



D5.6 Evaluation of national implementation actions - summary report

Issue Date 28-2-2024

Version: 1



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033740. The contents of this report reflect only the author's view and the Agency and the Commission are not responsible for any use that may be made of the information it contains.

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Issue Date	28-2-2024
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Version	1
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Dissemination level	Public

Revision and history chart

Version	Date	Editors	Comment Description
0.1	January 2024	Zuzana Hejlová, INCIEN	First draft of structure
0.2	February 2024	Zuzana Hejlová, INCIEN	First draft of deliverable content
0.25	February 2024	Benjamin Hague, INCIEN	First draft of deliverable content
0.3	February 2024	Gloria Callinan, TUS	Partner input
0.4	February 2024	Pavla Dvořáková, ČVUT	Partner input
0.5	February 2024	Pepa Esparza, IVE	Partner input
0.6	February 2024	Ira Ivanova, EnEffect	Partner input
0.7	February 2024	Empar Juanes, FEVEC	Partner input
0.8	February 2024	Viola Kelemen, ÉMI	Partner input
0.9	February 2024	Károly Matolcsy, ÉMI	Partner input
0.10	February 2024	Bojan Milovanović, UZ-FCE	Partner input
0.11	February 2024	Joan Romero, IVE	Partner input
0.12	February 2024	Sybren Steensma, BC	Partner input
0.13	February 2024	Daniella Mazzini, ISSO	Final review
1	28-2-2024	Jan Cromwijk. ISSO	Final approval

Executive summary

The overall aim of BUS-GoCircular is to address and overcome the challenges of the stimulation of demand for green energy skilled workforce, along with hands-on capacity building to increase the number of skilled professionals within the workforce across the value chain. This report describes the final results of Train the Trainer courses, national pilot training, other national implementation plan actions and KPIs at the country level.

List of acronyms and abbreviations

BIM: Building Information Model / Management

BUS: Build Up Skills

CE: Circular Economy

CPD: Continuous Professional Development

EAB: External Advisory Board

FTP: Fundamental Training Pack

KE: Key Elements

NIP: National Implementation Plan

ULO's: Units of Learning Outcomes

RES: Renewable Energy Source

WP: Work Package

TtT: Train the Trainers

Definitions

Circular economy: The circular economy offers the next progressive step in our economic model, taking over from the current linear ‘take-make-waste’ economy by seeking to extract the maximum value from resources in use and keep materials in circulation for as long as possible through processes like reuse, repair, remanufacture and recycling. The ultimate goal of a circular economy is to establish an ecologically safe and socially just operating space for humankind.

Critical raw materials: Those raw materials that are most important economically and have a high supply risk for the EU, as listed by the European Commission.

Focus group: A small subset of experts within the construction industry which have been brought in to assist in verification of the work we have completed.

Key elements framework: The Key Elements (KE) framework is a conceptual framework of eight elements of circularity that can be applied at different intervention levels (for example, national, regional, sector, business, product, process, or material) towards a circular economy. The KE framework consists of three core elements and five enabling elements. Core elements deal with physical flows directly, whilst enabling elements deal with creating the conditions or removing barriers, for a circular transition.

Skills Mapping: Mapping of skills levels from 0 to 5. This allows us to gauge the skills gap existing within any given profession.

- **Current Skills:** The skills level at which professionals and experts see their current level of skill.
- **Future Skills:** The skills level at which professionals and experts see their future level of skill.
- **Skills Gap:** The gap which exists between the current and future skills levels.

The three core key elements are:

1. **Prioritise regenerative resources:** Ensuring that renewable, reusable, non-toxic resources are used in the manufacturing of built environment. Ensuring that all resources are used in an efficient way.

2. Preserve and extend what is already made / Stretch the lifetime: 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.
3. Use waste as a resource: Utilise waste streams as a source of secondary resources and recover waste for reuse and recycling.

The five enabling key elements are:

1. Design for the future: Account for the systems perspective during the design process, to use the right materials, to design for appropriate lifetime and to design for extended future use.
2. Collaborate to create joint value: Work together throughout the supply chain, internally within organisations and with the public sector to increase transparency and create joint value.
3. Rethink the business model: Consider opportunities to create greater value and align incentives that build on the interaction between products and services.
4. Incorporate digital technology: Track and optimise resource use and strengthen connections between supply chain actors through digital, online platforms and technologies that provide insights.
5. Strengthen and advance knowledge: Develop research, structure knowledge, encourage innovation networks and disseminate findings with integrity.

