BUILD UP
The European portal for energy efficiency and renewable energy in buildings
WEBINAR
New Training Materials and Methodologies for Up-Skilling in Circular Economy in Construction for Training Centres

14th December 2023 / 11.00H – 12.30H CET
## AGENDA

<table>
<thead>
<tr>
<th>Presentation</th>
<th>Speaker(s)</th>
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</thead>
<tbody>
<tr>
<td>Ice breaker session and BUS-GoCircular context and introduction</td>
<td>• Gloria Callinan, Project Support Officer at Technological University of the Shannon</td>
</tr>
</tbody>
</table>
| BUS-GoCircular outcomes that are relevant for trainers: training materials,  | • Pepa Esparza Arbona, Project Manager at IVE  
| training "packs" for SMEs, e-learnings, circularity games, apps and more      | • Sreeja Raghunathan, Built Environment Consultant at Circle Economy                                                                   |
| Success stories on upskilling professionals                                  | • Daniella Mazzini, Project and Communications Coordinator at ISSO  
|                                                                               | • Maria Angeles Roca, Technical Staff at the Department of Circular Architecture of Universitat Jaume I  
|                                                                               | • Domagoj Tkalčić, Student at University of Zagreb                                                                                       |
| Interactive session: opportunities and next steps/challenges in uptake      | • Gloria Callinan, Project Support Officer at Technological University of the Shannon                                                   |
| after the project ends                                                      | • Daniella Mazzini, Project and Communications Coordinator at ISSO                                                                           |
| Take-aways and conclusions                                                  | • Gloria Callinan, Project Support Officer at Technological University of the Shannon                                                   |
| Thank you from BUILD UP                                                     | • BUILD UP                                                                                                                                 |

**BUILD UP**

The European portal for energy efficiency and renewable energy in buildings.
European Framework for Circular skills in Design and Construction

Gloria Callinan Project Support Officer, TUS - Ireland - BUSGoCircular project partner
Skills need-analysis and Qualification Development

- Framework for circular interventions
- Mapping of required skills and skill gaps
- Circular construction skills qualification framework
- Applied circular construction skills qualification framework
- Validated Circular construction skills qualification framework
Skills Mapping and Results

Based on the Key elements shown here and using the PROF/TRAC framework, we mapped out 58 skills and 38 professions relating to Circle Economy and MGRFIE which we would go on to map in order to discover the skills gap existing within Europe.
Profession

