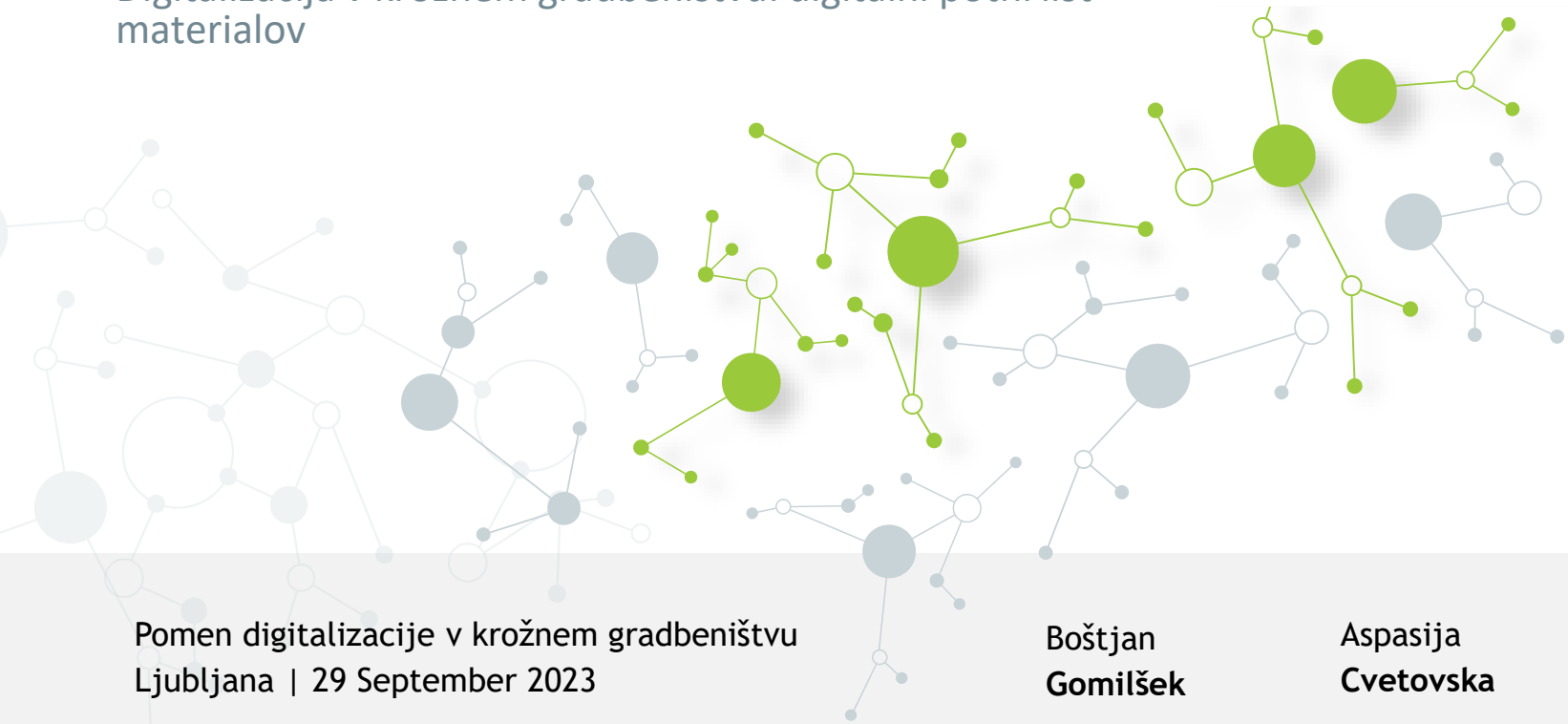
RESULT

Interreg CENTRAL EUROPE

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ReBuilt

Digitalizacija v krožnem gradbeništvu: digitalni potni list materialov



Pomen digitalizacije v krožnem gradbeništvu
Ljubljana | 29 September 2023

Boštjan **Gomilšek**

Aspasija **Cvetovska**

ZAKAJ JE DIGITALIZACIJA POMEMBNA

Prehod v krožno gospodarstvo potrebuje podatke

- Avtomatiziran zajem podatkov (kamere, GPS, tehtnice, senzorika)
- Avtomatizirana obdelava podatkov (BigData, AI)
- Povezljivost sistemov – standardizacija
- Transparentnost

KJE DIGITALIZACIJA



Predelava



Pridobivanje surovin



Stroji



Transport



Gradnja



Odlaganje



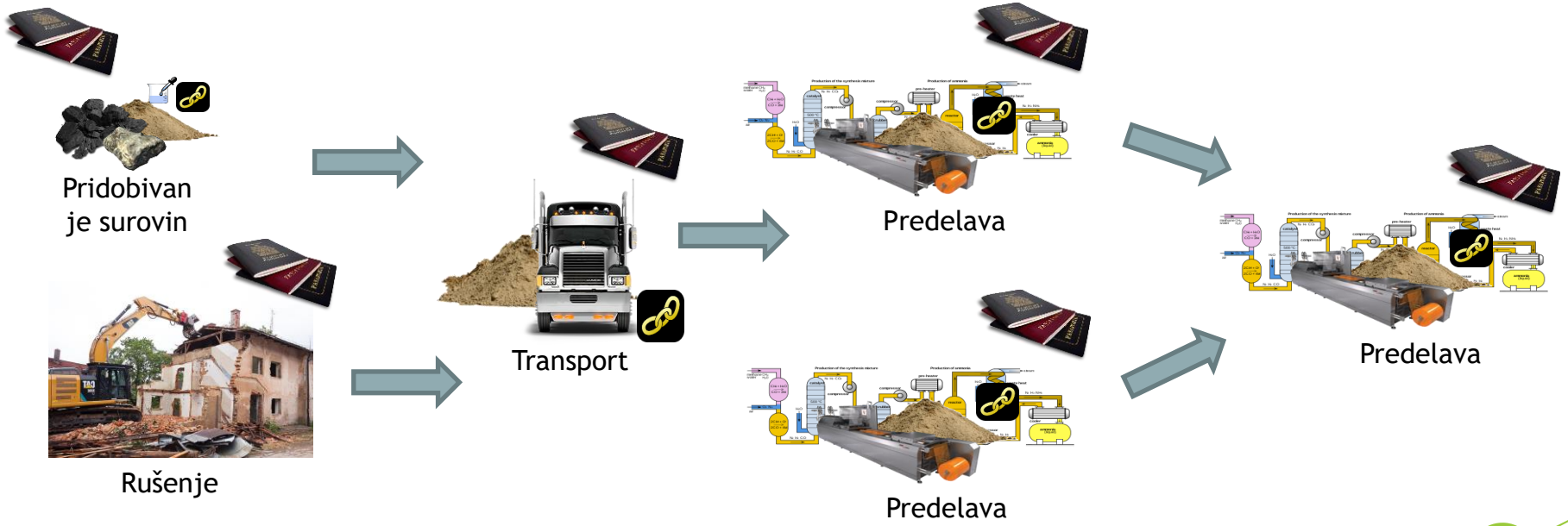
Rušenje



Vzdrževanje

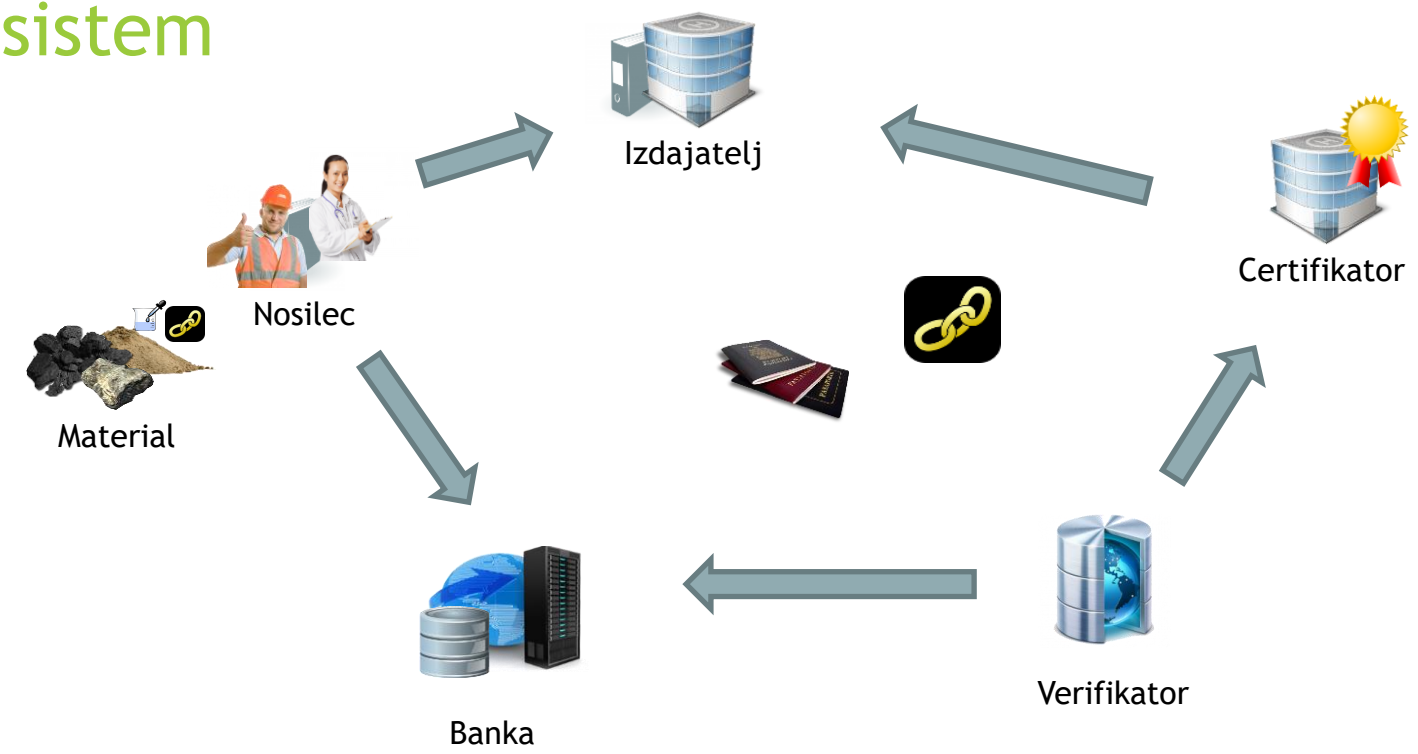
POTNI LISTI MATERIALOV

Vzpostavitev verige zaupanja



POTNI LISTI MATERIALOV

Ekosistem



POTNI LISTI MATERIALOV

Standardizacija

- Obstoječi projekti na nivoju EU
  - MADASTER
  - BAMB2020
  - RESTART
  - TRACE4EU
  - GAIA-X

KONČNI CILJ

- Transparentnost
- Zaupanje
- Ustrezna zakonodaja
- Podprto krožno gospodarstvo
- Zeleno naročanje



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Dobre prakse: CINDERELA - CinderOSS platforma

POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI, spletna delavnica, 29 Sept 2023

Alenka Mauko Pranjić, Dragica Marinič, ZAG

Interreg CENTRAL EUROPE

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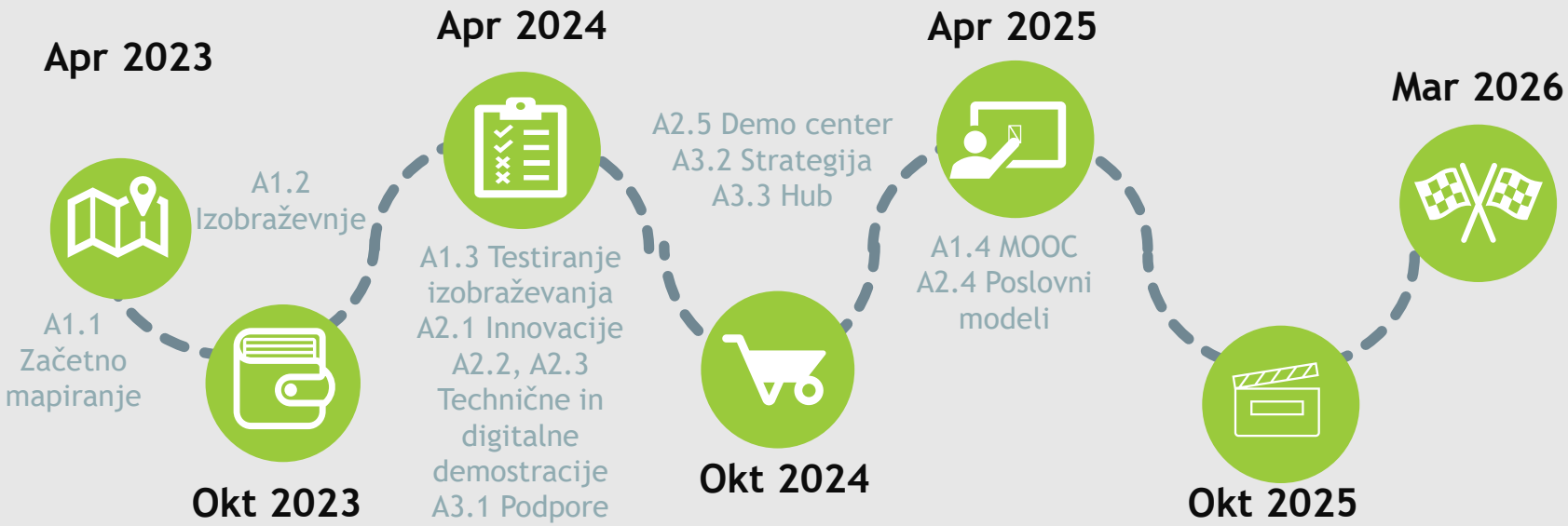
ReBuilt: Circular and digital renewal of central Europe construction and building sector

Partnerji: ZAG (SI, COO), SGZ (SI, CP), NIGRAD (SI), Opencontent (IT), Infordata (IT), TUWien (AT), POR (HR), BURST (HU), VVÖH (HU), USTARCH (SL), IIC (SL), IETU (PL), CZGBC (CZ), HM (GE)

04/2023 – 03/2026


Gradbeništvo:
- velika poraba virov
- odpadki
- emisije toplogrednih plinov
Dobre prakse uporabe recikliranih materialov
Gradbeništvo:
- velika poraba virov
- odpadki
- emisije toplogrednih plinov
Spodbujanje prehoda v krožno gradbeništvo
Inovacijski ekosistemi za krožno in digitalno gradnjo

POTEK PROJEKTA



Na čem gradimo?





. CINDERELA (H2020, 2018-2022): **CinderOSS**

. Retracking (Interreg Italia-Slovenia, 2017-2021): **Digitalizacija vrednostne verige in sledljivost materialov**

. TU Wien: **start-up za izolacijske plošče iz konopljinega betona**

. CINDERELA, LIFE IP Restart: **Dogoše (Maribor, Slovenija): demo center za ponovno uporabo gradbenih materialov**

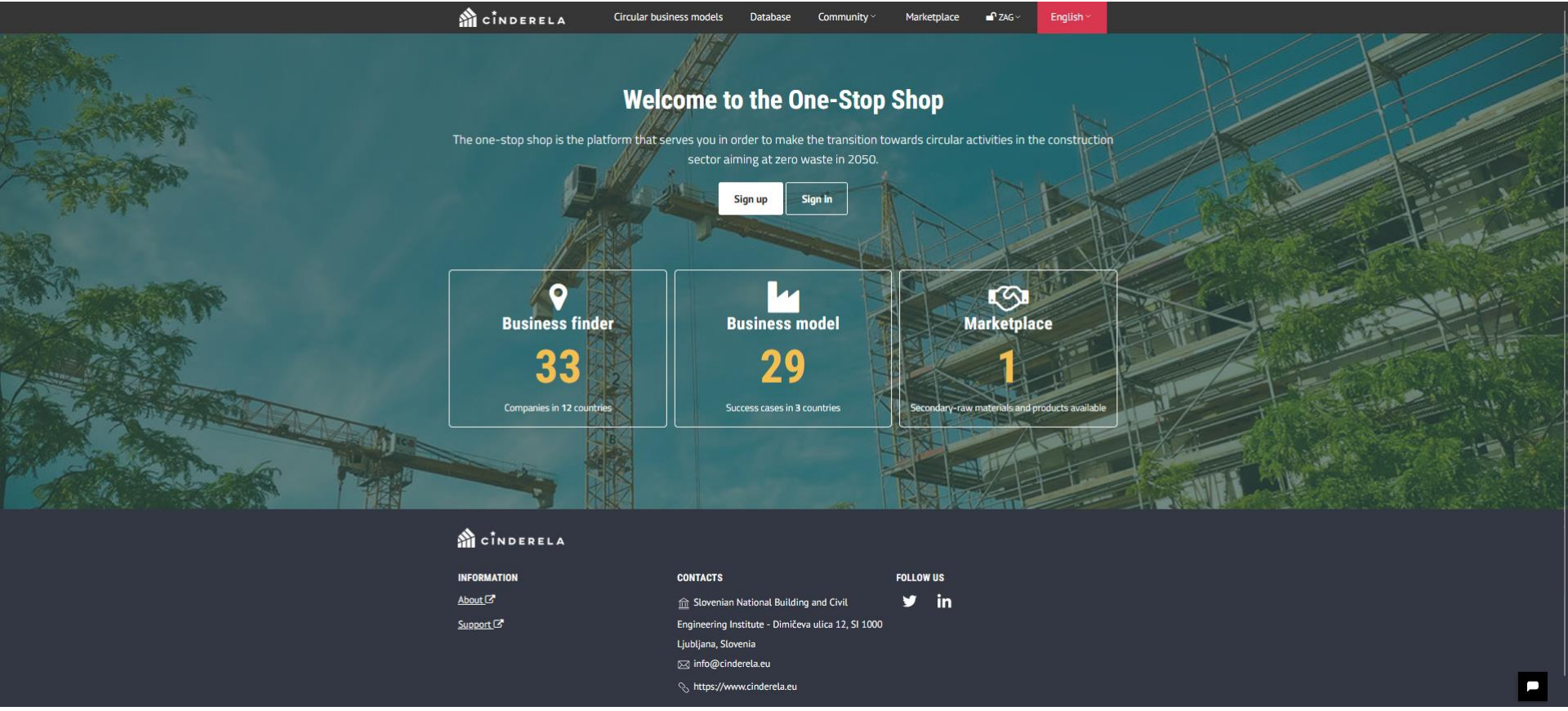
. LIFE IP Restart: **digitalni potni listi proizvodov**