- Architect
- Carpenter
- Demolition or Deconstruction Auditor
- Green Public Procurer
- Green Roofer
<table>
<thead>
<tr>
<th>Specific to Circular Economy</th>
<th>Table including all relevant Circular Skills either solely related to Circular Economy or prominently related to CE.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRR</strong> Prioritise regenerative resources</td>
<td>Taking into consideration that renewable, reusable, non-toxic resources are used in the construction and production of the built environment.</td>
</tr>
<tr>
<td><strong>PRR1</strong> Bio-Based and regenerative material application</td>
<td>Design with/for the use of bio-based and regenerative materials such as bio-based concrete, crops, algae. Maximise, preserve and manage biological products for buildings lifecycle. Material Creation and innovation. Knowledge of material impact.</td>
</tr>
<tr>
<td><strong>PRR2</strong> Reusable material application</td>
<td>Design for the use of reusable materials. The application of reusable materials such as timber, metal, etc. Including knowledge of material impact.</td>
</tr>
<tr>
<td><strong>PE</strong> Preserve and extend what is already made</td>
<td>While resources are in-use, maintain, repair and upgrade them to maximise their lifetime and give them a second life through take back strategies when applicable.</td>
</tr>
<tr>
<td><strong>UWR</strong> Use waste as a resource</td>
<td>Utilise waste streams (Sewage, Trade waste) as a source of secondary resources and recover waste for reuse and recycling.</td>
</tr>
<tr>
<td><strong>UWR1</strong> Deconstruction for reuse</td>
<td>Use demolition materials as a resource for new and retrofitting buildings. Specialism in deconstruction, material recovery and deconstruction material innovation.</td>
</tr>
<tr>
<td><strong>UWR2</strong> Material Innovation</td>
<td>Experimentation and innovation with materials to discover new sustainable methods of construction.</td>
</tr>
<tr>
<td><strong>UWR3</strong> Reclaiming Energy</td>
<td>Reclaiming energy from waste materials wherever possible.</td>
</tr>
<tr>
<td><strong>UWR4</strong> Continuous reuse of energy with little or no waste</td>
<td>Understanding/use of closed and open loop knowledge of waste (Closed loop - all resources created or used are kept within a continuous cycle. Open loop - not all resources created or used are kept within a continuous cycle).</td>
</tr>
<tr>
<td><strong>DF</strong> Design/Build for the future</td>
<td>Designing for building adaptability and to design for extended future use.</td>
</tr>
<tr>
<td><strong>DF1</strong> Design/Build for Reuse</td>
<td>Designing for easy dismantling and re-use of built elements, equipment or materials.</td>
</tr>
<tr>
<td><strong>DF2</strong> Design/Build for repurpose of materials</td>
<td>The use of Circular materials. Reuse, recycle and repurpose of all materials in construction.</td>
</tr>
<tr>
<td><strong>DF3</strong> Apply material passports</td>
<td>Apply material passports to enable more timely upgrading and life-time extension.</td>
</tr>
<tr>
<td><strong>DF4</strong> Design/Build for material impact reduction</td>
<td>Reduction of the materials impact on the environment from the design to installation phase.</td>
</tr>
<tr>
<td><strong>DF5</strong> Reduce/Build reliance on critical raw materials</td>
<td>Design increased use of renewable and sustainable materials in construction.</td>
</tr>
<tr>
<td><strong>DF6</strong> Design/Build out waste</td>
<td>Use design as a tool to reduce or eradicate all waste at design phase.</td>
</tr>
<tr>
<td><strong>DF7</strong> Design/Build for Durability</td>
<td>Design so that products and installations are easy to repair. Design for longevity.</td>
</tr>
<tr>
<td><strong>DF8</strong> Design/Build for Cyclability</td>
<td>Design/Build for resource efficiency for all life cycle stages, prioritising material reuse and reduction.</td>
</tr>
<tr>
<td><strong>CCJV</strong> Collaborate to create joint value</td>
<td>Work together throughout the supply chain, internally within organisations and with the public sector to increase transparency and create joint value (Mutual benefit).</td>
</tr>
<tr>
<td><strong>CCJV1</strong> Collaboration for Circular Economy</td>
<td>To ensure GPP, construction networks, digital marketplace, innovation, Circular Procurement training and application of circular strategies to establish circular construction principals and demolition criteria are incorporated at design stage.</td>
</tr>
<tr>
<td><strong>RBM</strong> Rethink the business model</td>
<td>Consider opportunities to create greater value and align incentives that build on the interaction between products and services.</td>
</tr>
<tr>
<td><strong>RBM1</strong> Repairs as a service</td>
<td>Rethinking repairs as a necessary part of the business model rather than replace.</td>
</tr>
<tr>
<td><strong>RBM2</strong> Environmental costing models and carbon taxes</td>
<td>Rethinking costing and carbon taxes within construction.</td>
</tr>
<tr>
<td><strong>IDT</strong> Incorporate digital technology</td>
<td>Track and optimise resource use and strengthen connections between supply chain actors through digital, online platforms and technologies that provide insights.</td>
</tr>
<tr>
<td><strong>SAK</strong> Communication, Education and information</td>
<td>Develop research, knowledge transfer, encourage innovation networks and disseminate findings with integrity.</td>
</tr>
<tr>
<td>Not specific to Circular Economy</td>
<td>Including all relevant skills involved in Circular Economy but not necessarily specific to CE within the construction industry.</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Prioritise regenerative resources</strong></td>
<td></td>
</tr>
<tr>
<td>PRR3 Sustainable Sourcing</td>
<td>Building with sustainable sourced materials i.e. Wood, Hemp, Seaweed, Cork, Bamboo, Earth, straw, wool etc.</td>
</tr>
<tr>
<td>PRR4 Energy storage and distribution</td>
<td>Measures to more efficiently use and store energy in the house.</td>
</tr>
<tr>
<td>PRR5 Production of Renewable Energy</td>
<td>The understanding and operation of creating energy from renewable sources</td>
</tr>
<tr>
<td>PRR 6 Continuous reuse of water with little or no waste</td>
<td>Understanding/use of closed and open loop knowledge of water (Closed loop - all resources created or used are kept within a continuous cycle. Open loop - not all resources created or used are kept within a continuous cycle)</td>
</tr>
<tr>
<td><strong>Preserve and extend what is already made</strong></td>
<td></td>
</tr>
<tr>
<td>PE1 Maintenance of building components</td>
<td>Share information and knowledge on how to maintain building components e.g. DIY painting. Knowledge specific to maintenance work.</td>
</tr>
<tr>
<td>PE2 Upgrade of building components</td>
<td>Use expertise to upgrade elements. Knowledge specific to maintenance work.</td>
</tr>
<tr>
<td><strong>Use waste as a resource</strong></td>
<td></td>
</tr>
<tr>
<td>UWR 5 Grey Water Collection and Use</td>
<td>Understanding/use of closed and open loop knowledge of water (Closed loop - all resources created or used are kept within a continuous cycle. Open loop - not all resources created or used are kept within a continuous cycle)</td>
</tr>
<tr>
<td>UWR6 Rainwater collection and use</td>
<td>Rainwater harvesting to be used for certain applications e.g. washing, toilets, gardening.</td>
</tr>
<tr>
<td>UWR7 Sustainable Drainage Systems</td>
<td>Roofs, interiors and walls connected to sewage systems and water recovery systems to avoid flooding them. Sensor technology in green facades to facilitate water flow from roof when needed.</td>
</tr>
<tr>
<td><strong>Design for the future</strong></td>
<td></td>
</tr>
<tr>
<td>DF9 Design for Adaptability</td>
<td>Build lifetime extensions, especially through adoption. Specifically in order for spaces to adjust to new conditions depending on need over time (change in family needs, changing needs of public rooms)</td>
</tr>
<tr>
<td>DF10 Modular Design</td>
<td>Use of modularity in construction of all elements of the building envelope to facilitate disassembly and reuse.</td>
</tr>
<tr>
<td><strong>Collaborate to create joint value</strong></td>
<td></td>
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<tr>
<td><strong>Rethink the business model</strong></td>
<td></td>
</tr>
<tr>
<td>RBM3 Facades as a services</td>
<td>Rethink the use of facades as a service (including services such as Ventilation, heating and cooling Systems).</td>
</tr>
<tr>
<td>RBM4 Technical Installation as a service</td>
<td>Electrical products, Boilers, Heat pumps, Solar systems.</td>
</tr>
<tr>
<td>RBM5 Interior features as a service</td>
<td>Rethink the use of interior features as a service (material, use and systems)</td>
</tr>
<tr>
<td><strong>Incorporate digital technology</strong></td>
<td></td>
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<tr>
<td>IDT1 Drones Use</td>
<td>To scan/image frontage and roofs of buildings for data collection and analysis for renovation.</td>
</tr>
<tr>
<td>IDT2 3D Printing</td>
<td>To avoid material loss and to allow for material innovation and experimentation.</td>
</tr>
<tr>
<td>IDT3 Prefabrication</td>
<td>This must include digital rendering leading to a further minimizing of waste from human error.</td>
</tr>
<tr>
<td>IDT 4 BIM/Digitisation</td>
<td>Digitally track materials in order to maximise lifetime of products through BIM. Digital tracking and management of building systems and components. Allowing for material and building tracking (building tracking, collaboration and communication).</td>
</tr>
<tr>
<td><strong>Communication, Education and information</strong></td>
<td></td>
</tr>
<tr>
<td>SAK1 Research and development</td>
<td>Develop high-value product applications. Analyse effectivity, barriers and successes of applied circular strategies. Analysis of barriers and success factors during operate phase/Operate phase analysis</td>
</tr>
<tr>
<td>MF</td>
<td>Multi-functional Green Roofs Facades and Interior Elements</td>
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<tr>
<td>MF1</td>
<td>Solar power systems for electricity generation</td>
</tr>
<tr>
<td>MF2</td>
<td>Solar thermal systems for domestic hot water and/or heating generation</td>
</tr>
<tr>
<td>MF3</td>
<td>Heat Pump</td>
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<tr>
<td>MF4</td>
<td>Insulation Installation</td>
</tr>
<tr>
<td>MF5</td>
<td>Establishing the cooling and heating function of green roofs</td>
</tr>
<tr>
<td>MF6</td>
<td>Horticulture</td>
</tr>
</tbody>
</table>
The Levels