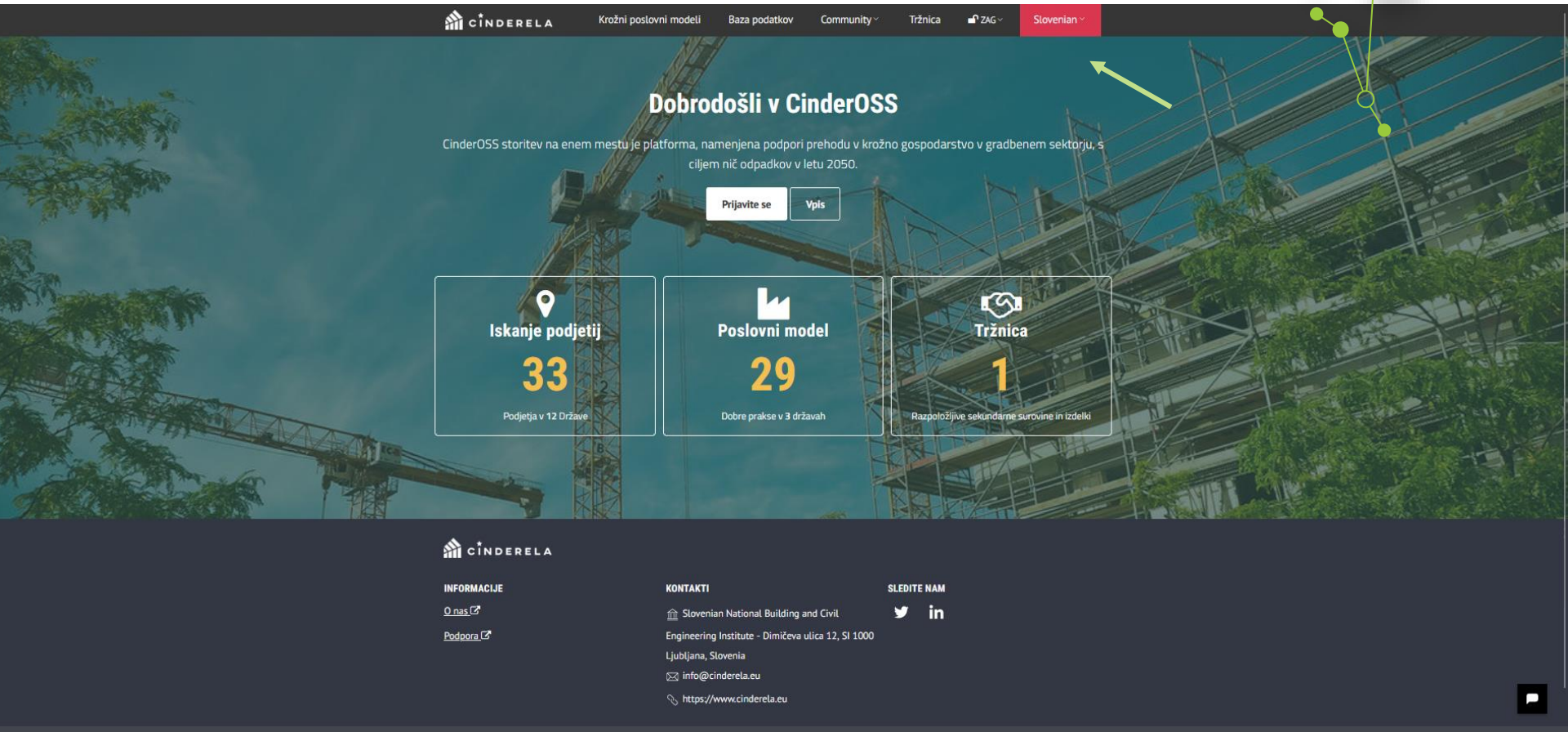
CinderOSS: vse na enem mestu za krožno gradbeništvo

https://youtu.be/1RWc5N2QkZ8

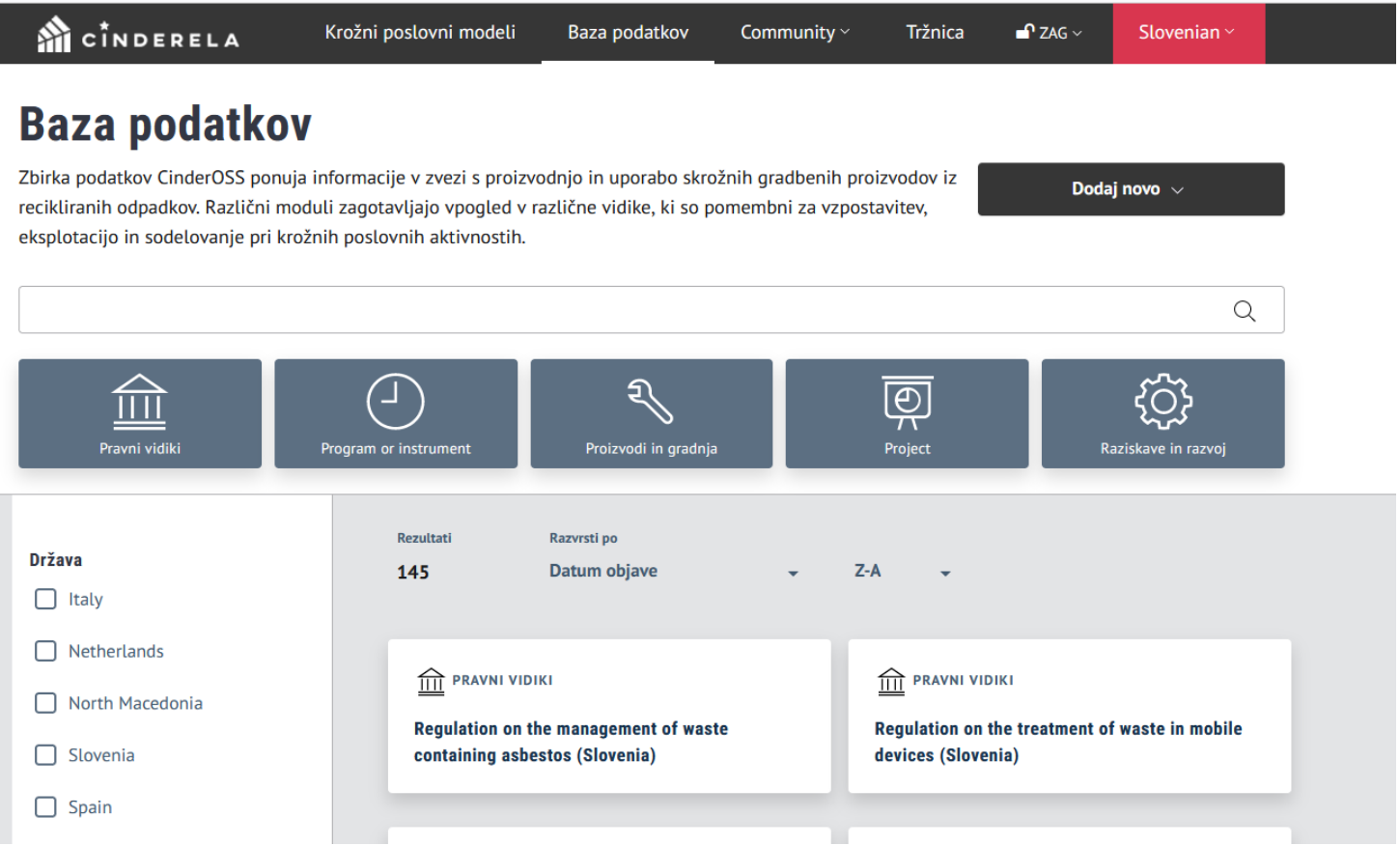


https://cindeross.cinderela.eu/



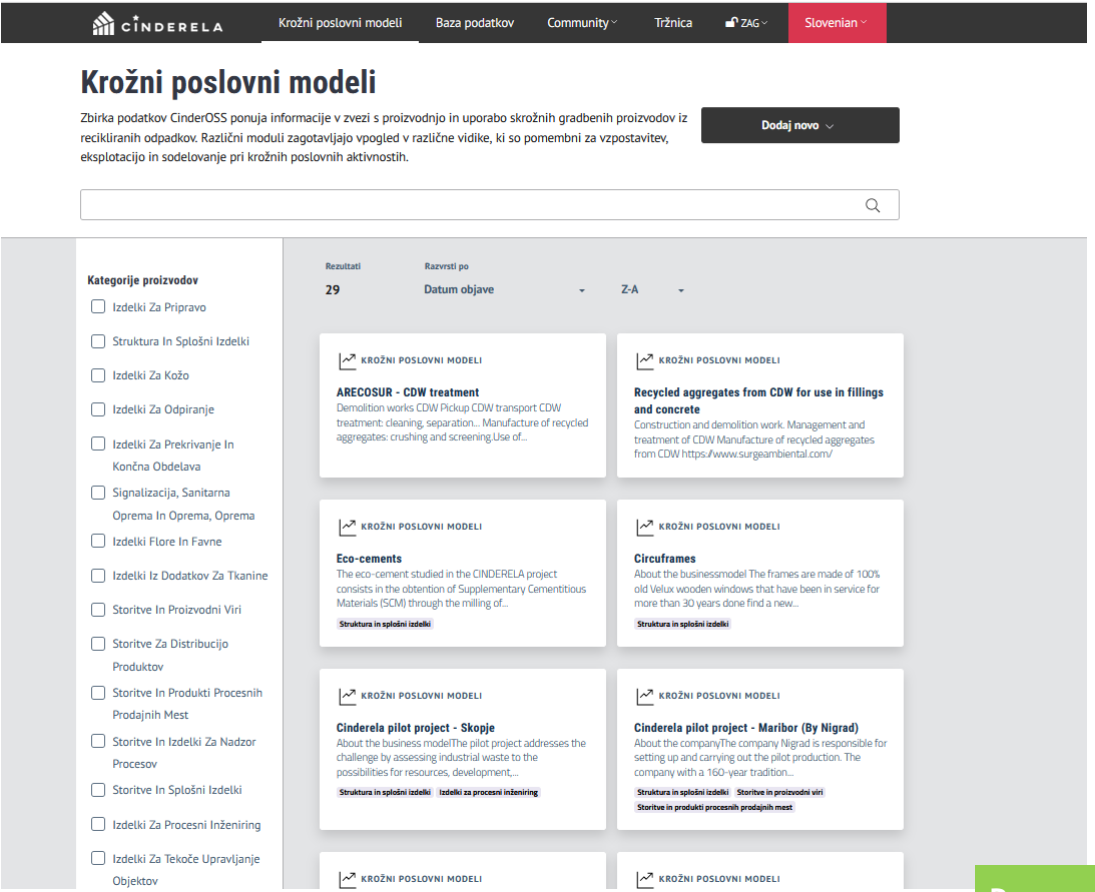

CINDERELA
Krožni poslovni modeli
Baza podatkov
Community
Tržnica
ZAG
Slovenian
Dobrodošli v CinderOSS
CinderOSS storitev na enem mestu je platforma, namenjena podpori prehodu v krožno gospodarstvo v gradbenem sektorju, s ciljem nič odpadkov v letu 2050.
Prijavite se
Vpis
Iskanje podjetij
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Podjetja v 12 Države
Poslovni model
29
Dobre prakse v 3 državah
Tržnica
1
Razpoložljive sekundarne surovine in izdelki
CINDERELA
INFORMACIJE
O nas
Podpora
KONTAKTI
Slovenian National Building and Civil Engineering Institute - Dimičeva ulica 12, SI 1000 Ljubljana, Slovenia
info@cinderela.eu
https://www.cinderela.eu
SLEDITE NAM

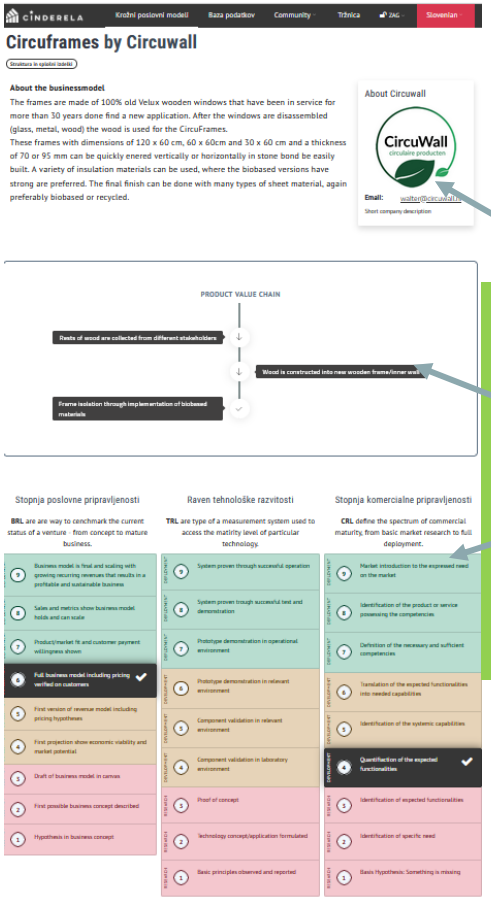
… INFORMACIJE ZA PODJETJA



- tehnologije
- proizvodi, gradbeni procesi, tehnologije,
- zakonodaja,
- raziskave in razvoj
- projekti

… NAVDIH IZ OBSTOJEČIH PRIMEROV

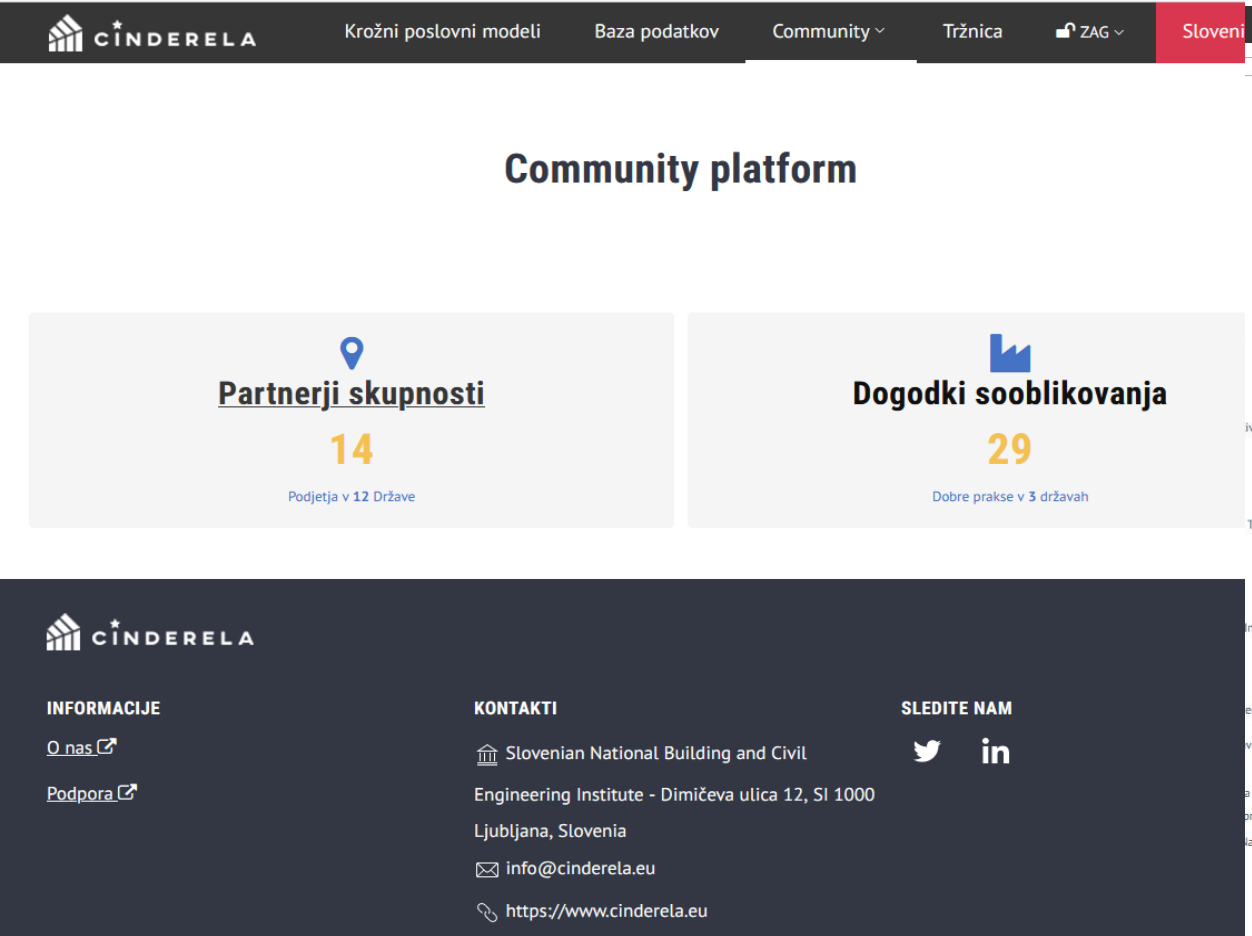


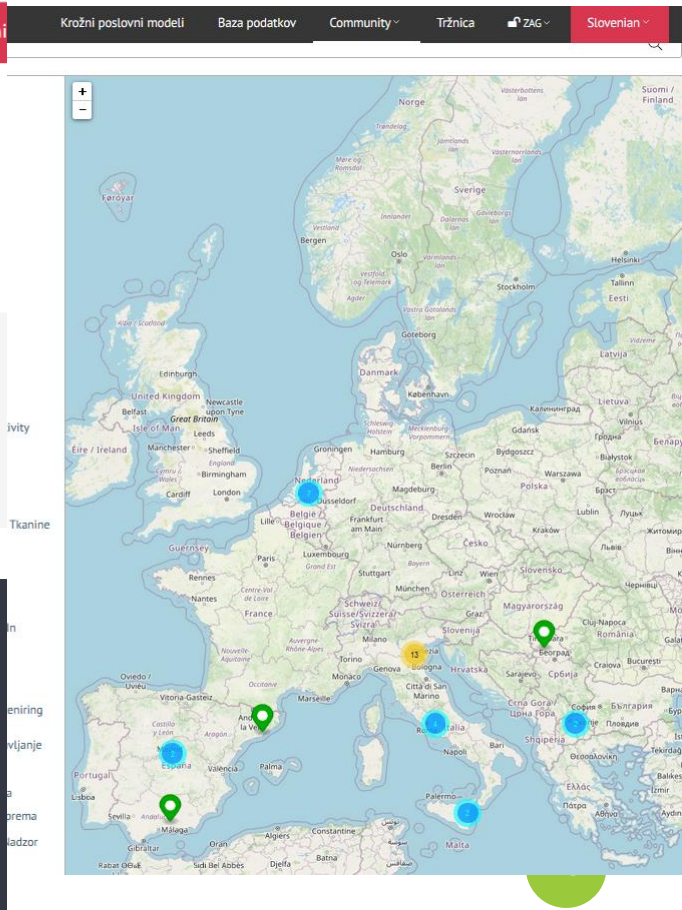


Informacije o:
- podjetju in njihovih znamkah, vrednostni verigah, poslovna pripravljenosti, tehnološka pripravljenost, pripravljenost uporabnikov…

Promocija lastnega modela

… VKLJUČITE SE V NAŠO SKUPNOST…





...STE PROJEKTANT, ARHITEKT?

CINDERELA | Krožni poslovni modeli | Baza podatkov | Community | Tržnica | ZAG | Slovenian

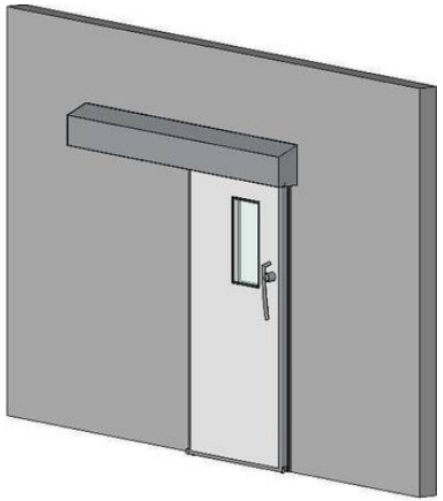
TD Shop Front - double sliding door

Italija | Abruzzo | L'Aquila

Description

With a wide range of sections available this door can be triple or double glazed with a header bar to cater for differing automatic gearing suppliers. Standard hook doors can also be used on this highly versatile product range.

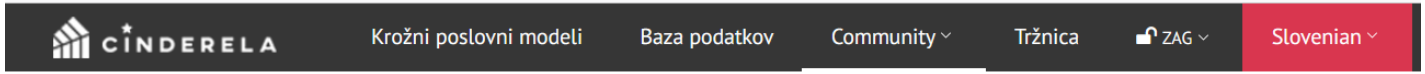
The product range also includes a variety of low thresholds such as 150 mm thresholds, and a drained threshold to compliment the standard double and single ramp threshold.



Revit file: Download revit file

IFC file: Download IFC file

… ALI BI SI ŽELELI SAMO VEČ ZNANJA…



Platforma za e-učenje

Če želite postati Cinder svetovalec, se prijavite za našo platformo za e-izobraževanje.

Sharing knowledge and experiences is crucial in the transition towards a circular construction sector across Europe. As a way of facilitating this, the CINDERELA project will soon launch an e-learning platform. This platform provides stakeholders in the European construction industry with the skills and competences necessary to implement a Circular Economy Business Model.

Join now the CINDERELA e-learning community

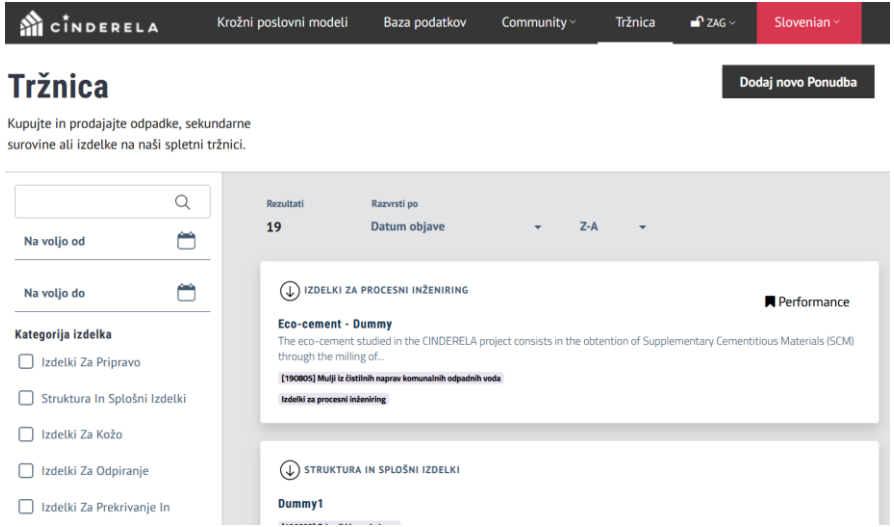
CINDERELA Massive Open Online Course

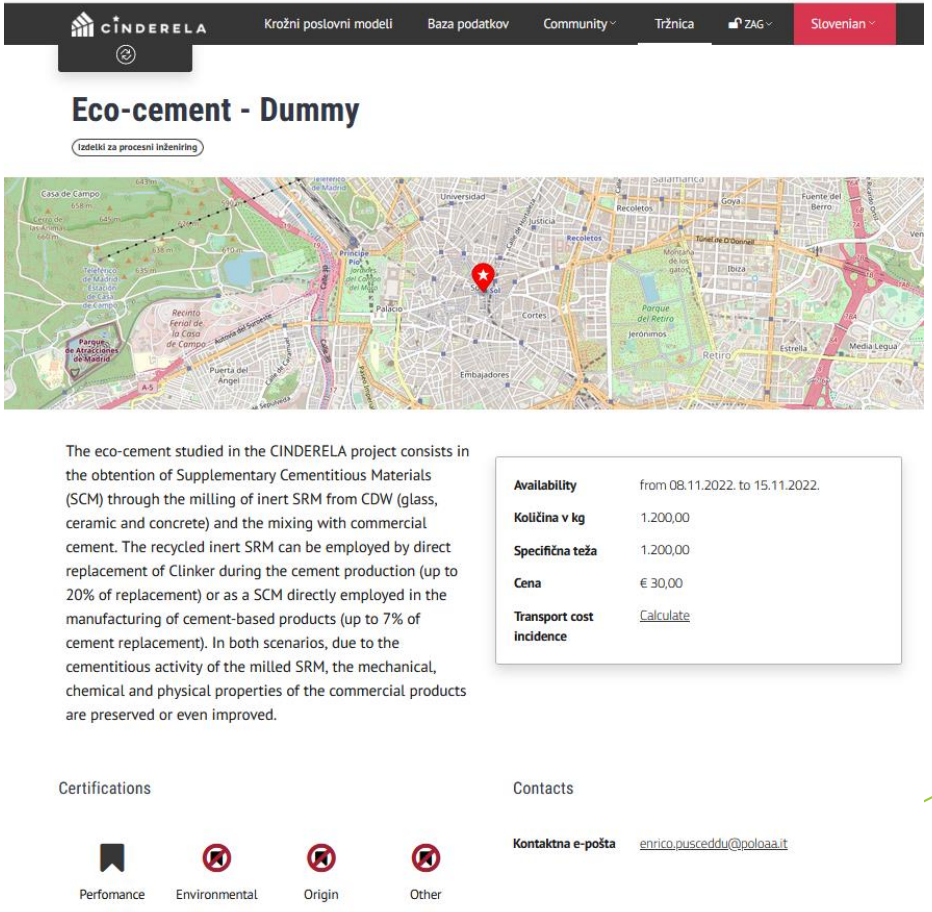
The e-learning platform will include a Massive Open Online Course (MOOC) with several learning modules related to circular construction. This learning environment will be openly accessible to anyone interested, and allows people to interact with each other and with the CINDERELA experts. Collaboration is facilitated through Q&A forums, chats and guided discussions.

As of now, the CINDERELA MOOC is divided into four consecutive learning modules with different sub-modules. While the project progresses, more modules might be added to enrich the learning process. The course structure is as follows:

Module 1 | Circular construction

…IN PA PONUDITE SVOJE PROIZVODE, KUPUJTE NA SPLETNI TRŽNICI





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+386 1 2804 25

SKUPINA JHMB | Digrad Z vami že od 1857

POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI

Interreg CENTRAL EUROPE | Co-funded by the European Union

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DOBRE PRAKSE: BANKA GRADBENIH MATERIALOV



PROJEKT LIFE RESTART

- Sofinanciran s strani Evropske unije v sklopu programa LIFE.
- Osredotoča se na premagovanje ovir pri doseganju ciljev EU glede recikliranja ter na doseganje popolnega izvajanja Programa ravnanja z odpadki in programa preprečevanja odpadkov.
- Zmanjšanje emisij CO2 za 20 % zaradi izboljšanega ravnanja.
- Povečanje recikliranja za približno 18 % (2 % na leto).
- Recikliranje 50 % nenevarnih gradbenih odpadkov.
- Projekt bo Nigradu omogočil, da bo prvi na področju prodaje in predelave sekundarnih materialov ter tudi pri dokazovanju samega izvora sekundarnih materialov s pomočjo materialnih potnih listov.



ReStari

Life

BANKA MATERIALOV

- Skladišča ali zaloge dragocenih materialov, ki bi jih bilo mogoče obnoviti. Ti materiali bi lahko nadomestili primarne vire, ki se uporabljajo pri gradnji, obratovanju ali obnovi stavb in druge infrastrukture (odpravi potreba po pridobivanju primarnih virov).
- Obnova: tehnološki postopek ločevanja dragocenih materialov ali gradbenih delov od stavbe ali sklopa, v katerega so bili nekoč vgrajeni, ali od odpadkov, tako da se ohrani ali ponovno poveča njihova vrednost.
- Zbiranje materialov: pridobivanje materialov iz obstoječe infrastrukture z namenom njihove ponovne uporabe, recikliranja ali biološke razgradnje ter uresničitve tehnične ali biološke snovne zanke.
- Zbiranje sestavnih delov: pridobivanje sestavljenih materialov iz obstoječih stavb oz. infrastrukture z namenom njihove ponovne uporabe ali recikliranja in uresničitve tehnične snovne zanke.
- Prav tako ima banko materialov tudi Nigrad (slika desno spodaj)















ODLOK MOM

- »Odlok o načinu opravljanja lokalne gospodarske javne službe rednega vzdrževanja občinskih javnih cest in drugih prometnih površin v Mestni občini Maribor«
- Z odlokom postali izvajalec javne službe in krovni prevzemnik odpadkov za Maribor.
- Namen je širitev dejavnosti ter trajnostnega in zelenega naročanja.
- Določa organizacijsko in prostorsko zasnovo javne službe, vrste in obseg javne službe ter njeno prostorsko razporeditev.
- Pooblastila za prevzem določenih vrst nenevarnih gradbenih odpadkov, izvajanje določenih nalog lokalne geodetske službe, nadzor nad izvajanjem določb odloka, pogodba o izvajanju javne službe, končna določba.





HVALA ZA POZORNOST!

Mag. Sergej Gutsmandl, vodja razvoja v Javnem podjetju Nigrad, d.o.o.

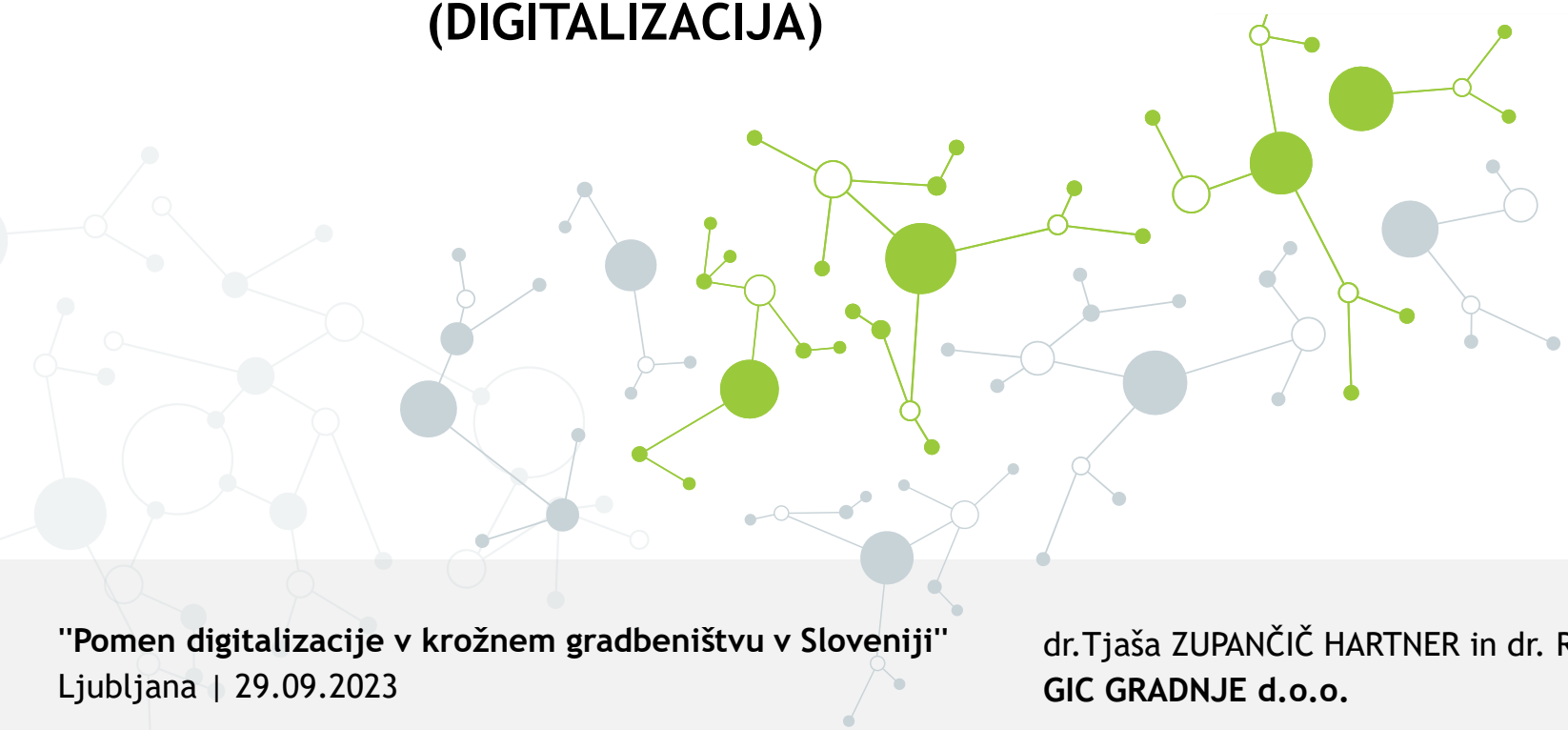
29.09.2023

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TRAJNOSTNA GRADNJA KROŽNO GOSPODARSTVO (DIGITALIZACIJA)



"Pomen digitalizacije v krožnem gradbeništvu v Sloveniji"
Ljubljana | 29.09.2023

dr.Tjaša ZUPANČIČ HARTNER in dr. Rok CAJZEK
GIC GRADNJE d.o.o.

GIC GRADNJE D.O.O.

1. Trajnostna gradnja
2. Omogočitvene tehnologije
3. Krožno gospodarstvo

VIZIJA

Ustvarjati trajnostno gradbeno podjetje z največjo dodano vrednostjo za sodelavce in naročnike

POSLANSTVO

Ustvarjamo novo gradbeno kulturo

GIC GRADNJE ROGAŠKA



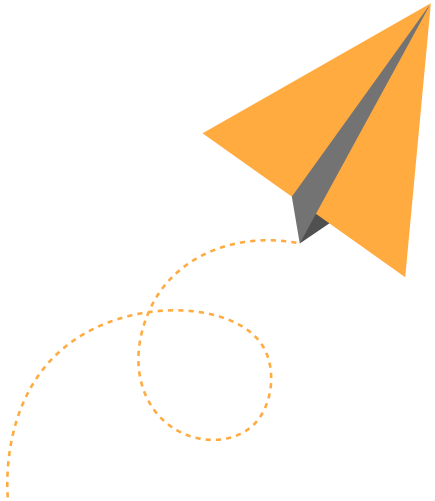
TRAJNOSTNA GRADNJA **KROŽNO GOSPODARSTVO**

digitalizacija

Trajnost v gradbeni industriji pomeni upoštevanje življenjskega cikla stavb celostno in kot cikel.

1. TRAJNOSTNA GRADNJA

Je koncept v katerem se povežejo vsi deležniki verig vrednosti, ki imajo enake cilje, vrednote.



- materiali z nizko stopnjo emisij in energije
- **vitki gradbeni procesi**
- energijska učinkovitost in ekonomičnost
- **učinkovita razgradnja ali ponovna uporaba posameznih delov/materialov**
- uporabniku prijazno
- **prstni odtis objekta**

GIC GRADNJE ROGAŠKA

2. OMOGOČITVENE TEHNOLOGIJE

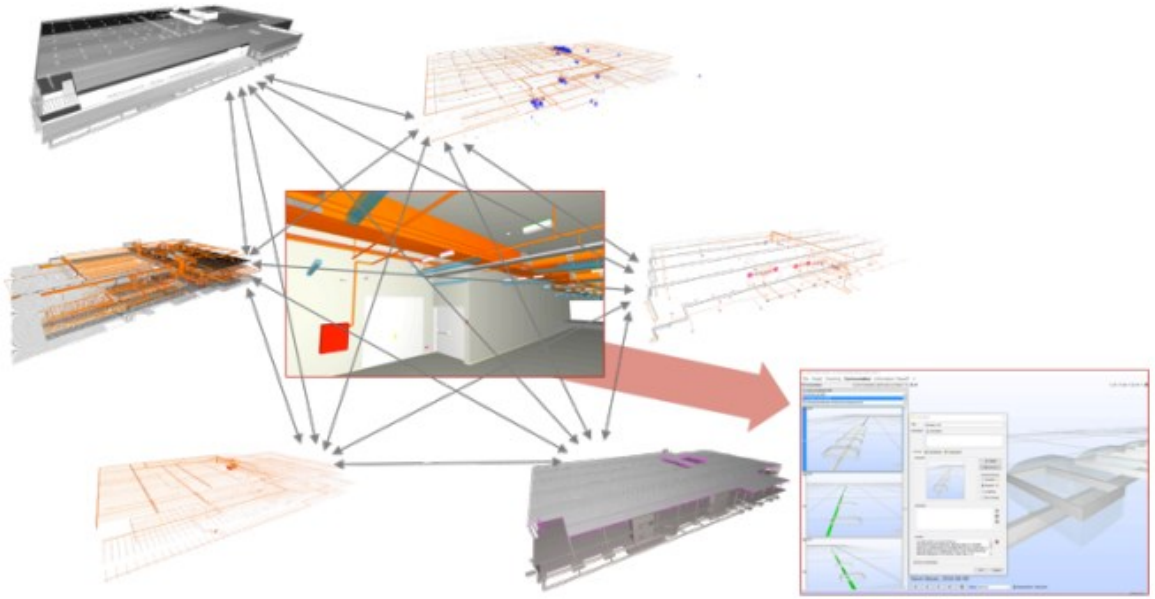
So orodja, pripomočki za digitalizacijo procesov, kot temelj za transformacijo panoge.



- **BIM** (Building Information Modeling)
- **Velepodatki** (Big Data)
- Internet stvari **(IoT**)
- **Strojno učenje** (ML)
- Veriženje podatkov (**BlockChain**)
- **AR**(AugmentedReality)in**VR** (VirtualReality)
- **AM**(AdditiveManufacturing)-dodajalne tehnologije (**3Dprint**)

GIC GRADNJE ROGAŠKA

OMOGOČITVENE TEHNOLOGIJE



Shematični prikaz koordinacijskega modela, ki združuje več podmodelov, *Vir: IZS: priročnik: BIM*

- **BIM**

(Building Information Modeling)

RAZVOJNI PROJEKTI

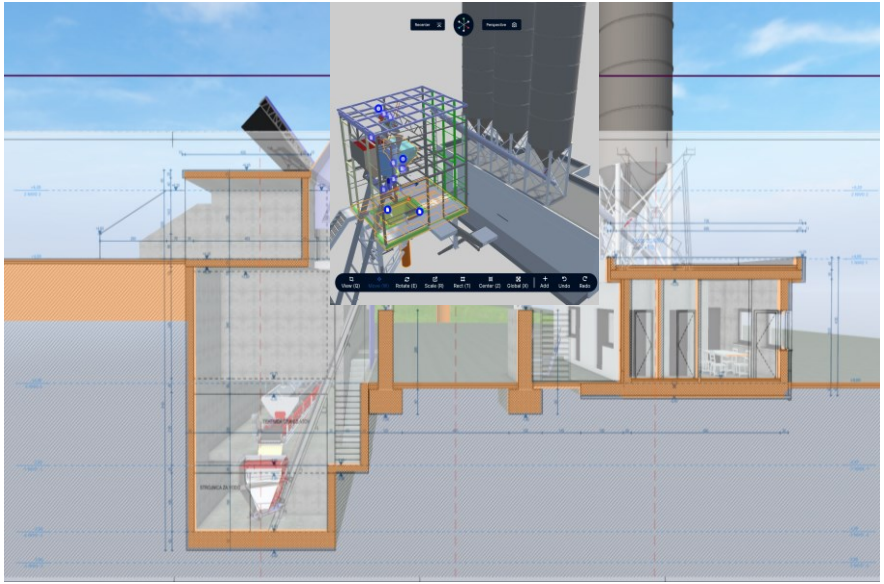
SPIRIT SLOVENIA

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA GOSPODARSTVO, TURIZEM IN ŠPORT

Financira Evropska unija
NextGenerationEU

NOO
NAČRT ZA OKREVANJE IN ODPORNOST

Javni razpis za spodbujanje velikih investicij za večjo dodano vrednost in konkurenčnost v Republiki Sloveniji



GIC GRADNJE ROGAŠKA

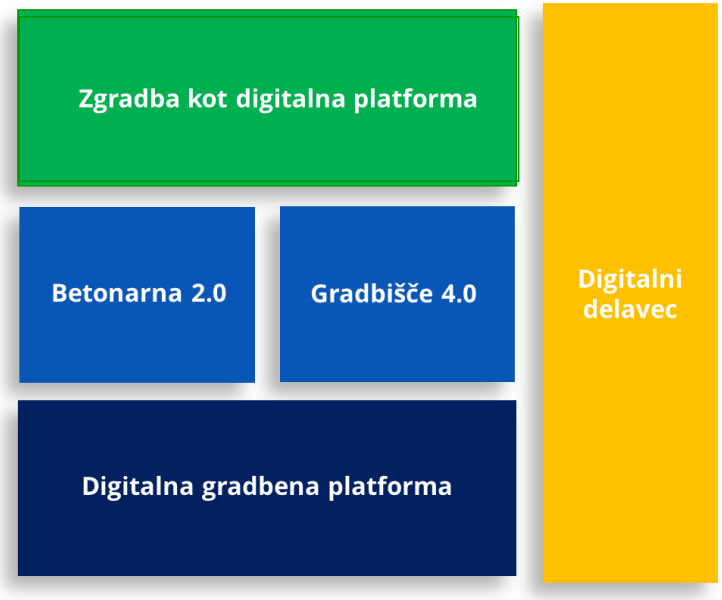
RAZVOJNI PROJEKTI

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA GOSPODARSTVO, TURIZEM IN ŠPORT

Financira Evropska unija
NextGenerationEU

NOO
NAČRT ZA OKREVANJE IN ODPORNOST

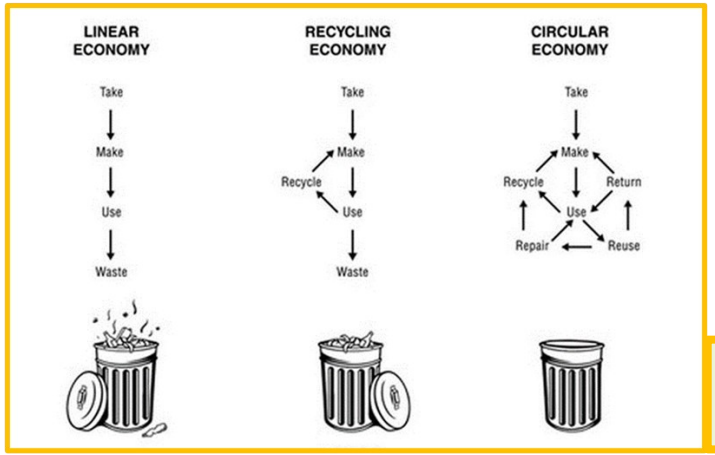
Javni razpis „Digitalna preobrazba gospodarstva“



GIC GRADNJE ROGAŠKA

3. KROŽNO GOSPODARSTVO

Krožno gospodarstvo je regenerativni gospodarski proces, ki zahteva spremembo paradigme, koncepta 'konca življenjske dobe' z zmanjševanjem, alternativno ponovno uporabo, recikliranjem in/ali predelavo npr. materialov.



KAJ LAHKO NAREDIMO? Osredotočimo se na ukrepanje.

Krožno gospodarstvo **ni cilj**, je le ORODJE s **CILJEM: za bolj trajnostno, uravnoteženo prihodnost.**

Neopredmeteni stroški

GIC GRADNJE ROGAŠKA

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ROGAŠKA

gradnje@gic-gradnje.si
03/81 82 830
www.gic-gradnje.si

HVALA ZA POZORNOST



VZGOJENI VZGAJAJO USPEŠNO.