We worked with professionals within each partner country which allowed us to
- The current and future skills levels in each country
- A common level across Europe
- Map the skills gap which exists
- Identify gaps across all sectors and skills
Future Skills Levels
How to Use Skills Levels

Identify your target profession or professions.
Note the skills levels of these professions.
Highlight how you would or can upskill in relation to these skills.
Task-based qualifications

Why?

- Practical perspective on required skills for circular construction
- Increased recognition of learned skills
- Learning outcomes for development of training
- Circularity applied to different fields in construction
Scope of circular construction skills qualifications

Included
• **Integrating circular principles** in existing work activities
• Focus on working as a member of the construction value chain
• Including **interdisciplinary skills:**
  o Collaboration
  o Research and evaluation
  o Education

Not included
• Detailed skills and knowledge
• Technology specific (e.g. details of installing heat pumps, specifics of designing pre-fabricated structures)
## The main Tasks

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Prioritise regenerative and efficient use of resources</td>
</tr>
<tr>
<td>2</td>
<td>Design for the future</td>
</tr>
<tr>
<td>3</td>
<td>Assemble/construct for the future</td>
</tr>
<tr>
<td>4</td>
<td>Rethink the business model</td>
</tr>
<tr>
<td>5</td>
<td>Stretch the lifetime</td>
</tr>
<tr>
<td>6</td>
<td>Use secondary resources</td>
</tr>
<tr>
<td>7</td>
<td>Incorporate digital technology</td>
</tr>
<tr>
<td>8</td>
<td>Collaborate to create joint value</td>
</tr>
<tr>
<td>9</td>
<td>Strengthen and advance knowledge</td>
</tr>
<tr>
<td></td>
<td>Prioritise regenerative and efficient use of resources</td>
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<td>------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Design with bio-based, non-toxic and/or non-critical materials</td>
</tr>
<tr>
<td>1.2</td>
<td>Replace energy sources with less impactful alternatives</td>
</tr>
<tr>
<td>1.3</td>
<td>Apply suitable energy efficiency measures to the building design (taking into account building purpose and climate)</td>
</tr>
<tr>
<td>1.4</td>
<td>Generate energy from renewable sources - e.g. solar, sustainable biomass</td>
</tr>
<tr>
<td>1.5</td>
<td>Apply measures that replace freshwater with less impactful alternatives</td>
</tr>
<tr>
<td>1.6</td>
<td>Enact water efficiency measures</td>
</tr>
<tr>
<td>1.7</td>
<td>Source bio-based, reusable, non-toxic and non-critical materials</td>
</tr>
<tr>
<td>1.8</td>
<td>Source local and lightweight materials</td>
</tr>
</tbody>
</table>
Pre-selection of relevant Tasks

Based on your target profession/professions select:
- Identify the principles (key elements) you want to train on
- Identify the relevant tasks
- Review the ULO’s provided (on usability on first sight)
BUS-GoCircular outcomes relevant for trainers

Pepa Esparza Arbona (IVE) & Sreeja Raghunathan (CE)

14th December 2023
List of the most useful BUS-GoCircular project outcomes for trainers:

- Compilation of existing training material
- Training materials for public procurers
- Training materials for trainers
- Training Packs: 1 EU level + 7 Country level (NL, BG, CZ, ES, HR, HU, IE)
- Trainers programme (TtT)
- Gamified learning approach:
  - Circularity Games by CE
  - Circularity Game by ISSO
- Ozone e-learnings
- BUS app: maturity scan
Assessment of the available and existing Training material

- To develop the training material Circle Economy Foundation guided an assessment and mapping of 26 different training modules.
- CE, ISSO, EnEffect, CVUT, FEVEC, IVE, UZ-FCE, EMI and TUS all contributed information on the training modules.
- On the basis of this assessment recommendations for the design of the “Train the Trainers (TtT) programme” and the “Training Packs” have been formulated.
- To see the material that has been assessed and the recommendations see this report.
Training Materials

BUS–GoCircular makes use and refers to open available training materials but also creates new ones to upskill professionals in circular construction.