SLOVENSKI PREGOVOR

dr. Tjaša ZUPANČIČ HARTNER

Univerza v Mariboru

Fakulteta za kemijo in kemijsko tehnologijo

Interreg CENTRAL EUROPE

Co-funded by the European Union

ReBuilt

Potencial izobraževanja o krožnem gospodarstvu v Sloveniji:

Celovit pristop za večkriterijsko odločanje in doseganje trajnostnih rešitev

Pomen digitalizacije v krožnem gospodarstvu v Sloveniji
Online | 29 September 2023

Zorka Novak Pintarič

FORMALNO IZOBRAŽEVANJE O KROŽNEM GOSPODARSTVU

- Zeleno in krožno gospodarstvo, UP, Fakulteta za management (mag)
- Krožno gospodarstvo, UL, Ekonomska fakulteta (obštudijska dejavnost)
- Tehnologije in inovacije za krožno gospodarstvo, UM FL

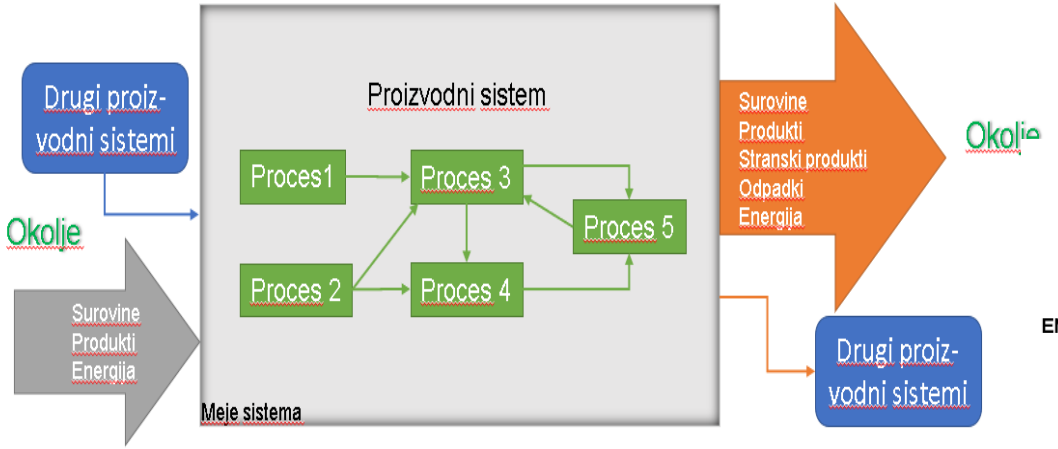
PROJEKTI KROŽNEGA GOSPODARSTVA

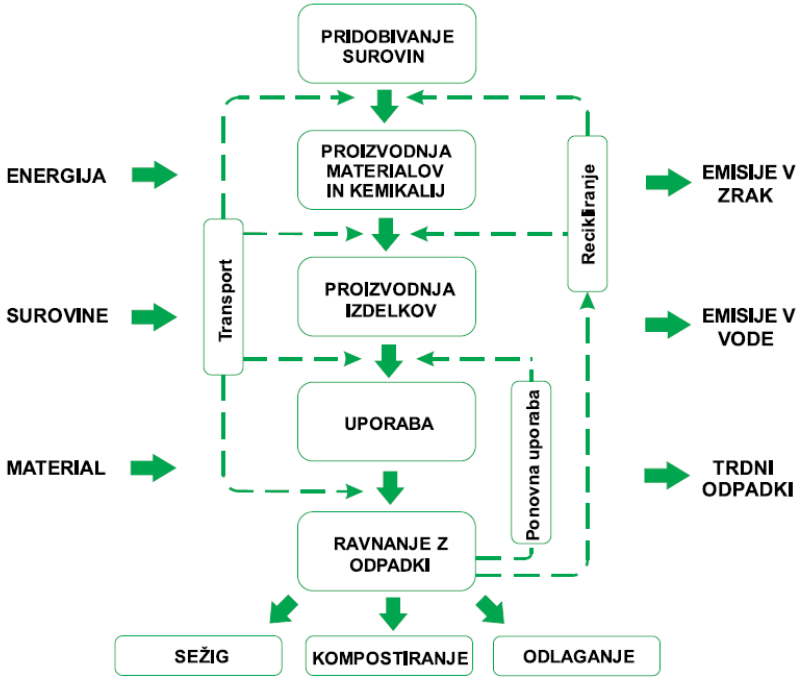
- Se razlikujejo od ‘klasičnih’ projektov
- Tehnologije so malo raziskane
- Zahtevne raziskave in razvoj
- Investicije so praviloma visoke
- Malo razvita infrastruktura
- Koristi praviloma niso visoko dobičkonosne
- Klasični ekonomski kazalci so neugodni
- Dolgoročni projekti z nizko dodano vrednostjo
- Potrpežljiv (patient) kapital
- Pomen zakonodaje

POTREBNA ZNANJA

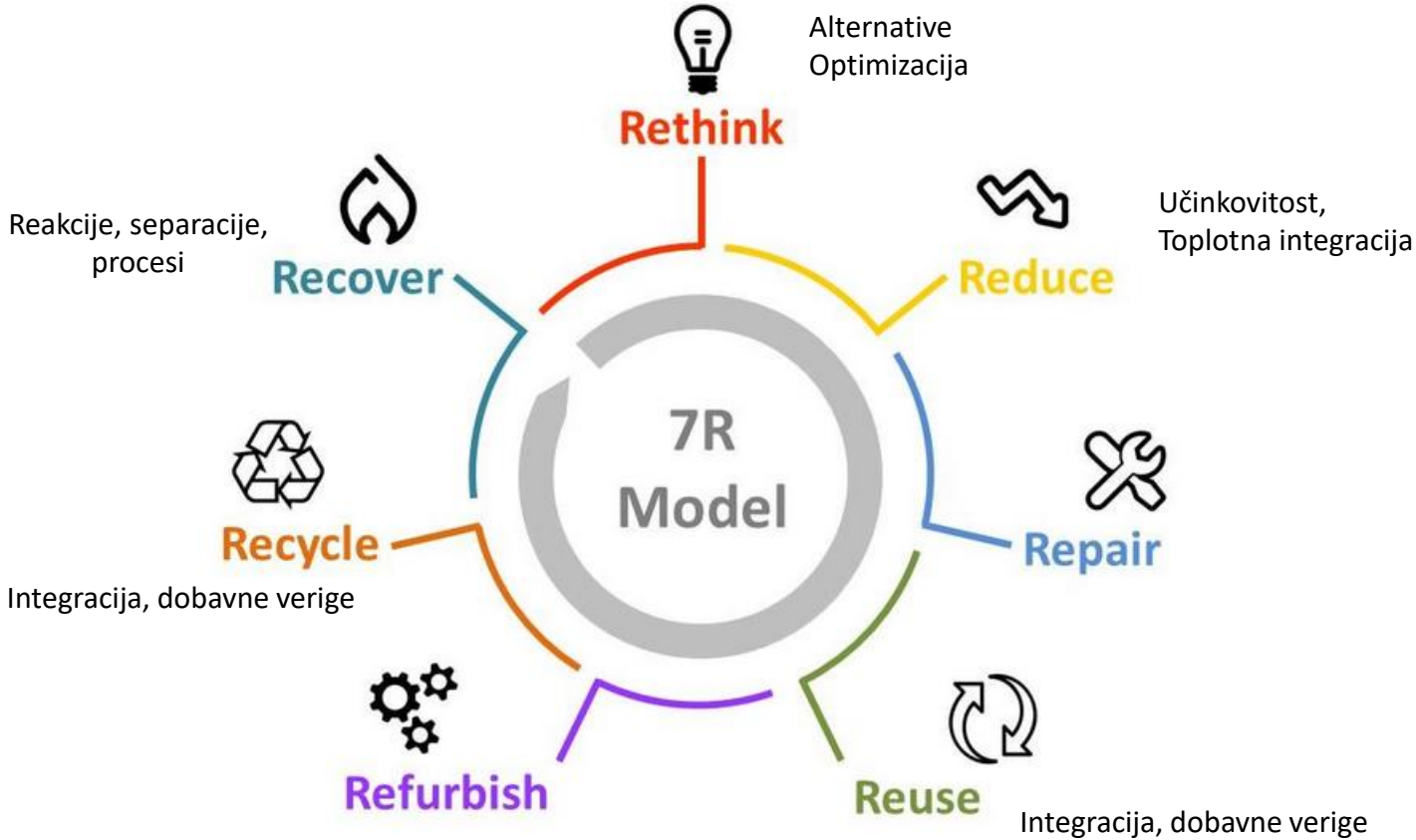
- Kemijsko fizikalne lastnosti
- Masne in energijske bilance
- Reakcije, separacije
- Tehnologije in procesi
- Učinkovitost
- Ekonomika
- Okoljski vplivi
- Računalništvo

PROCESNO SISTEMSKI PRISTOP





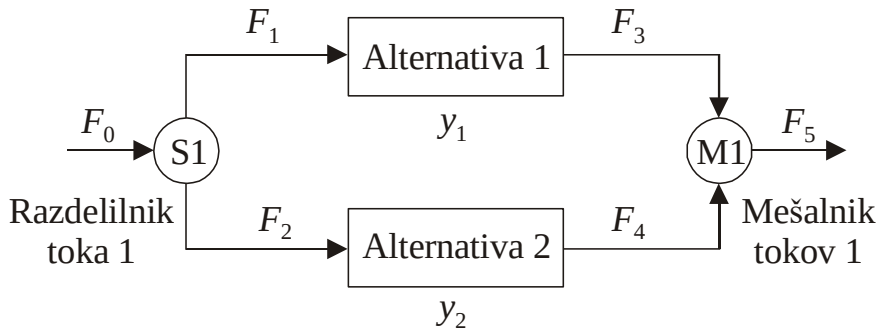
PROCESNO SISTEMSKI PRISTOP



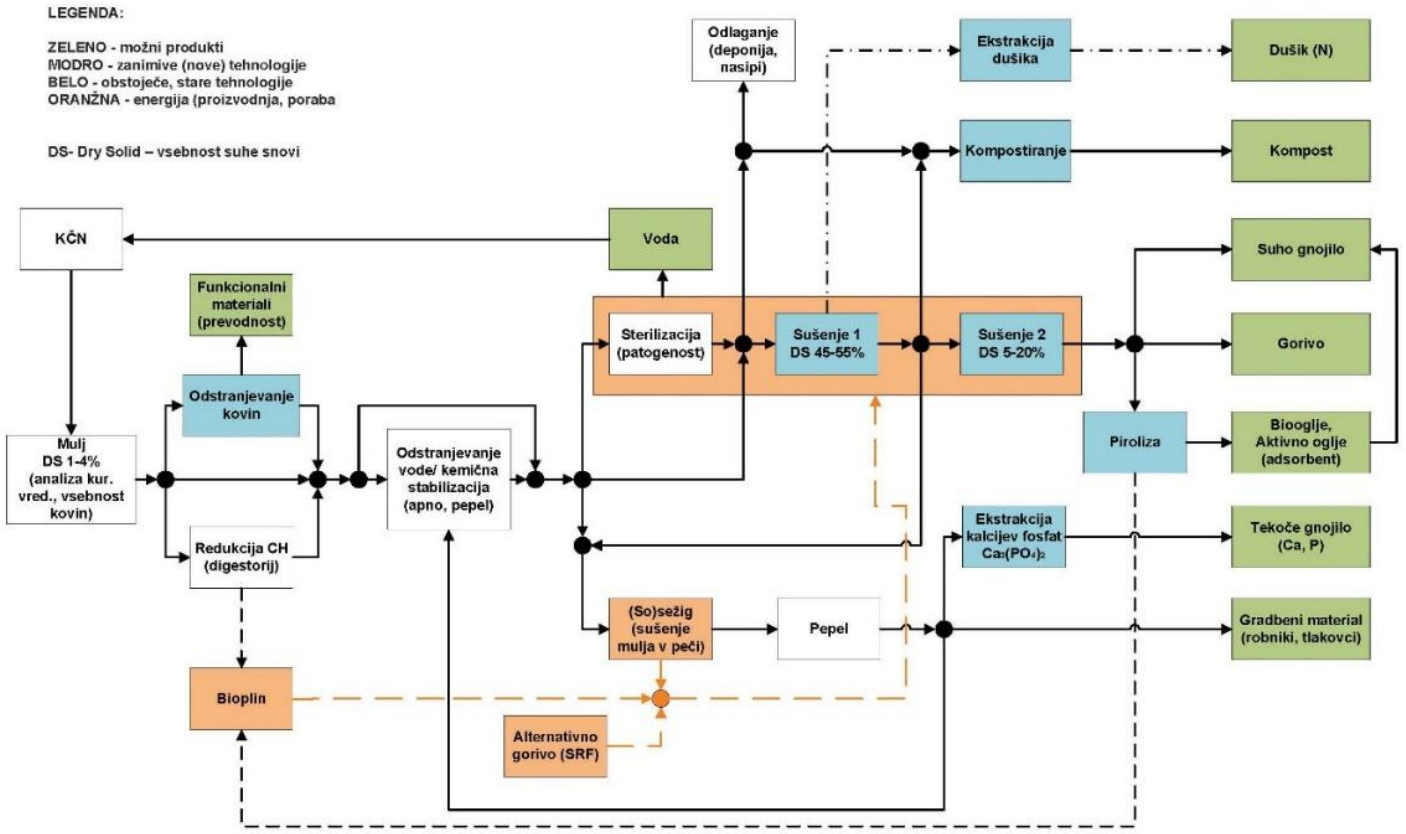
MODELIRANJE, OPTIMIZACIJA

Izbor optimalnih tehnologij, produktov, ukrepov

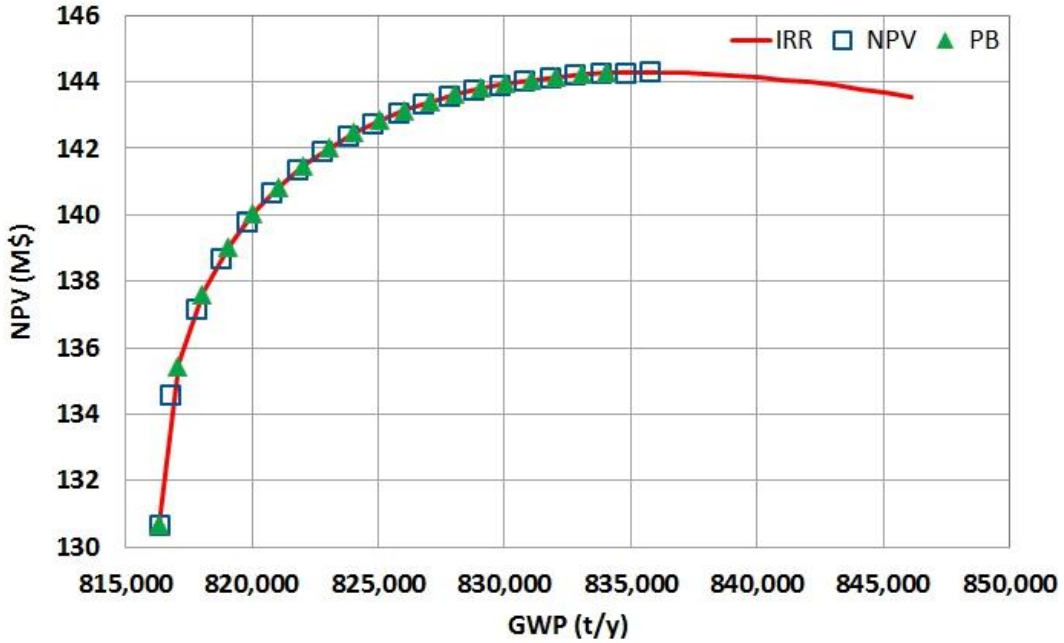
$\max Z = f(y, x)$	optimizacijski kriterij
$h\,(y, x) = 0$	bilance, načrtovalske enačbe
$g\,(y, x) \leq 0$	specifikacije, logični pogoji
$y \in Y$	binarne spremenljivke za izbor alternativ (0 ali 1)
$x \in X$	zvezne spremenljivke



PRIMER – IZBOR TEHNOLOGIJ IN PRODUKTOV



VEČKRITERIJSKO ODLOČANJE



VEČKRITERIJSKO ODLOČANJE

$$TNSV = NSV^{\text{Ekon}} + NSV^{\text{Okolj}} + NSV^{\text{Soc}}$$

Ekonomska NSV

- ✓ Investicija
- ✓ Diskontirani denarni tokovi (prihodki, odhodki, olajšave)