Training material for public procurers: How to procure circular construction skills? (click HERE).

Materials for training of trainers: the following modules are intended as a bank of free training material that can be used and edited by trainers

1. Introduction to the Circular Economy (PDF click here)
2. Design and Implementation of Circular Practices (PDF click here)
3. Bio Based Material Use (PDF click here)
4. Retrofits, Upgrades, Repair and Maintenance (PDF click here)
5. Water in Design and Construction (PDF click here)
6. Energy in Design and Construction (PDF click here)
7. Digitalisation (PDF click here)
8. Material Impact Measurement and Reduction (PDF click here)
9. Waste in Design and Construction (PDF click here)
10. Deconstruction (PDF click here)
11. Circular Economy Principles Across the Value Chain (PDF click here)

https://busgocircular.eu/training/
How to procure circular construction skills?

This training material aims to help public procurers and policymakers better understand how they can stimulate demand for circular construction skills through public procurement.

- **Introduction**
- **Offer internal training to your staff**
- **Engage your contractors**
- **Procure selective demolition and deconstruction services**
- **Prevent construction waste by design**
- **Maintain, retrofit and refurbish**
- **Include training clauses in tenders**
- **Include circularity skills to recruit the design team for an urban project**

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https://busgocircular.eu/training/
Training Packs

BUS-GoCircular has created the “Training Packs” to enable SME’s to train their staff in a simple, attractive, short and low-cost way (click HERE). In addition to the 7 national packs for the Netherlands, Bulgaria, Czechia, Spain, Hungary, Croatia and Ireland, an English Pack has been published for wider use in the EU.

https://busgocircular.eu/training/
Trainers programme

BUS-GoCircular develops a “Train the Trainers (TtT)” programme, that addresses application of the Circular Economy interventions in the construction value chain framework and the Circular Construction Skills qualification framework. All trainers together form the “BUS-GoCircular learning community” composed of leading training organisations across Europe focused on new skills for circular construction. These trainers will develop a tailored training plan which they will later implement in their own environment.

1st Train the Trainers (TtT): Prague, 18–19 January 2023 (click HERE)

2nd Train the Trainers (TtT): Online, 6, 13 & 20 June 2023 (click HERE)

3rd Train the Trainers (TtT): Online, 31 Oct., 7 & 14 Nov. 2023 (click HERE)
Gamified Learning Approach

Circularity Games by Circle Economy Foundation

Circularity Game by ISSO
Learning Skills to operate in a Circular Economy

Using **Circularity Games**, learn about circular economy strategies through a blended learning approach full of gamification.

1. Learn about circular economy strategies through a blended learning approach full of gamification.

2. Get inspired by case studies, videos, and frameworks from the BUS-GoCircular consortium members.

3. After completion, get an overview of:
   - Your organisation’s level of circular expertise
   - What next steps to take to pursue your learning
Mission Control for Organizations

With Mission Control, Circularity Games’ dashboard, you can:

- monitor the training and circularity capacity over time across teams, individuals, and expertise
- identify and grow your potential to drive the circular transition.
The Circular Built Environment Basic Track

Circularity Games

The Circular Built Environment Basic Track
Alice testing
Train yourself or your entire organisation to boost the adoption of circularity in the Built Environment.

2/6

How Nature Builds
Be inspired by the innovative ways nature builds

The Challenges for the Industry
Dive into modern Built Environment challenges

Narrowing the Gap
Examine how to narrow the circularity gap in the Built Environment

The Value Hill and the R-ladder
Dive into the key frameworks to optimise value retention in the BE

Incentives and Opportunities
Unlocking potential: The incentives of building circularity

Leadership and Collaboration
Leadership and collective action in advancing circular building

Coming Soon - February 2024
Go Circular Game for Construction
A social team learning approach

ISSO developed a Gideon Transition Game for gamified learning with change teams in construction sector in the learning platform from the 2BeCollective

Closing the green skills gap by,

1. Learn about circular economy strategies through a blended learning approach full of gamification.
2. Get inspired by shared ideas and solutions of other players.
3. When done at company level win prizes for the most liked shared ideas and solutions
**Circularity Game**

**About this program**
The circularity game is focused on the building and installation sector. The game challenges players to transcend linear models of production and consumption and wholeheartedly embrace circular economy principles. Participants gain insights into sustainable material choices, recycling strategies, and design approaches that minimize waste and maximize resource utilization.

**How can you use this content?**
Contact Layla van der Schaaf from ISSO
lvanderschaaf@ioso.nl

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**CHALLENGE 1**
**Introduction Circular building and installation**
Why is circularity important in construction and installation work?
What does the Toolbox circular principles entail?
Which circular strategies can you use to add value to your value chain?

**CHALLENGE 2**
**Stretch the lifetime**
What does stretch the lifetime entail?
Which strategies exist to apply this key principle?
How can you apply this strategy to your project?

**CHALLENGE 3**
**Regenerative resources**
What are regenerative resources?
What opportunities are there to add regenerative resources in construction?
How can regenerative resources be implemented?

**CHALLENGE 4**
**Waste as a resource**
What do open and closed loop reuse mean?
What opportunities are there to use secondary sources in construction?
How do professions play a role in reuse?

**CHALLENGE 5**
**Developing and disseminating knowledge**
Why is knowledge management important?
Which strategies exist to apply this key principle?
How can professions stimulate research and development?

**CHALLENGE 6**
**Collaborating for value creation**
How can collaboration enhance the transition to a circular building environment?
Which different strategies of collaboration exist?
Which professions are useful to implement this strategy?
Circularity Game

Created by:
ISSO

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CHALLENGE 7
New business models
Which circular business models exist?
What roles do professions play in the adoption of new business models?
Which new business model could enhance your project?

CHALLENGE 8
Designing and building for the future
What does Designing and building for the future entail?
In what ways do professions change when you apply building and installing for the future?
How can you design and build for the future?

CHALLENGE 9
Digital techniques
Which digital techniques exist?
Which professions are needed to implement data techniques?
How can you implement this strategy in your project/company/value chain?
Ozone nine self-paced e-learnings accessible from BUILD UP Skills advisor -app
BUS app maturity scan

1. Identify interest areas
2. Skills self assessment
3. Receive an overview of your knowledge gaps

Determine your knowledge gaps by:

Kies een onderwerp om een self assessment te doen:

Kies je ambitieniveau

0 Verkennen
Ik wil wat weten van circulair ontwerpen

1 Basis
Ik wil meer over implementatie van circulaire principes

2 Fundamenteel
Ik ben in staat om sommige circulaire vaardigheden toe te passen

3 Gevorderd
Ik ben in staat om de meeste circulaire vaardigheden toe te passen

4 Expert
Ik ben een expert in toepassing van circulaire vaardigheden

Beoordeel je huidige niveau als Architect voor Circulaire vaardigheden.

Hoe beoordeel jij je kennis en vaardigheden voor Circulair bouwen:

Dit onderwerp is nieuw voor mij

Als Architect voor Circulaire vaardigheden heb je momenteel 34 procent van de vereiste vaardigheden.

Hieronder zie je een overzicht van de onderwerp[en] die voldoende zijn of die verbeterd kunnen worden.

Circulair bouwen: 0%
CE: De levensduur verlengen: 0%
Thank you for your attention

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Colophon

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Success stories on upskilling professionals

Discussion led by:
Daniella Mazzini, Project and Communications Coordinator at ISSO

Guest storytellers:
Maria Angeles Roca, technical Staff at the Department of Circular Architecture of Universitat Jaume I
&
Domagoj Tkalčić, Student at University of Zagreb
Interactive session: Opportunities and next steps/challenges in uptake after the project ends

Gloria Callinan, Project Support Officer at Technological University of the Shannon & Daniella Mazzini, Project and Communications Coordinator at ISSO
Take-aways and conclusions

Gloria Callinan, Project Support Officer at Technological University of the Shannon
Thank you!