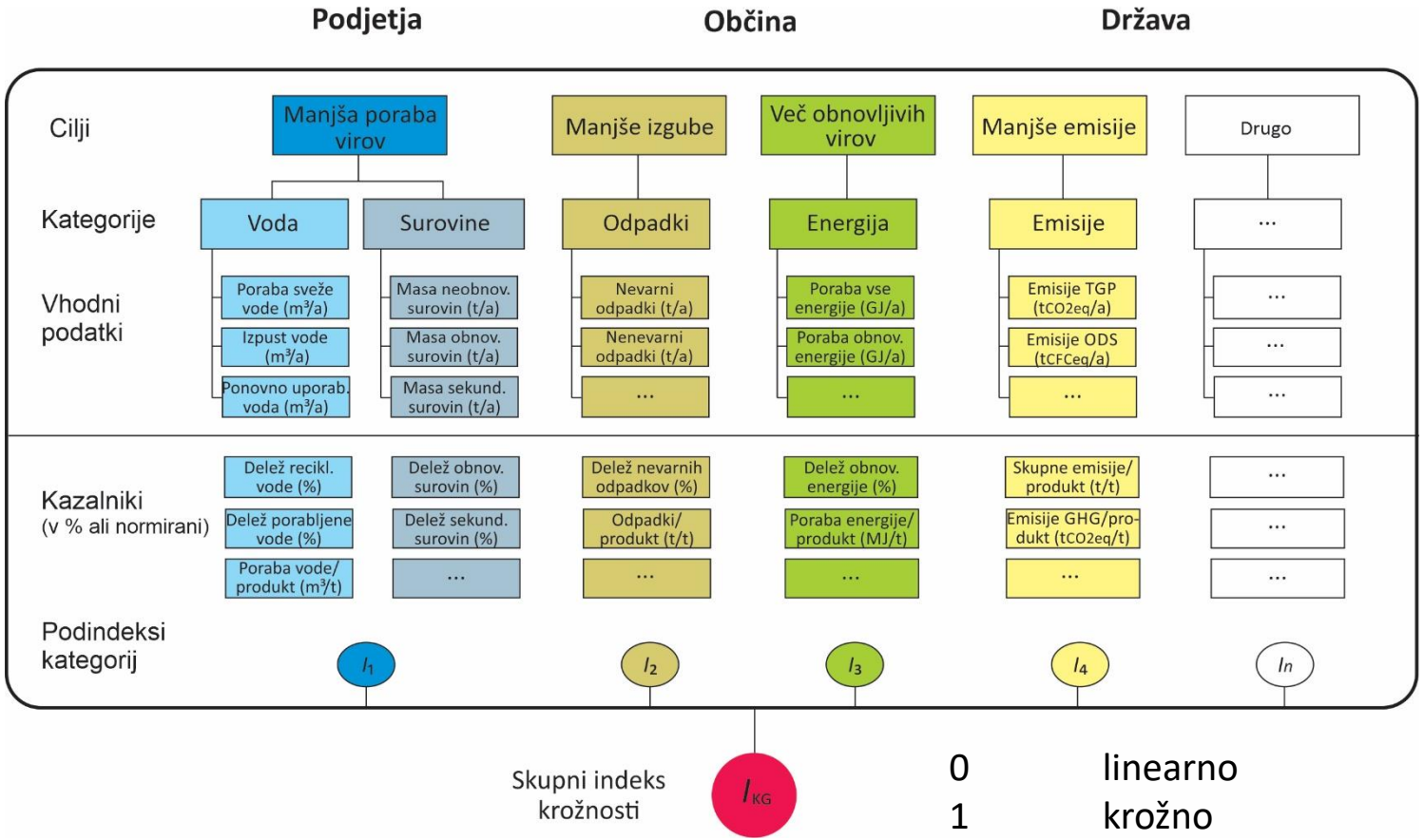
Okoljska NSV

- ✓ Eko-investicija
- ✓ Eko stroški razbremenitve in obremenitve okolja

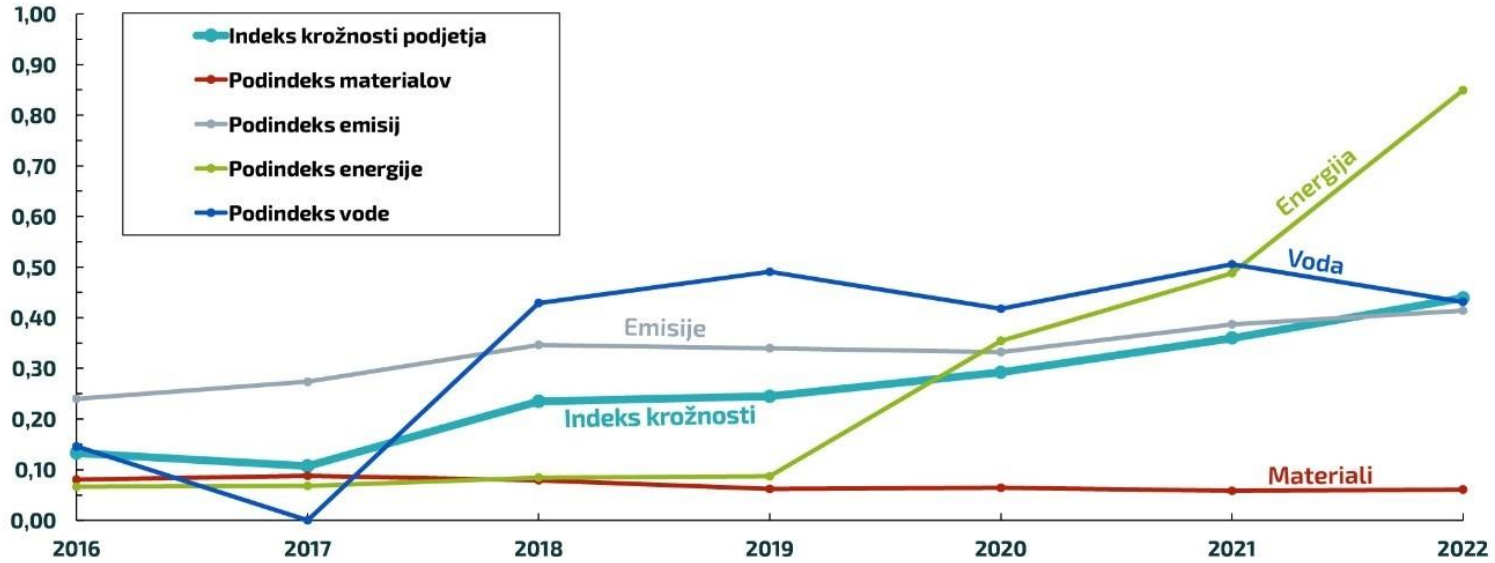
Socialna NSV

- ✓ Socialni prispevki
- ✓ Zmanjšanje socialnih transferjev ob novih zaposlitvah

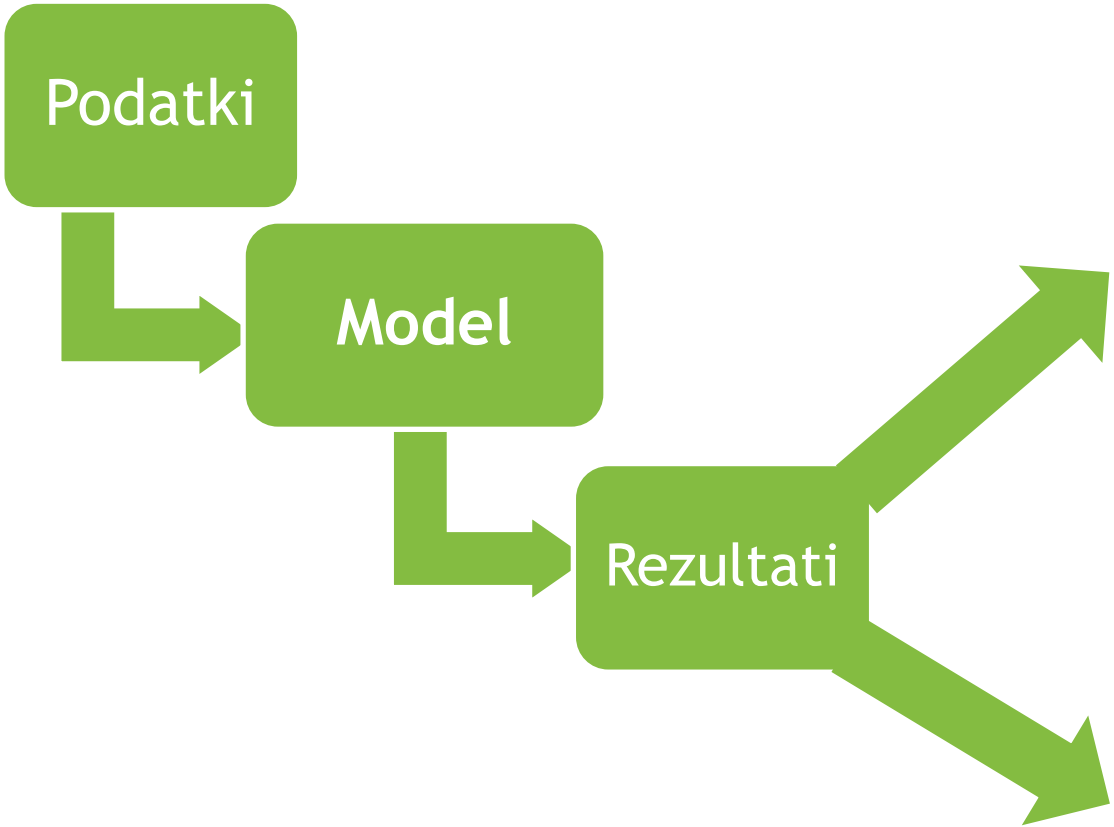
VEČKRITERIJSKO ODLOČANJE - INDEKS KROŽNOSTI



INDEKS KROŽNOSTI ZA PODJETJE



PRIMER OPTIMIRANJE PREHRANSKE VERIGE V SLOVENIJI



- Površine za pridelke
- Načini pridelave
- Mase pridelkov
- Število živali
- Uvoz, izvoz hrane
- Okoljski vplivi
- Ekonomika
- Stopnja samooskrbe

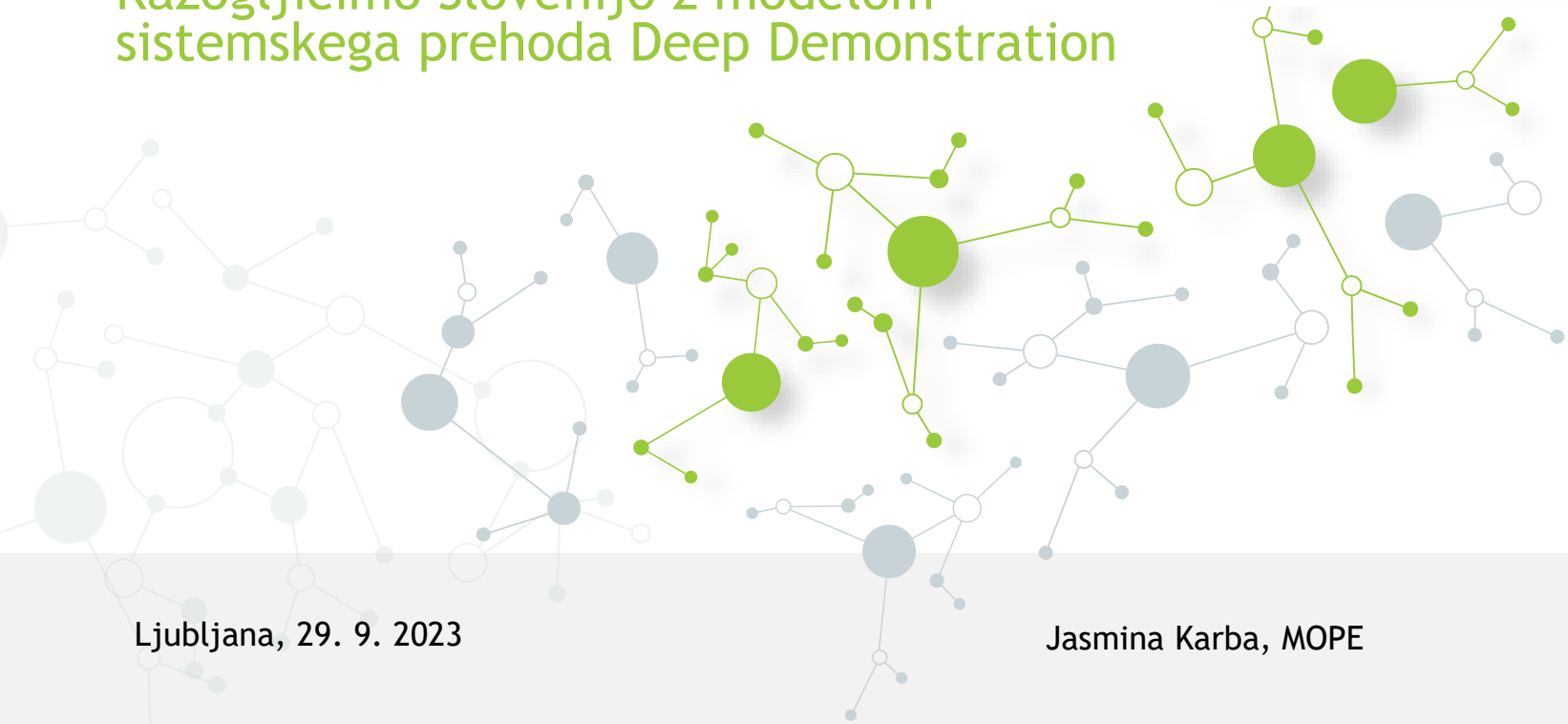
KAKO DOSEČI KROŽNO KMETIJSTVO (PRIMER UPORABE PROCESNO SISTEMSKEGA PRISTOPA)

- Matematični model prehranske verige
- Kriterij za odločanje: indeks krožnosti
- Večperiodno optimiranje do npr. leta 2050
- Izbor optimalnih ukrepov v vsaki periodi, npr.:
  - ✓ Načini pridelave (ekološka, precizno kmetijstvo)
  - ✓ Zbiranje vode, namakanje
  - ✓ Optimizacija vnosa beljakovin rastlinskega in živalskega izvora
  - ✓ Ustaviti izvoz hrane živalskega izvora in krme
  - ✓ Lokalna proizvodnja
  - ✓ Naravna, obnovljiva gnojila
  - ✓ Zmanjšanje in učinkovita izraba izgub in odpadne hrane za krmo
  - ✓ Digitalizacija (prepoznavanje vrst odpadne hrane)

REPUBLIKA SLOVENIJA
Ministrstvo za OKOLJE, PODNEBJE IN ENERGIJO
Langusova ulica 4, 1000 Ljubljana, Slovenija

Interreg CENTRAL EUROPE
Co-funded by the European Union
ReBuilt

Razogljičimo Slovenijo z modelom sistemskega prehoda Deep Demonstration



Ljubljana, 29. 9. 2023

Jasmina Karba, MOPE

Vizitka projekta

Projekt Vlade RS z namenom podpreti Slovenijo pri doseganju podnebnih ciljev

Izhodišče: **le sistemski ukrepi lahko učinkovito podprejo razogljičenje in preobrazbo sistemov zaradi** podnebnih izzivov

Zato: krepitev sposobnosti za sistemsko inoviranje z metodologijo Deep Demonstration **v soustvarjalnem procesu** slovenskih deležnikov in EIT Climate KIC (koordinacija na SLO strani: MJU)

Projekt je **inovacija sam po sebi** za Slovenijo in za EIT Climate KIC

Časovni okvir: nov 2021 – junij 2025

Finančni vir: **združena sredstva** Podnebnega sklada in EIT Climate KIC

Koordiniranje slovenskih deležnikov: **MJU (kontaktna oseba: Marjana Dermelj)**

https://www.gov.si/zbirke/projekti-in-programi/razogljicimo-slovenijo/

DEEP DEMONSTRATION SLOLOVENIJA = „SISTEMSKO“ NA „STRUKTURIRAN NAČIN“

1. podpora razogljičenju ključnih **verig vrednosti (graditvena, prehranska, gozdno-lesna, mobilnostna, proizvodna)**
2. vključevanje podnebni/krožnih vsebin na **horizontalna področja** podjetništva, izobraževanja, oblikovanja politik in finančnih instrumentov
3. dvig **usposobljenosti** in opolnomočenje vseh deležnikov, predvsem javnega sektorja, da bo bolje oblikoval in podpiral izvajanje ukrepov za razogljičenje družbe in prehod v krožno gospodarstvo.

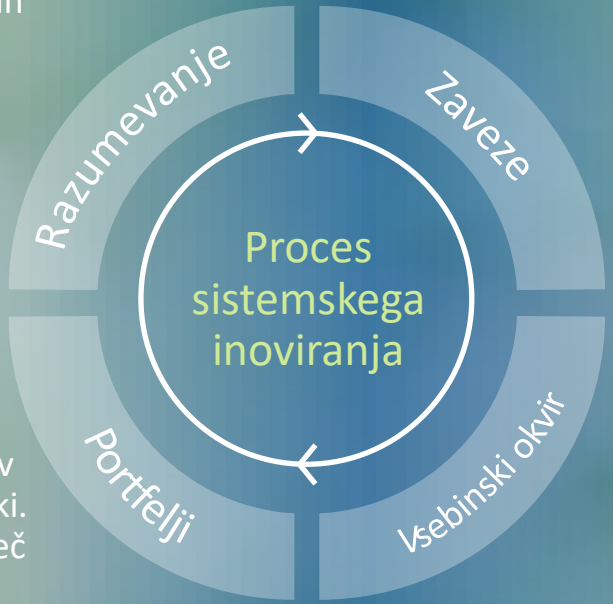
Proces sistemskega inoviranja (Deep Demonstration)

4 Osmišljanje s povratnimi zankami

Ustvarjanje razumevanja in znanja, ki je osnova za sprejemanje odločitev

1 Opredelitev namena in zavez

Vlada RS je opredelila razvojne zaveze, vključno s podnebnimi zavezami



3 **Portfelji inovacij**

Dinamično upravljanje portfeljev inovacij z multiplikativnimi učinki. Sistemske inovacije podpirajo več vzvodov sprememb hkrati na področjih s potencialom

2 Opredelitev področij inoviranja

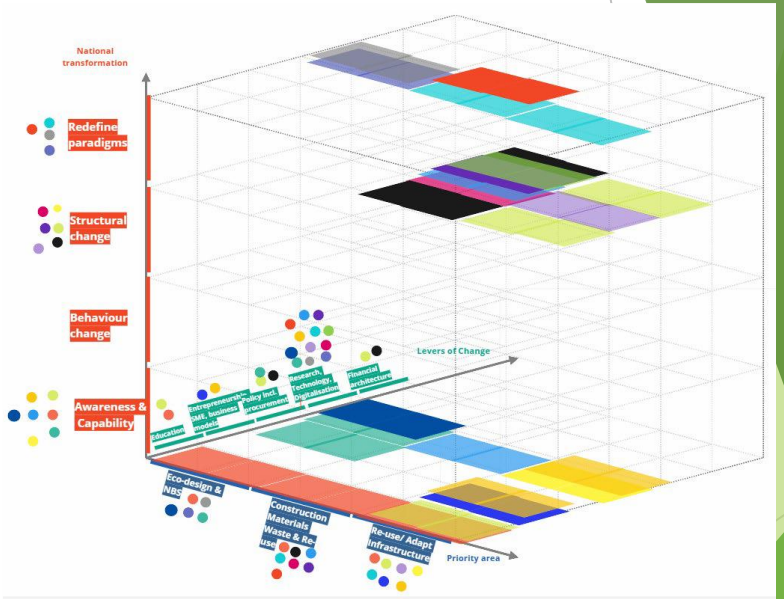
Osredotočanje na področja s potencialom, da njihova preobrazba ključno podpre podnebne cilje: 5 verig vrednosti in 4 horizontalna področja

eit Climate-KIC

Portfelj inovacij / ukrepov za graditveno verigo vrednosti -1

Koraki:

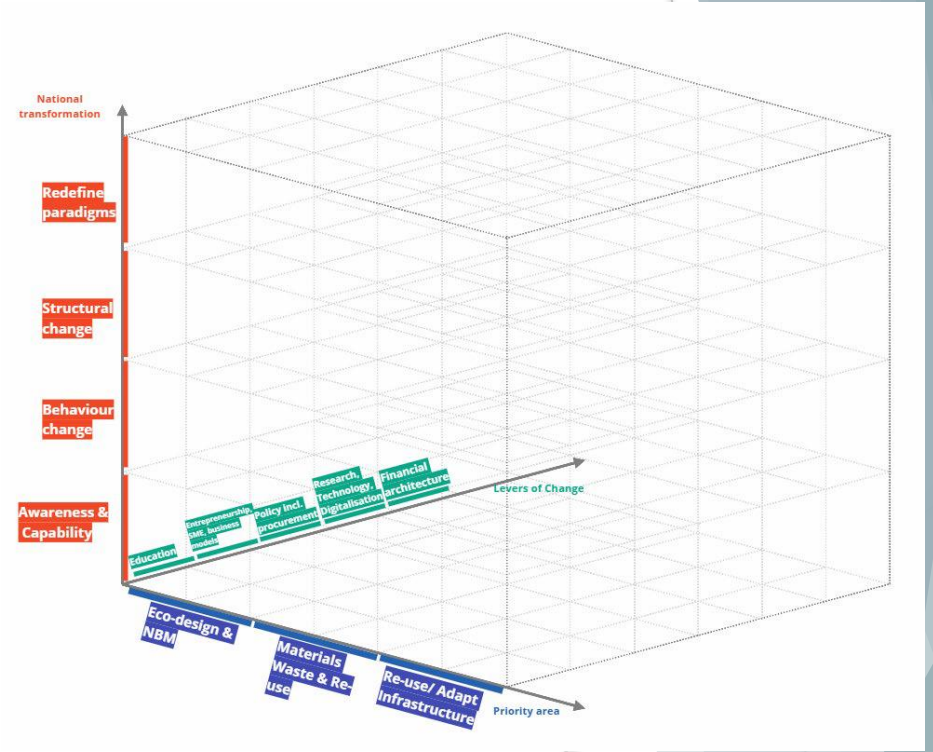
1. Robni pogoji portfelja
2. Identifikacija željenih stanj/ ciljev
3. Pregled obstoječih projektov/ukrepov/aktivnosti
4. Umestitev projektov v portfelj – na podlagi meril in glede na opredeljena željena stanja
5. Analiza rezultatov projektov, učenje iz rezultatov, iskanje stičnih točk, identifikacija vrzeli, prenos dognanj med projekti
6. Predlogi sistemskih inovacij = predlogi ukrepov
7. Aktiviranje ukrepov



Portfelj = vizualizacija dogajanja v sistemu, podlaga za odločanje.
Orodje, da z njim prepoznamo in podpremo ključne inovacijske priložnosti, ki lahko aktivirajo sistemski prehod sektorja.

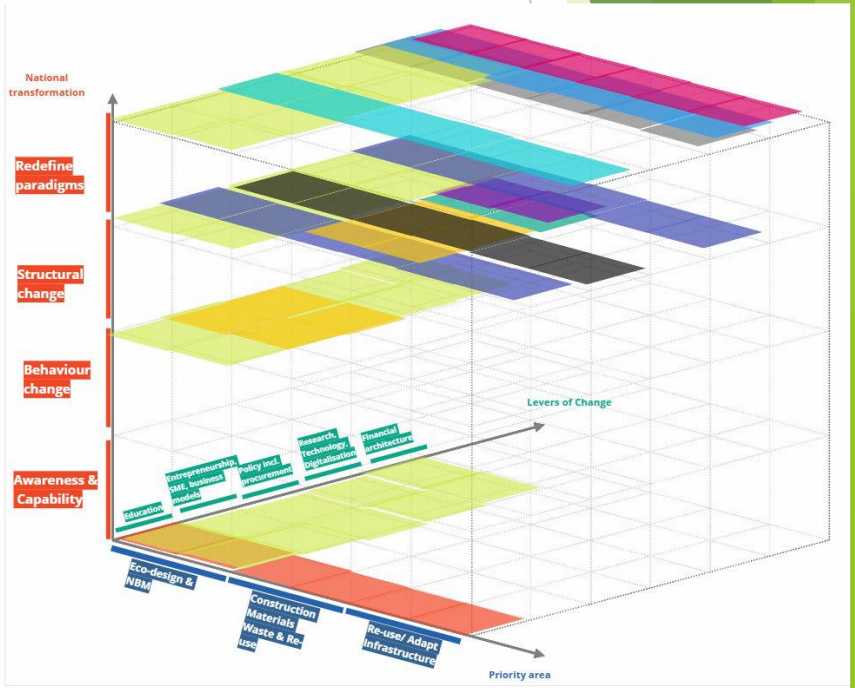
Portfelj inovacij / ukrepov za graditveno verigo vrednosti -2 (robni pogoji)

1. Področja preobrazbe sistema
   a) eko-dizajn in uporaba naravnih materialov
   b) uporaba sekundarnih materialov
   c) ponovna uporaba in prenova stavb
2. Vzvodi preobrazbe
   a) izobraževalni sistem
   b) načrtovanje politik (vklj. z ZJN)
   c) podjetniški sektor
   d) raziskave in inovacije
   e) finančni sistem
3. Raven preobrazbe
   a) zavedanje
   b) sprememba vzorcev obnašanja
   c) strukturna sprememba
   d) sprememba paradigme = raven, ko so izpolnjeni pogoji za preobrazbo



Portfelj inovacij / ukrepov za graditveno verigo vrednosti – 3 (identifikacija ciljev in njihova umestitev v portfelj

1. Usposobljeni inženirji in arhitekti
2. Uporaba bio-materialov
3. Vzpostavljeno podporno okolje za trajnostne poslovne modele
4. Ravnanje z gradbenimi odpadki, ki podpira krožnost
5. Vzpostavljena pravila (vklj. z ZJN) glede eko-dizajna, uporabe sekundarnih materialov in ponovno rabo/prenovo stavb
6. Vzpostavljen sistem označevanja stavb, ki so grajene/opremljene s sekundarnimi materiali
7. Vzpostavljen sistem sledenja materialom (potni list)
8. Finančni mehanizmi (spodbude, davki, …) podpirajo trajnostno/krožno gradnjo
9. Krožno prostorsko načrtovanje in graditev
10. Postopno do neto ničelne pozidave



Portfelj inovacij / ukrepov za graditveno verigo vrednosti – analiza in učenje in prenos dognanj med projekti, iskanje stičnih točk, identifikacija vrzeli

Rezultat: 9 področij za ukrepanje:

- Krepitev **podpornega ekosistema** za krožno gradbeništvo in industrijo gradbenega materiala
- **Digitalna platforma** za spodbujanje uporabe sekundarnih surovin
- Vključevanje načel trajnostne in krožne gradnje v izobraževalni sistem in vseživljenjsko učenje
- Načela krožne gradnje vključena v **Zeleno javno naročanje**
- Spodbujanje **prenove stavb** z materiali **iz lesa in celuloze**
- **Razgradnja stavb** podpira uporabo sekundarnih surovin
- **Digitalizacija** projektiranja in gradnje
- Prostorsko načrtovanje in ukrepi za trajnostno in krožno gradnjo
- Podpora **finančnih instrumentov** krožni prenovi stavb

Graditvena veriga vrednosti - 9 področij za ukrepanje – 1,2

1. Krepitev **podpornega sistema** za krožno gradbeništvo in industrijo gradbenega materiala

1.1 nadgradnja in harmonizacija pogojev in meril za dodelitev finančnih podpor iz javnih sredstev gospodarskim družbam

1.2 izvedba hekatonov za iskanje inovativnih rešitev

1.3 vzpostavitev enotne točke („vse na enem mestu“) z informacijami glede trajnostne in krožne gradnje (za investitorje in ponudnike) / nadgradnja obstoječih (SPIRIT, SPS)

1.4 spodbujanje prenosa/komercializacije tehnologij – povezovanje zagonskih podjetij in vlagateljev

1.5 razogljičenje produktov in poslovnih modelov z uporabo orodja IFT (Impact Forecast Tool)

1.6 spodbujanje lokalne uporabe gradbenih odpadkov za vzdrževanje lokalne infrastrukture (širjenje dobre prakse MOM)

1.7 vzpostavitev seznama ponudnikov trajnostne in krožne gradnje in prenove

2. Digitalna platforma za spodbujanje uporabe sekundarnih surovin

2.1 opredelitev tehničnih in vsebinskih specifikacij platforme / gostitelja platforme / vira sredstev za vzpostavitev in vzdrževanje

2.2 testna uporaba platforme iz projekta CinderOss

Graditvena veriga vrednosti - 9 področij za ukrepanje – 3, 4

3. Vključevanje načel trajnostne in krožne gradnje v izobraževalni sistem in vseživljenjsko učenje

3.1 uporaba rezultatov pilotnih projektov visokošolskih zavodov za zelen in odporen prehod v družbo 5.0 iz NOO

3.2 izdelava e-smernic za razumevanje razogljičenja izobraževalnega sistema, vključno z graditveno terminologijo

3.3 uporaba dognanj projekta Drive 0 (ponovna uporaba in sprememba namembnosti materialov iz razgradnje)

3.4 uporaba dognanj iz projektov C4C, Restart in Rebuilt za bolj učinkovito izobraževanje različnih ciljnih skupin in jih povezati z rezultati pilotnih projektov

3.5 krepitev sposobnosti ministrstev za kurikularno prenovo

3.6 uporaba mehanizma Usmeritve za pripravo Načrta za izvajanje študijske dejavnosti za področja, ki se dotikajo trajnostne gradnje

3.7 podpora SRIPom pri izvedbi usposabljanj

4. Načela krožne gradnje vključena v ZJN – z uporabo Stičišča za javne politike

4.1 za načrtovanje in izvedbo trajnostne sanacije poplavljenih območij

4.2 vključitev načel krožnega gospodarstva v ZJN

Graditvena veriga vrednosti - 9 področij za ukrepanje – 5, 6, 7

5. Prenova stavb z materialom iz lesa/celuloze

5.1 z boljšim ločevanjem, shranjevanjem in ponovno uporabo/recikliranjem lesenih odpadkov

5.2 s krepitvijo ponovne uporabe papirne celuloze in lesa za prenovo stavb

6. Razgradnja stavb podpira uporabo sekundarnih surovin

6.1 spodbujanje gradbenih in komunalnih podjetij za ponovno rabo/recikliranje gradbenih materialov/odpadkov od razgradnje stavb

6.2 prenos dognanj projekta Re-birth v prakso (navodila za razgradnjo stavb, …..)

6.3 revizija odpadkovne politike za bolj učinkovito uporabo odpadkov za sekundarne surovine

7. Digitalizacija projektiranja in gradnje

7.1 usposobljenost projektantov (in ozaveščanje investitorjev) za uporabo BIM

7.2 uporaba dognanj projekta Buildchain

7.3 podpore MSP za uvedbo BIM (vavčerski sistem za naložbe in izobraževanje)

Graditvena veriga vrednosti - 9 področij za ukrepanje – 8, 9

8. Prostorsko načrtovanje in ukrepi za trajnostno in krožno gradnjo

8.1 revizija mehanizmov prostorskega načrtovanja (uporaba razvrednotenih območij, Strategija prostorskega načrtovanja, Prostorski red, ….)

8.2 podpora trajnostni in krožni gradnji/prenovi stavb (nadgradnja tehnične pisarne za energetsko učinkovitost, vzpostaviti odgovornost upravnikov stavb za celovito prenovo, …)

8.3 podpora mestom, ki so del programa „podnebno nevtralna in pametna mesta“

9. Podpora finančnih instrumentov krožni prenovi stavb

9.1 revizija davka na nepremičnine

9.2 poraba javnih sredstev le za trajnostno in krožno gradnjo / prenovo javnih stavb

9.3 nadgraditi razpise Eko sklada z vključitvijo načel krožnega gospodarstva

Predvideni koraki aktivacije ukrepov:

- Sestanki za prvo povratno informacijo pristojnih organov
- Preverjanje ustreznosti in interesa z zunanjimi deležniki
- Predlogi za dopolnitve in prilagoditve in sinergije z obstoječimi aktivnostmi
- Zelena luč s strani DS (glede vsebine in glede vodenja procesa)



MS Teams – seznam udeležencev na strokovni spletni delavnici

29. 9. 2023

1. Povzetek

Naslov srečanja POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI

Ogledana stran za registracijo 70

Registriran 37

Preklicane registracije 1

Udeleženi 35

Začetni čas 29. 9. 23, 09:27:55

Končni čas 29. 9. 23, 14:58:44

Trajanje srečanja 5 h 30 min 49 s

Povprečni čas udeležbe 2 h 3 min 59 s

2. Udeleženci

Ime	Prva pridružitev	Čas zadnjega odhoda	Trajanje srečanja	E-poštni naslov (UPN)	ID udeleženca	Vloga	Ime registracije	Priimek registracije	E-poštni naslov za registracijo	Obrazec za registracijo	Stanje registracije	Telefonska številka	c32b5d07-924e-4abd-8b2b-d6c9817a2df0:Organizacija
Nina Kovačič	29. 9. 23, 09:28:02	29. 9. 23, 12:24:31	2 h 56 min 29 s	nina.kovacic@stajerskagz.si	nina.kovacic@stajerskagz.si	Organizator							

Dragica Marinič 29. 9. 23, 09:32:02 29. 9. 23, 14:58:44 5 h 26 min 42 s dragica.marinic@zag.si dragica.marinic@zag.si Predstavitelj

Alenka Mauko 29. 9. 23, 09:32:19 29. 9. 23, 12:24:31 2 h 52 min 12 s alenka.mauko@zag.si alenka.mauko@zag.si Predstavitelj

Tjaša Zupančič Hartner 29. 9. 23, 09:34:22 29. 9. 23, 12:21:16 2 h 46 min 53 s tjasa.zh@gic.si tjasa.zh@gic.si Predstavitelj

Jasmina Karba 29. 9. 23, 09:50:09 29. 9. 23, 12:20:53 2 h 30 min 44 s Jasmina.Karba@gov.si Jasmina.Karba@gov.si Predstavitelj

Bostjan Gomilsek 29. 9. 23, 09:51:02 29. 9. 23, 11:15:40 1 h 24 min 38 s bostjan.gomilsek@result.si bostja@result.si Predstavitelj Boštjan Gomilšek bostjan.gomilsek@result.si 29. 9. 23, 09:50:09 Registriran Slovenia Result d.o.o.

Janja Treiber 29. 9. 23, 09:51:06 29. 9. 23, 12:20:16 2 h 29 min 9 s Udeleženec

Sergej Gutsmandl | NIGRAD 29. 9. 23, 09:56:28 29. 9. 23, 12:14:43 2 h 18 min 15 s Sergej.Gutsmandl@nigrad.si Sergej.Gutsmandl@nigrad.si Predstavitelj

Antonija Božič Cerar 29. 9. 23, 09:56:48 29. 9. 23, 10:58:31 1 h 1 min 42 s antonija.cerar@gzs.si antonija.cerar@gzs.si Predstavitelj

Nuša Sluga | NIGRAD 29. 9. 23, 09:57:01 29. 9. 23, 12:14:41 2 h 17 min 40 s Nusa.Sluga@nigrad.si Nusa.Sluga@nigrad.si Udeleženec

Duška Gradišnik 29. 9. 23, 09:59:21 29. 9. 23, 12:21:18 2 h 21 min 56 s Udeleženec Duška Gradišnik Dusana.Gradisnik@Dri.si 25. 9. 23, 10:05:50 Registriran 031 390 584 DRI d. o. o.

mn 29. 9. 23, 09:59:22 29. 9. 23, 12:21:42 2 h 22 min 20 s Udeleženec

Sašo Blatešič 29. 9. 23, 09:59:22 29. 9. 23, 12:22:01 2 h 22 min 38 s saso.blatesic@slovenjgradec.si saso.blatesic@slovenjgradec.si Udeleženec Sašo Blatešič saso.blatesic@slovenjgradec.si 25. 9. 23, 13:24:12 Registriran 051 303 170 MOSG

Bojan Sušec 29. 9. 23, 09:59:22 29. 9. 23, 11:40:30 1 h 41 min 7 s bojan.susec@lumar.si bojan.susec@lumar.si Udeleženec

Stanislav Leben DRI d.o.o. 29. 9. 23, 09:59:27 29. 9. 23, 12:21:57 2 h 22 min 29 s Udeleženec Stanislav Leben Stanislav.Leben@dri.si 26. 9. 23, 08:11:37 Registriran 51330488 DRI d.o.o.

Brglez Medeja 29. 9. 23, 09:59:27 29. 9. 23, 12:21:36 2 h 22 min 8 s medeja.brglez@forum-media.si medeja.brglez@forum-media.si Udeleženec Medeja Brglez medeja.brglez@forum-media.si 27. 9. 23, 17:43:07 Registriran 386 2 230 28 56 Forum Media

Robert Klinc 29. 9. 23, 09:59:57 29. 9. 23, 11:35:12 1 h 35 min 14 s Udeleženec

Lara Mohoric Eller 29. 9. 23, 10:00:51 29. 9. 23, 12:21:09 2 h 19 min 3 s lmohor18@student.aau.dk lmohor18@student.aau.dk Udeleženec Lara Eller lmohor18@student.aau.dk 25. 9. 23, 12:58:11 Registriran 4520753009 ZAG in Aalborg University

Mirko Troha 29. 9. 23, 10:00:59 29. 9. 23, 12:21:46 2 h 20 min 46 s mirko.troha@axis.si mirko.troha@axis.si Udeleženec Bogomir Troha mirkotroha@gmail.com 28. 9. 23, 08:41:26 Registriran Slovenija Axis

Valneja Erat 29. 9. 23, 10:01:06 29. 9. 23, 12:15:04 2 h 13 min 57 s valneja.erat@result.si eratv@result.si Udeleženec Valneja Erat valneja.erat@result.si 25. 9. 23, 08:18:35 Registriran 31793622 Result

Katja ZAG (Guest) 29. 9. 23, 10:01:09 29. 9. 23, 11:12:48 1 h 11 min 38 s Udeleženec Katja Slanc katja.slanc@zag.si 27. 9. 23, 09:20:17 Registriran 51376102 Zavod za gradbeništvo Slovenije

Irena Ravnikar Levec 29. 9. 23, 10:01:39 29. 9. 23, 12:21:21 2 h 19 min 41 s Udeleženec Irena Ravnikar Levec irena.ravnikar-levec@dri.si 25. 9. 23, 10:55:51 Registriran 41862497 DRI

milan (Gost) 29. 9. 23, 10:02:06 29. 9. 23, 10:42:51 40 min 44 s Udeleženec

Švagelj (Gost) 29. 9. 23, 10:02:22 29. 9. 23, 12:21:53 2 h 19 min 30 s Udeleženec Iztok Švagelj iztok.svagelj@dri.si 25. 9. 23, 10:33:38 Registriran Slovenija DRI

Ivan Grašič 29. 9. 23, 10:02:23 29. 9. 23, 12:21:20 2 h 18 min 57 s Udeleženec

Lea Vrečar Capuder 29. 9. 23, 10:02:29 29. 9. 23, 12:21:44 2 h 19 min 15 s Udeleženec

Aljaž Meisnger - PRIOT Digital Systems 29. 9. 23, 10:03:30 29. 9. 23, 12:10:54 2 h 7 min 23 s Udeleženec Aljaž Mesinger aljaz@priot.io 23. 9. 23, 19:26:00 Registriran 51894641 PRIOT Digital Systems

Zoran Pučko 29. 9. 23, 10:04:00 29. 9. 23, 12:21:48 2 h 17 min 48 s zoran.pucko@watchbuilt.com zoran.pucko@watchbuilt.com Udeleženec

Borut Hojnik | NIGRAD 29. 9. 23, 10:04:41 29. 9. 23, 12:18:08 2 h 12 min 20 s Borut.Hojnik@nigrad.si Borut.Hojnik@nigrad.si Udeleženec Borout Hojnik borut.hojnik@nigrad.si 29. 9. 23, 09:04:35 Registriran 51298688 Javno podjetje Nigrad, d.o.o.

Tadej Slapnik, Hashnet 29. 9. 23, 10:16:44 29. 9. 23, 11:44:39 1 h 27 min 54 s Udeleženec Tadej Slapnik tadej.slapnik@tolar.io 25. 9. 23, 13:55:50 Registriran 31348930 Hashnet d.o.o.

Andrej DOVER 29. 9. 23, 10:24:21 29. 9. 23, 11:58:17 1 h 33 min 56 s Andrej.DOVER@rra-podravje.si Andrej.DOVER@rra-podravje.si Udeleženec

Fujs, Damjan 29. 9. 23, 10:42:13 29. 9. 23, 10:54:40 12 min 27 s damjan.fujs@fri.uni-lj.si damjan.fujs@fri1.uni-lj.si Udeleženec Damjan Fujs damjan.fujs@fri.uni-lj.si 26. 9. 23, 15:21:17 Registriran 0 UL FRI

Valentina Kuzma 29. 9. 23, 11:00:42 29. 9. 23, 12:21:09 1 h 20 min 26 s valentina.kuzma@gzs.si valentina.kuzma@gzs.si Udeleženec VALENTINA KUZMA valentina.kuzma@gzs.si 29. 9. 23, 10:58:45 Registriran 01 5898 246 GZS

milan (Gost) 29. 9. 23, 11:02:54 29. 9. 23, 12:08:11 1 h 5 min 17 s Udeleženec

Zorka Novak Pintarič 29. 9. 23, 11:34:50 29. 9. 23, 12:21:13 46 min 23 s zorka.novak@um.si zorka.novak@um.si Predstavitelj

Bojan Sušec bojan.susec@lumar.si 22. 9. 23, 10:35:40 Registriran 51352098 Lumar IG, Maribor

Zoran Pučko zoran.pucko@um.si 22. 9. 23, 14:18:39 Registriran 040 251 537 UM Fakulteta za gradbeništvo, prometno inženirstvo in arhitekturo

Tjaša Zupančič Hartner Tjasa.zh@gic.si 23. 9. 23, 09:08:09 Registriran 041 279594 GIC GRADNJE d.o.o.

Blaž Jakopin blaz@priot.io 23. 9. 23, 15:19:01 Registriran 38640550371 PRIOT Digital Systems

Janja Treiber janja.treiber@dri.si 25. 9. 23, 08:05:32 Registriran 51313332 DRI upravljanje investicij d.o.o.

Nadja Košmrlj nadja.kosmrlj@dri.si 25. 9. 23, 08:48:49 Preklicano 041 380 256 DRI d. o. o.

jasmina KARBA jasmina.karba@gov.si 25. 9. 23, 09:09:43 Registriran 051 254 859 Ministrstvo za okolje, podnebne in energijo

Nina Kovačič nina.kovacic@stajerskagz.si 25. 9. 23, 09:27:35 Registriran 30667727 ŠGZ

Sergej Gutsmandl sergej.gutsmandl@nigrad.si 25. 9. 23, 12:40:48 Registriran +386 40 472 406 Javno podjetje, Nigrad

Nuša Sluga nusa.sluga@nigrad.si 25. 9. 23, 12:44:59 Registriran 41308855 Javno podjetje Nigrad, d.o.o.

Majda Potokar majda.potokar@tp-lj.si 25. 9. 23, 13:38:50 Registriran 041 66 11 59 Tehnološki park Ljubljana

Dare Stojan dare.stojan@avitel.si 25. 9. 23, 14:05:36 Registriran 041 662 049 Avitel Sonce d.o.o.

Tomo CEROVSEK tomo.cerovsek@fgg.uni-lj.si 26. 9. 23, 12:39:51 Registriran 38640297459 Univerza v Ljubljani

Andrej Dover andrej.dover@rra-podravje.si 26. 9. 23, 13:39:32 Registriran 041 444 464 Regionalna razvojna agencija za Podravje-Mariborr

Milan Zrim milan.zrim@aerogel.si 26. 9. 23, 14:44:57 Registriran 041 758217 TEHNOLOGIJE TVG Podsmreka

Ivan Grašič ivan.grasic@jelovica.si 26. 9. 23, 15:23:30 Registriran Slovenija Jelovica hiše d.o.o.

Alenka Mauko Pranjic alenka.mauko@zag.si 26. 9. 23, 16:48:53 Registriran 38612804251 ZAG

Alen Kegl projekt@roto.si 27. 9. 23, 07:35:17 Registriran Slovenija Roto ECO

Lea Vrečar Capuder lea.capuder@zag.si 27. 9. 23, 12:32:44 Registriran 041 393 814 ZAG, Služba za tehnične ocene in soglasja

Mojca Novak m.novak@dri.si 27. 9. 23, 14:34:51 Registriran 40476990 DRI

Robert Klinc robert.klinc@fgg.uni-lj.si 27. 9. 23, 19:30:35 Registriran 14768554 UL FGG

AJDA PIRŠ ZIDAR ajda.pirs@stajerskagz.si 28. 9. 23, 08:28:39 Registriran 31305608 ŠGZ

3. Dejavnosti med srečanjem

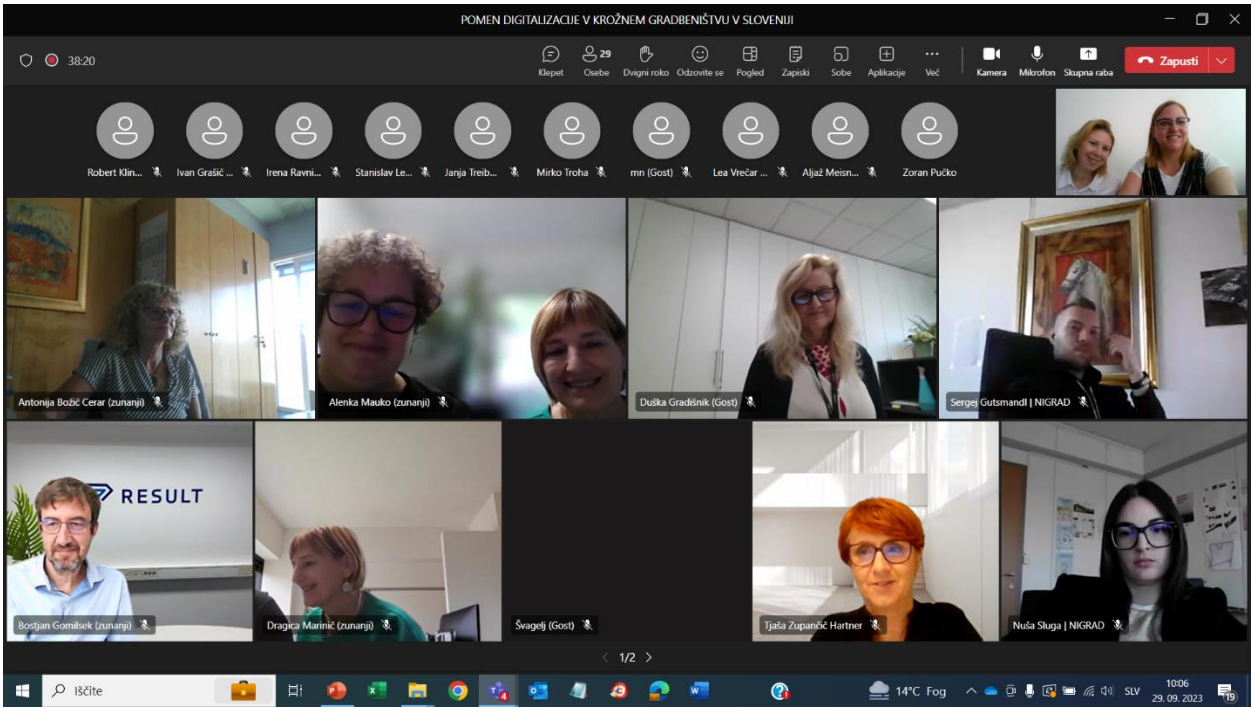
Ime	Čas pridružitve	Čas odhoda	Trajanje	E-poštni naslov	Vloga
Nina Kovačič	29. 9. 23, 09:28:02	29. 9. 23, 12:24:31	2 h 56 min 29 s	nina.kovacic@stajerskagz.si	Organizator
Dragica Marinič	29. 9. 23, 09:32:02	29. 9. 23, 14:58:44	5 h 26 min 42 s	dragica.marinic@zag.si	Predstavitelj
Alenka Mauko	29. 9. 23, 09:32:19	29. 9. 23, 12:24:31	2 h 52 min 12 s	alenka.mauko@zag.si	Predstavitelj
Tjaša Zupančič Hartner	29. 9. 23, 09:34:22	29. 9. 23, 12:21:16	2 h 46 min 53 s	tjasa.zh@gic.si	Predstavitelj
Jasmina Karba	29. 9. 23, 09:50:09	29. 9. 23, 12:20:53	2 h 30 min 44 s	Jasmina.Karba@gov.si	Predstavitelj
Bostjan Gomilsek	29. 9. 23, 09:51:02	29. 9. 23, 11:15:40	1 h 24 min 38 s	bostjan.gomilsek@result.si	Predstavitelj
Janja Treiber	29. 9. 23, 09:51:06	29. 9. 23, 12:20:16	2 h 29 min 9 s		Udeleženec
Sergej Gutsmandl | NIGRAD	29. 9. 23, 09:56:28	29. 9. 23, 12:14:43	2 h 18 min 15 s	Sergej.Gutsmandl@nigrad.si	Predstavitelj

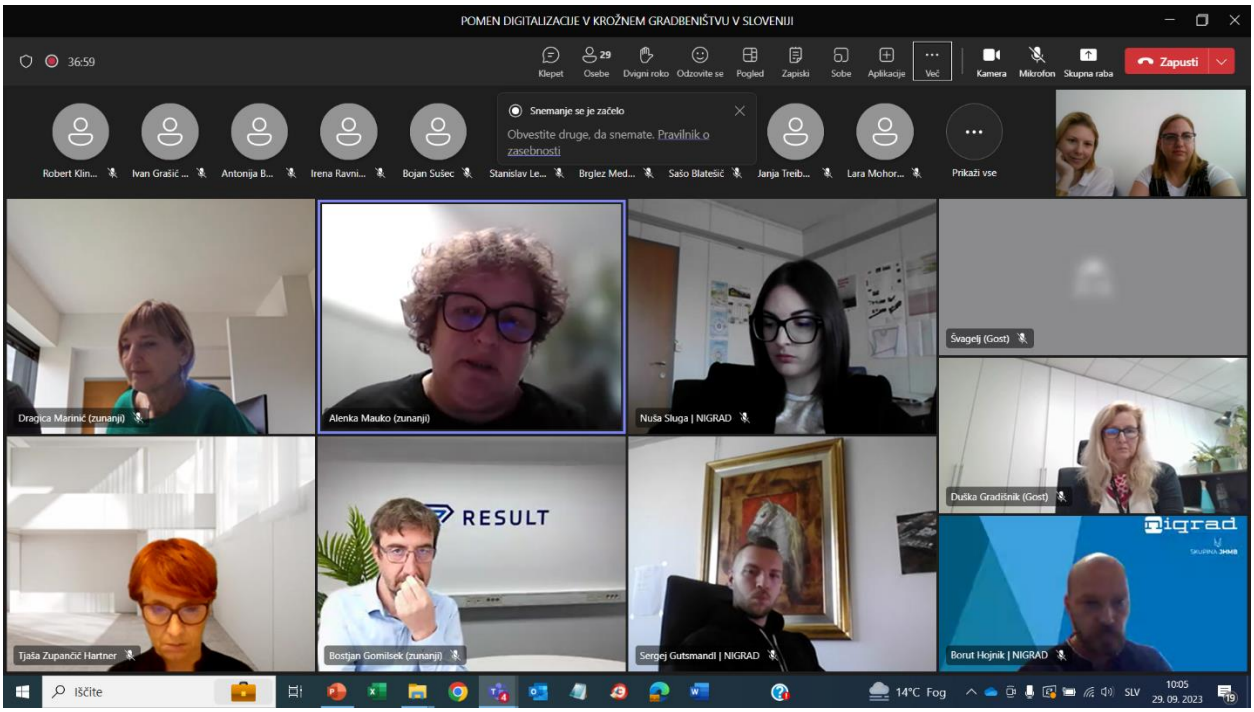
Antonija Božič Cerar	29. 9. 23, 09:56:48	29. 9. 23, 10:58:31	1 h 1 min 42 s	antonija.cerar@gzs.si	Predstavitelj
Nuša Sluga | NIGRAD	29. 9. 23, 09:57:01	29. 9. 23, 12:14:41	2 h 17 min 40 s	Nusa.Sluga@nigrad.si	Udeleženec
Duška Gradišnik	29. 9. 23, 09:59:21	29. 9. 23, 12:21:18	2 h 21 min 56 s		Udeleženec
mn	29. 9. 23, 09:59:22	29. 9. 23, 12:21:42	2 h 22 min 20 s		Udeleženec
Sašo Blatešič	29. 9. 23, 09:59:22	29. 9. 23, 12:22:01	2 h 22 min 38 s	saso.blatesic@slovenjgradec.si	Udeleženec
Bojan Sušec	29. 9. 23, 09:59:22	29. 9. 23, 11:40:30	1 h 41 min 7 s	bojan.susec@lumar.si	Udeleženec
Stanislav Leben DRI d.o.o.	29. 9. 23, 09:59:27	29. 9. 23, 12:21:57	2 h 22 min 29 s		Udeleženec
Brglez Medeja	29. 9. 23, 09:59:27	29. 9. 23, 12:21:36	2 h 22 min 8 s	medeja.brglez@forum-media.si	Udeleženec
Robert Klinc	29. 9. 23, 09:59:57	29. 9. 23, 11:35:12	1 h 35 min 14 s		Udeleženec
Lara Mohoric Eller	29. 9. 23, 10:00:51	29. 9. 23, 11:47:18	1 h 46 min 26 s	lmohor18@student.aau.dk	Udeleženec
Lara Mohoric Eller	29. 9. 23, 11:48:31	29. 9. 23, 12:21:09	32 min 37 s	lmohor18@student.aau.dk	Udeleženec
Mirko Troha	29. 9. 23, 10:00:59	29. 9. 23, 12:21:46	2 h 20 min 46 s	mirko.troha@axis.si	Udeleženec
Valneja Erat	29. 9. 23, 10:01:06	29. 9. 23, 12:15:04	2 h 13 min 57 s	valneja.erat@result.si	Udeleženec
Katja ZAG (Guest)	29. 9. 23, 10:01:09	29. 9. 23, 11:12:48	1 h 11 min 38 s		Udeleženec
Irena Ravnikar Levec	29. 9. 23, 10:01:39	29. 9. 23, 12:21:21	2 h 19 min 41 s		Udeleženec

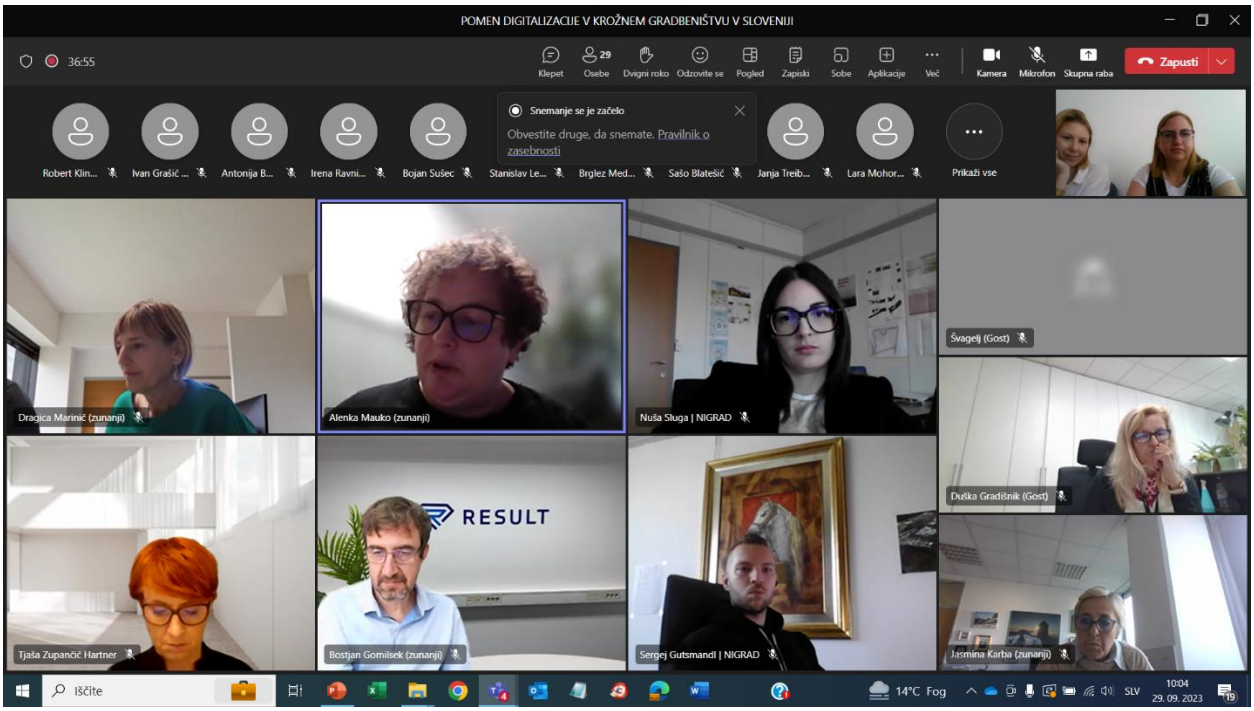
milan (Gost)	29. 9. 23, 10:02:06	29. 9. 23, 10:42:51	40 min 44 s	Udeleženec
milan (Gost)	29. 9. 23, 11:02:54	29. 9. 23, 12:08:11	1 h 5 min 17 s	Udeleženec
Švagelj (Gost)	29. 9. 23, 10:02:22	29. 9. 23, 12:21:53	2 h 19 min 30 s	Udeleženec
Ivan Grašič	29. 9. 23, 10:02:23	29. 9. 23, 12:21:20	2 h 18 min 57 s	Udeleženec
Lea Vrečar Capuder	29. 9. 23, 10:02:29	29. 9. 23, 12:21:44	2 h 19 min 15 s	Udeleženec
Aljaž Meisnger - PRIOT Digital Systems	29. 9. 23, 10:03:30	29. 9. 23, 12:10:54	2 h 7 min 23 s	Udeleženec
Zoran Pučko	29. 9. 23, 10:04:00	29. 9. 23, 12:21:48	2 h 17 min 48 s	zoran.pucko@watchbuilt.com Udeleženec
Borut Hojnik | NIGRAD	29. 9. 23, 10:04:41	29. 9. 23, 10:48:03	43 min 22 s	Borut.Hojnik@nigrad.si Udeleženec
Borut Hojnik | NIGRAD	29. 9. 23, 10:49:09	29. 9. 23, 12:18:08	1 h 28 min 58 s	Borut.Hojnik@nigrad.si Udeleženec
Tadej Slapnik, Hashnet	29. 9. 23, 10:16:44	29. 9. 23, 11:44:39	1 h 27 min 54 s	Udeleženec
Andrej DOVER	29. 9. 23, 10:24:21	29. 9. 23, 11:58:17	1 h 33 min 56 s	Andrej.DOVER@rra-podravje.si Udeleženec
Fujs, Damjan	29. 9. 23, 10:42:13	29. 9. 23, 10:54:40	12 min 27 s	damjan.fujs@fri.uni-lj.si Udeleženec
Valentina Kuzma	29. 9. 23, 11:00:42	29. 9. 23, 12:21:09	1 h 20 min 26 s	valentina.kuzma@gzs.si Udeleženec
Zorka Novak Pintarič	29. 9. 23, 11:34:50	29. 9. 23, 12:21:13	46 min 23 s	zorka.novak@um.si Predstavitelj

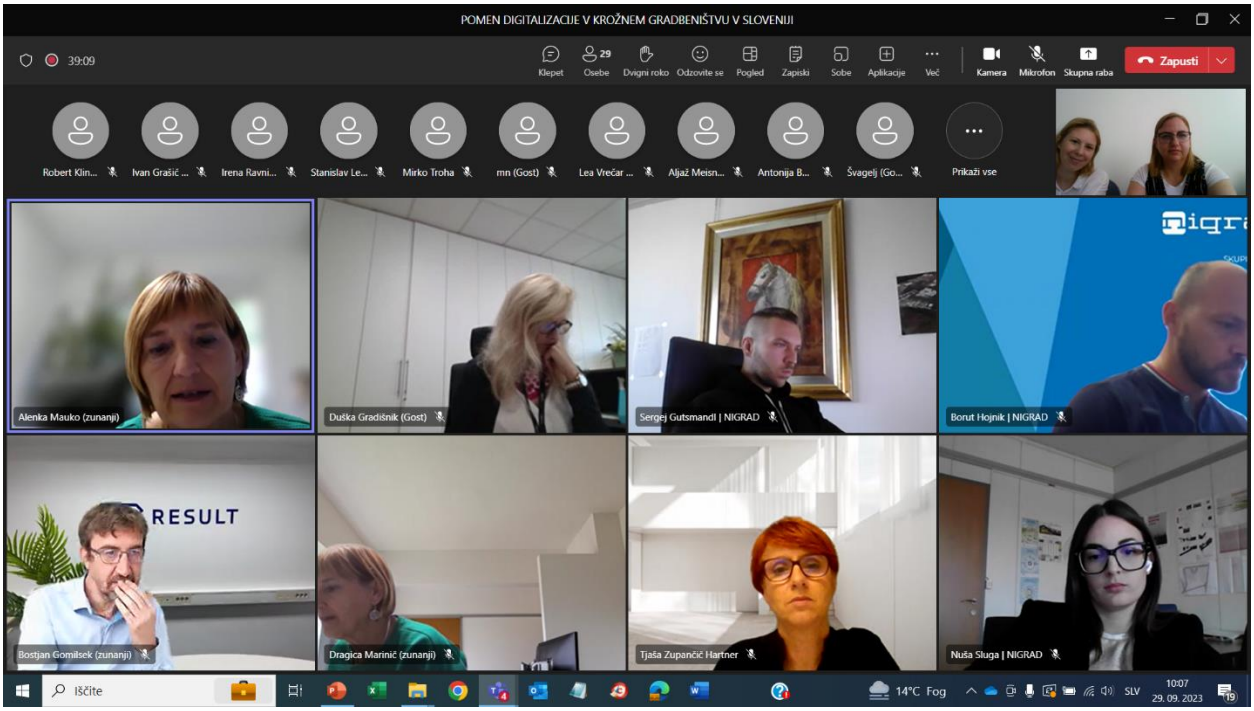
Posnetki zaslona – Strokovne delavnice Pomen digitalizacije v krožnem gradbeništvu v Sloveniji

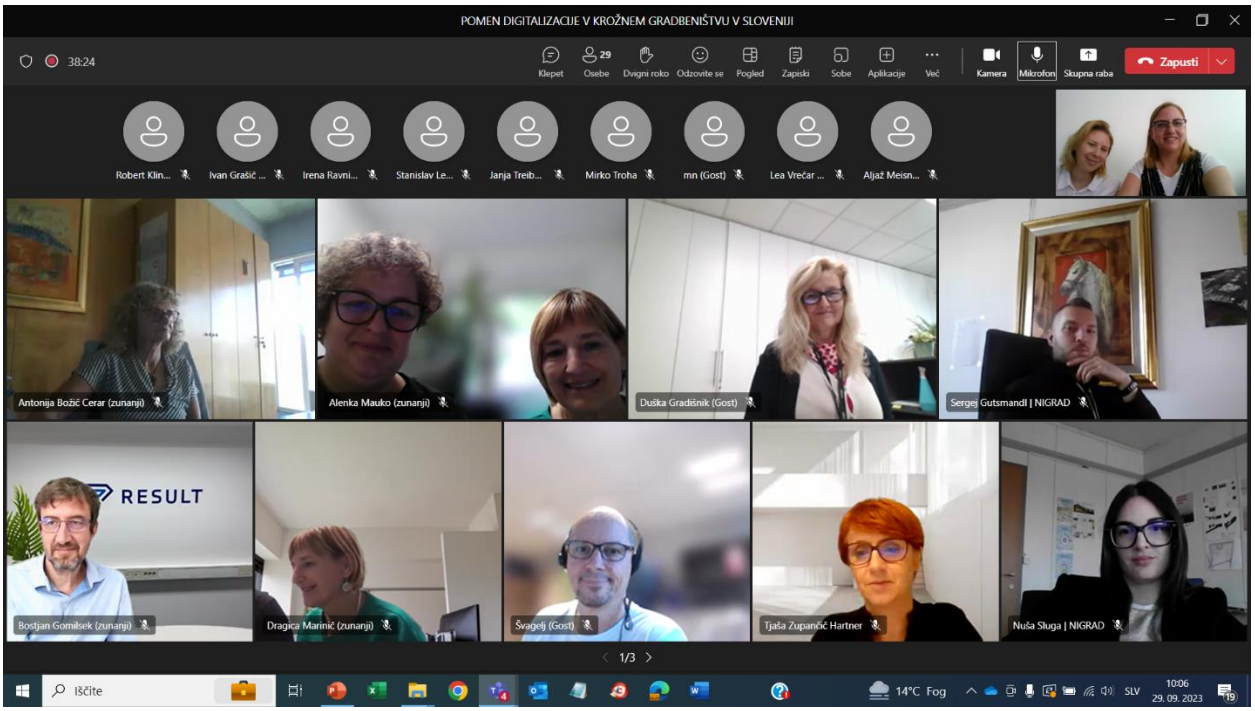
29. 9. 2023

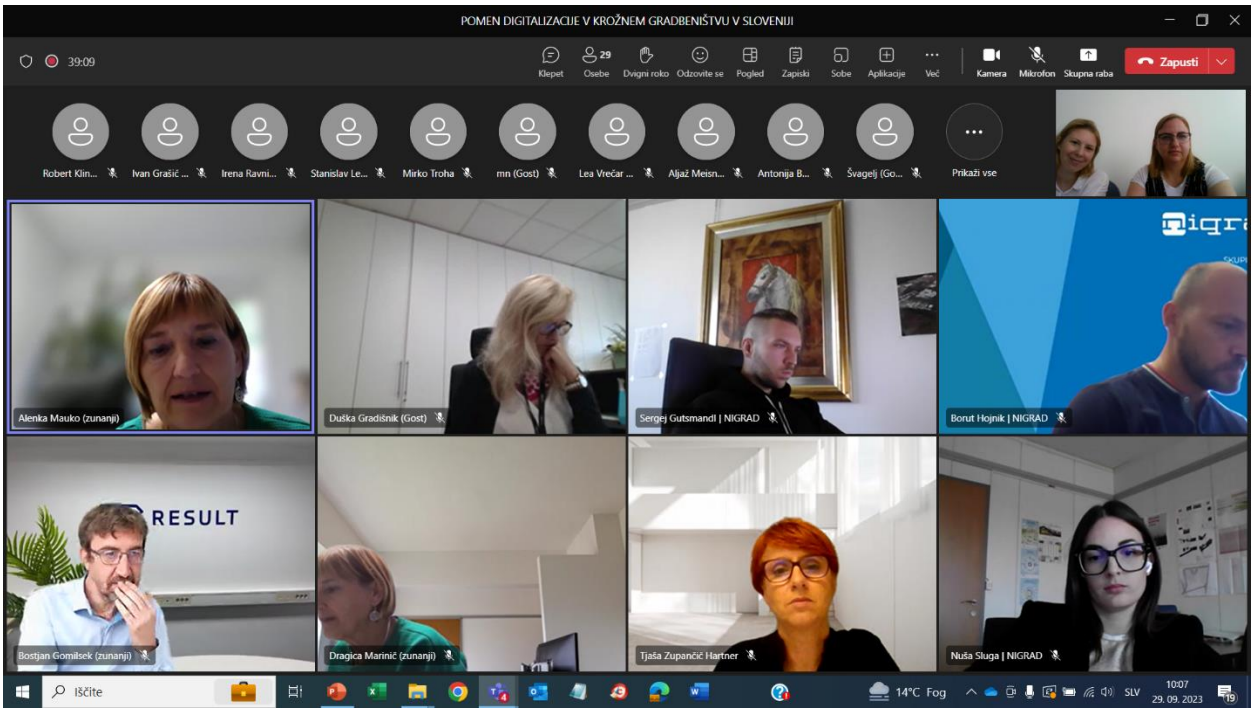


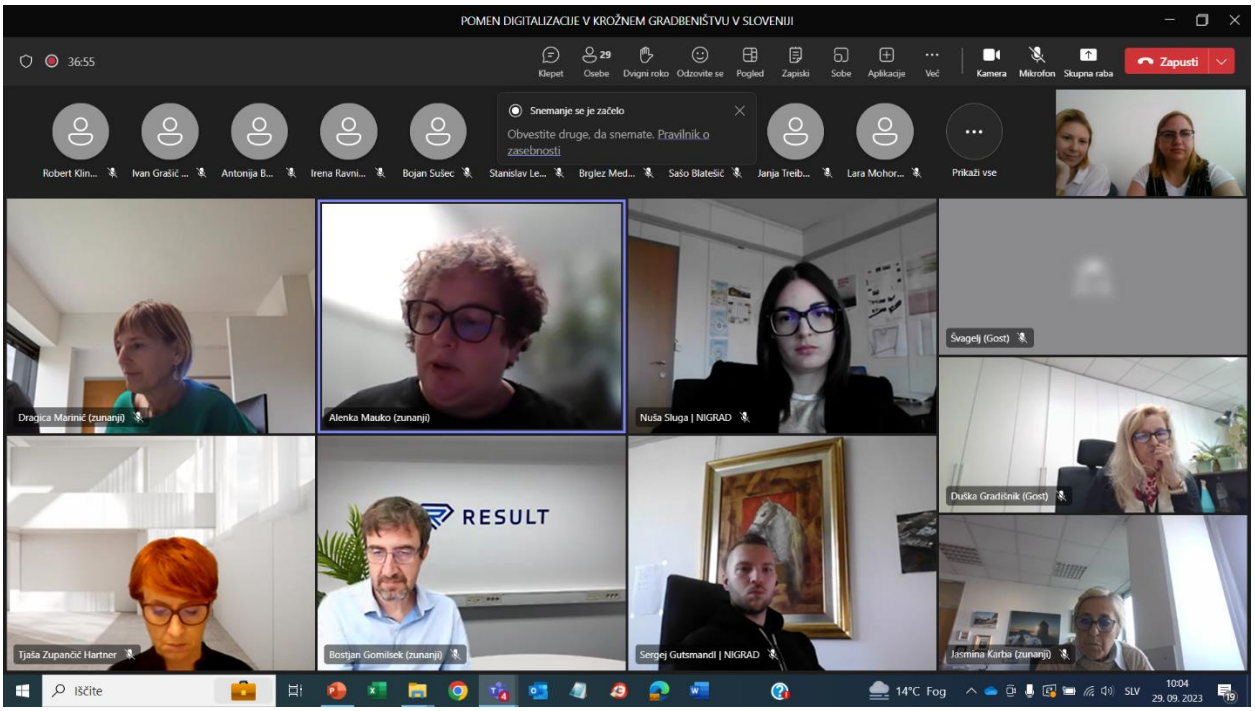


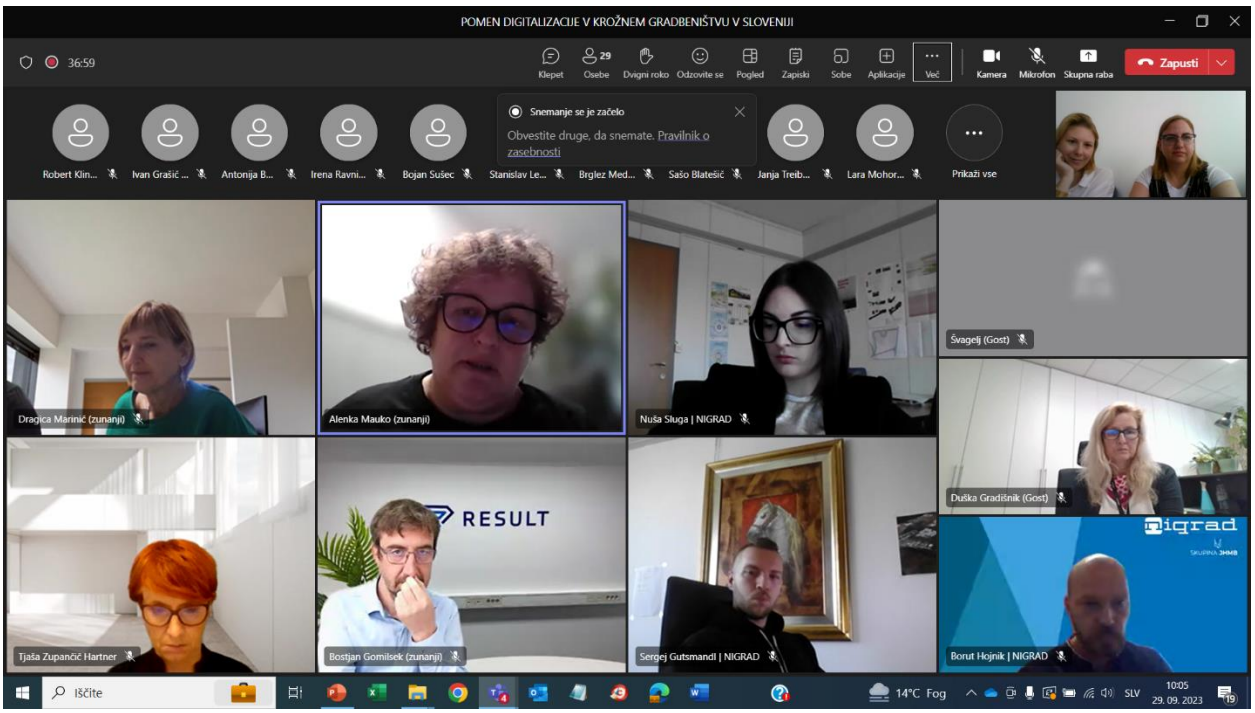

POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI
36:55
Klepet
Osebe
Dvigni roko
Odzovite se
Pogled
Zapiski
Sobe
Aplikacije
Več
Kamera
Mikrofon
Skupna raba
Zapusti
Snemanje se je začelo
Obvestite druge, da snemate. Pravilnik o zasebnosti
Robert Klin...
Ivan Grašič ...
Antonija B...
Irena Ravni...
Bojan Sušec
Stanislav Le...
Brglez Med...
Sašo Blatešič
Janja Treib...
Lara Mohor...
Prikaži vse
Dragica Marinič (zunanji)
Alenka Mauko (zunanji)
Nuša Sluga | NIGRAD
Švagelj (Gost)
Duška Gradišnik (Gost)
Tjaša Zupančič Hartner
Bostjan Gomilsek (zunanji)
Sergej Gutsmandl | NIGRAD
Jasmina Karba (zunanji)
RESULT
Iščite
14°C Fog
SLV
10:04
29. 09. 2023

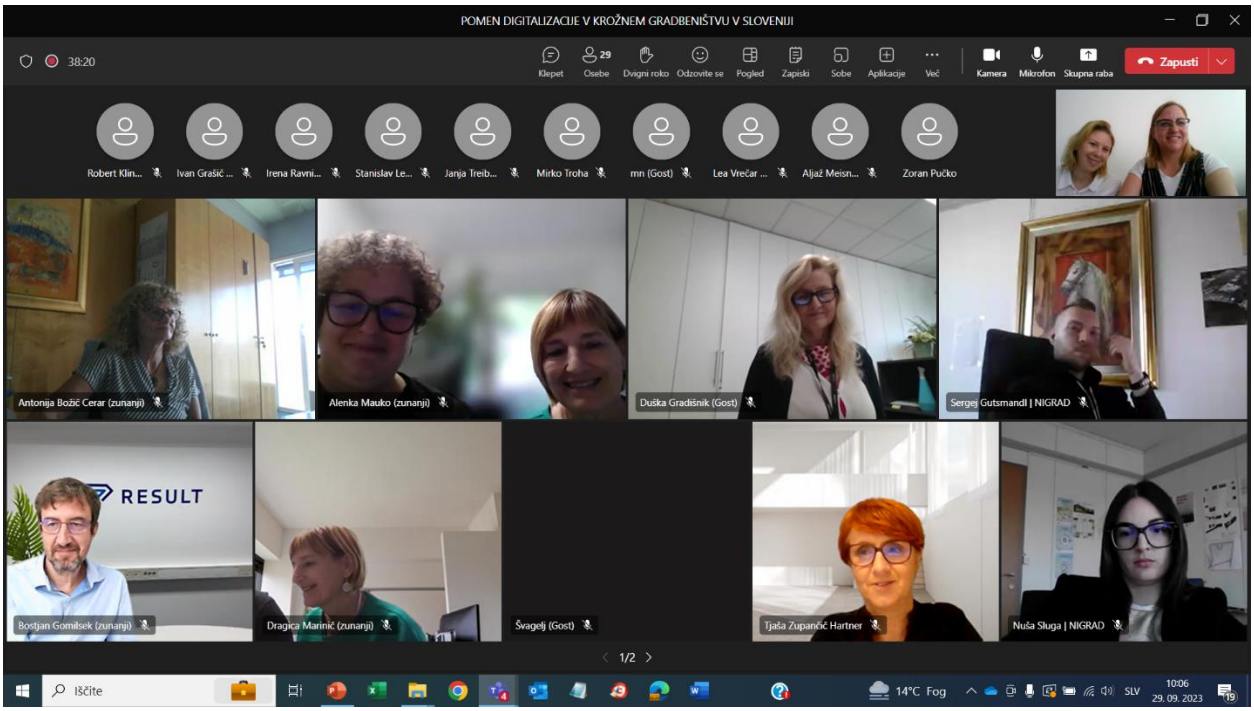

POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI
39:09
Klepet
Osebe
Dvigni roko
Odzovite se
Pogled
Zapiski
Sobe
Aplikacije
Več
Kamera
Mikrofon
Skupna raba
Zapusti
Robert Klin...
Ivan Grašič ...
Irena Ravni...
Stanislav Le...
Mirko Troha
mn (Gost)
Lea Vrečar ...
Aljaž Meisn...
Antonija B...
Švagelj (Go...
Prikaži vse
Alenka Mauko (zunanji)
Duška Gradišnik (Gost)
Sergej Gutsmandl | NIGRAD
Borut Hojnik | NIGRAD
Bostjan Gomilsek (zunanji)
Dragica Marinič (zunanji)
Tjaša Zupančič Hartner
Nuša Sluga | NIGRAD
RESULT
Iščite
14°C Fog
SLV
10:07
29. 09. 2023


POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI
38:24
Klepet
Osebe
Dvigni roko
Odzovite se
Pogled
Zapiski
Sobe
Aplikacije
Več
Kamera
Mikrofon
Skupna raba
Zapusti
Robert Klin...
Ivan Grašič ...
Irena Ravni...
Stanislav Le...
Janja Treib...
Mirko Troha
mn (Gost)
Lea Vrečar ...
Aljaž Meisn...
Antonija Božič Cerar (zunanji)
Alenka Mauko (zunanji)
Duška Gradišnik (Gost)
Sergej Gutsmandl | NIGRAD
RESULT
Bostjan Gomilsek (zunanji)
Dragica Marinič (zunanji)
Švagelj (Gost)
Tjaša Zupančič Hartner
Nuša Sluga | NIGRAD
1/3
Iščite
14°C Fog
SLV
10:06
29. 09. 2023


POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI
39:09
Klepet
Osebe
Dvigni roko
Odzovite se
Pogled
Zapiski
Sobe
Aplikacije
Več
Kamera
Mikrofon
Skupna raba
Zapusti
Robert Klin...
Ivan Grašič ...
Irena Ravni...
Stanislav Le...
Mirko Troha
mn (Gost)
Lea Vrečar ...
Aljaž Meisn...
Antonija B...
Švagelj (Go...
Prikaži vse
Alenka Mauko (zunanji)
Duška Gradišnik (Gost)
Sergej Gutsmandl | NIGRAD
Borut Hojnik | NIGRAD
RESULT
Bostjan Gomilsek (zunanji)
Dragica Marinič (zunanji)
Tjaša Zupančič Hartner
Nuša Sluga | NIGRAD
Iščite
14°C Fog
SLV
10:07
29. 09. 2023


POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI
36:55
Klepet
Osebe
29
Dvigni roko
Odzovite se
Pogled
Zapiski
Sobe
Aplikacije
Več
Kamera
Mikrofon
Skupna raba
Zapusti
Snemanje se je začelo
Obvestite druge, da snemate. Pravilnik o zasebnosti
Robert Klin...
Ivan Grašič ...
Antonija B...
Irena Ravni...
Bojan Sušec
Stanislav Le...
Brglez Med...
Sašo Blatešič
Janja Treib...
Lara Mohor...
Prikaži vse
Dragica Marinič (zunanji)
Alenka Mauko (zunanji)
Nuša Sluga | NIGRAD
Švagelj (Gost)
Duška Gradišnik (Gost)
Tjaša Zupančič Hartner
Bostjan Gomilsek (zunanji)
RESULT
Sergej Gutsmandl | NIGRAD
Jasmina Karba (zunanji)
Iščite
14°C Fog
SLV
10:04
29. 09. 2023


POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI
36:59
Klepet
Osebe
29
Dvigni roko
Odzovite se
Pogled
Zapiski
Sobe
Aplikacije
Več
Kamera
Mikrofon
Skupna raba
Zapusti
Snemanje se je začelo
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Robert Klin...
Ivan Grašič ...
Antonija B...
Irena Ravni...
Bojan Sušec
Stanislav Le...
Brglez Med...
Sašo Blatešič
Janja Treib...
Lara Mohor...
Prikaži vse
Dragica Marinič (zunanji)
Alenka Mauko (zunanji)
Nuša Sluga | NIGRAD
Švagelj (Gost)
Duška Gradišnik (Gost)
Tjaša Zupančič Hartner
Bostjan Gomilsek (zunanji)
RESULT
Sergej Gutsmandl | NIGRAD
Borut Hojnik | NIGRAD
Iščite
14°C Fog
SLV
10:05
29. 09. 2023


POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI
38:20
Klepet
Osebe
29
Dvigni roko
Odzovite se
Pogled
Zapiski
Sobe
Aplikacije
Več
Kamera
Mikrofon
Skupna raba
Zapusti
Robert Klin...
Ivan Grašič ...
Irena Ravni...
Stanislav Le...
Janja Treib...
Mirko Troha
mn (Gost)
Lea Vrečar ...
Aljaž Meisn...
Zoran Pučko
Antonija Božič Cerar (zunanji)
Alenka Mauko (zunanji)
Duška Gradišnik (Gost)
Sergej Gutsmandl | NIGRAD
RESULT
Bostjan Gomilsek (zunanji)
Dragica Marinič (zunanji)
Švagelj (Gost)
Tjaša Zupančič Hartner
Nuša Sluga | NIGRAD
1/2
Iščite
14°C Fog
SLV
10:06
29. 09. 2023

ZAG ZAVOD ZA GRADBENIŠTVO SLOVENIJE SLOVENIAN NATIONAL BUILDING AND CIVIL ENGINEERING INSTITUTE

Interreg CENTRAL EUROPE Co-funded by the European Union

ReBuilt

POTRDILO O UDELEŽBI

[redacted]

Identifikacijska številka IZS: [redacted]
zaposlena na [redacted]

Pasivna udeležba

na
strokovni delavnici

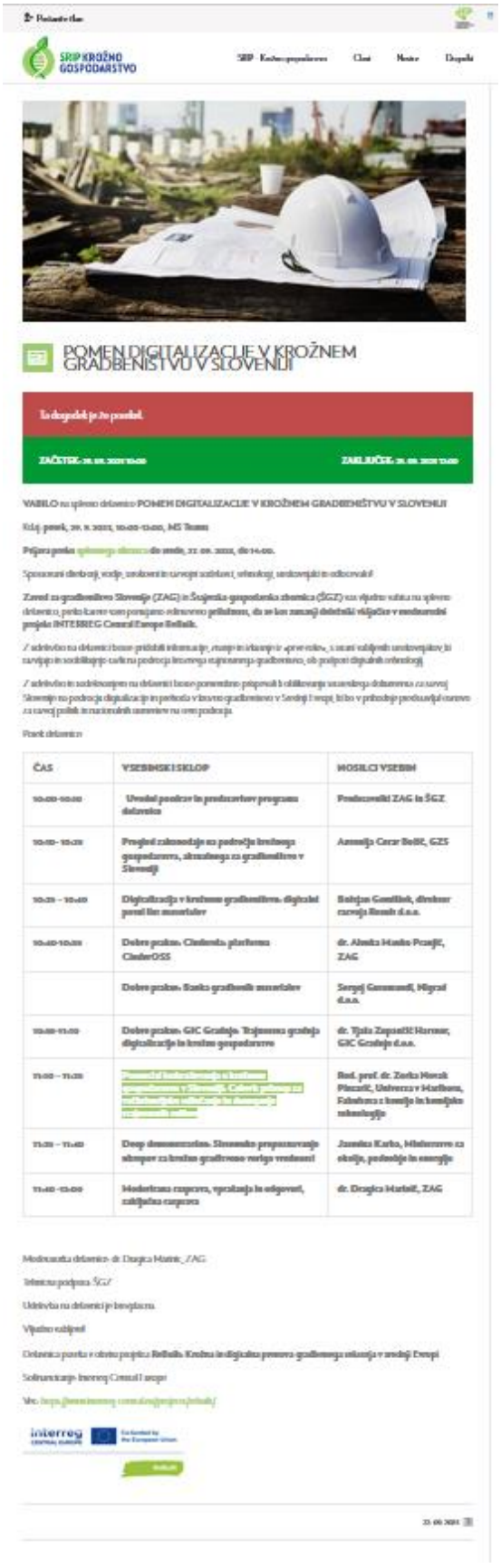
POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI

29. september 2023, od 10:00 - 12:20 ure, preko MS Teams

Zavod za gradbeništvo Slovenije
doc. dr. Aleš Žnidarič, univ. dipl. inž. grad.
direktor

Vabila in poročilo o delavnici 29. 9. 2023

https://srip-krozno-gospodarstvo.si/pomen-digitalizacije-v-kroznem-gradbenistvu-v-sloveniji/

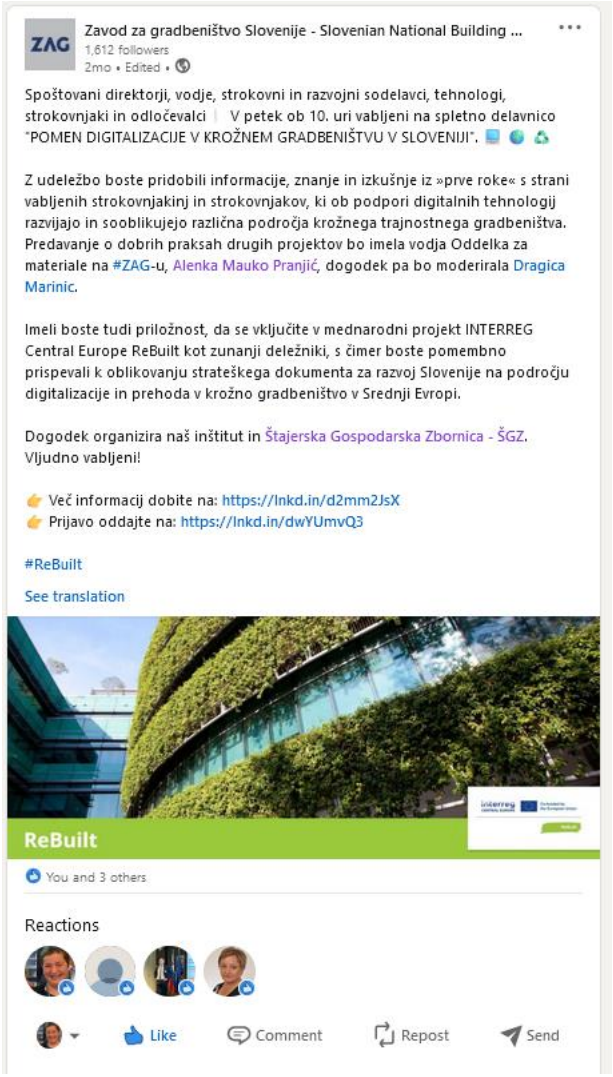


POMEN DIGITALIZACIJE V KROŽNEM GRADBENIŠTVU V SLOVENIJI

ČAS	VSEBINSKI SKLOP	NOSILCI VSEBIN
10.00-10.10	Uvodni pozdrav in predstavitev programa delavnice	Predstavniki ZAG in ŠGZ
10.10- 10.20	Pregled zakonodaje na področju krožnega gospodarstva, akcijskega za gradbeništvo v Sloveniji	Asenija Cezar Božič, GZS
10.20 – 10.40	Digitalizacija v krožnem gradbeništvu. digitalni potni list materialov	Bohjan Gomilšek, direktor razvoja Resnik d.o.o.
10.40-10.50	Dobre prakse. Cinderela platforma CinderOSS	dr. Alenka Hanke Pezdič, ZAG
	Dobre prakse. Banka gradbenih materialov	Sergej Gorenzadi, Migrad d.o.o.
10.50-11.10	Dobre prakse. GIC Gradnje. Trajnostna gradnja digitalizacija in krožno gospodarstvo	dr. Tjaša Zupančič Horvat, GIC Gradnje d.o.o.
11.00 – 11.20		Red. prof. dr. Zorka Novak Pintarič, Univerza v Mariboru, Fakulteta z kemijo in kemijsko tehnologijo
11.20 – 11.40	Deep demonstration. Slovenska prepoznavnost akterjev za krožno gradbeno verigo vrednosti	Jasmina Kurta, Ministrstvo za okolje, podnebje in energijo
11.40 -12.00	Moderirana razprava, vprašanja in odgovori, zaključna razprava	dr. Dragica Marinič, ZAG

LinkedIN

https://www.linkedin.com/posts/zavod-za-gradbeni%C5%A1tvo-slovenije---slovenian-national-building-and-civil-engineering-institute-%E2%80%93-zag_zag-rebuilt-activity-7112765835173113856-ZBEs/



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