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1. Introduction

The national BUS-GoCircular teams were guided on putting the national implementation plan in practice and were monitored and evaluated by the use of Key Performance Indicators (KPI) set at the beginning of the project and agreed by the project partners. These KPIs allowed timely adjustment and comparing the results among the different countries in relation to the increased demand of CE, EE and RES skills.

Based on the national implementation plan from task 5.1 follow-up national pilot courses (at least 2 per country) for involved target groups at different qualification levels and in different parts of the value chain (as defined in the circular construction skills qualification framework with a focus on multifunctional green roofs, façades and interior elements) were needed to be organised. Some national teams also organised 1 or more TtT courses at national level. All courses were supervised/organised by previously registered TtT course graduates (T5.2), with specific attention for the interaction with different stakeholders in the value chain.

Members of the BUS-GoCircular consortium offered mentoring support. For successful courses, the developed materials, gained knowledge and acquired connections during the project duration were used. The interlocutor (T5.1) was contacted monthly by email to inform about the implementation progress. At the end of the implementation phase all the results and KPIs were collected, including outcomes and a description of qualitative lessons learned by each country. For the additional Train the Trainers at national level we expected 7 trainings with on average 10 participants = 70 additional trained trainers. As of February 2024, 7 national level trainings were organised with 73 additional trained trainers, thus the target has been reached.

This report describes how the BUS-GoCircular consortium developed national pilot training courses and built a network of trainers across the seven consortium countries as well as the content and success of national implementation actions. Furthermore at the country level the possibilities to integrate BUS-GoCircular results in practice were explored and monitored.

2. Summary

2.1. National TtT and pilot courses

Based on the national implementation plan from Task 5.1, follow-up national pilot courses (at least 2 per country) were organised for involved target groups at different qualification levels and in different parts of the value chain (as defined in the circular construction skills qualification framework, with a focus on multifunctional green roofs, façades and interior elements). Those national pilot courses were lead by trained trainers from either national train-the-trainer courses or trainees from the three international TtT “kickstarter” rounds (Task 5.2) that were held in the following dates and locations:

1. January 18-19, 2023, Prague, Czech Republic
2. June 6th, 13th, 20th 2023, online
3. October 31st, November 7th, 14th 2023, online

National pilot courses are those that are based on the kickstarter round outcomes and their certified tutors used the gained knowledge and skills from these rounds to train more target groups. National TtTs, on the other hand, are courses organised on national level to provide “certified trainer” status for additional trainers at training and other professional organisations that provide continuous professional development (CPD) courses for practising building professionals and focus on new knowledge and skills needed for the design, construction, use, maintenance, and end of service life of "circular" buildings.

The national targets and final achievement for trained trainers, courses and number of trained professionals are summarised in the following tables.

Implementation country	Train-the-Trainer courses		Number of trained trainers						
	# of BGC T5.2 Kickstarter courses attended	# of TtT courses completed at national level	TtT kickstarter course, 1st round (Prague)	TtT Kickstarter course, 2nd round (online)	TtT Kickstarter course, 3rd round (online)	Trainers trained on national TtT courses	KPI - Total number of trained trainers	# of national pilot courses completed	# of trained professionals
Bulgaria	2	2	3	2	0	24	24	2	80
Croatia	2	2	2	3	2	8	15	2	50
Czechia	2	0	4	0	4	0	8	2	40
Hungary	2	2	2	1	1	8	12	2	50
Ireland	2	0	2	5	4	0	8	2	50
Netherlands	1	1	1	0	0	8	8	2	48
Spain	2	1	2	3	1	6	12	3	96
		8	16	14	12	52	89	16	379

Table 1. Summary of National Targets

Implementation country	Train-the-Trainer courses		Number of trained trainers						
	# of BGC T5.2 kickstarter courses attended	# of TtT courses completed at national level	TtT kickstarter course, 1. round (Prague)	TtT kickstarter course, 2. round (online)	TtT kickstarter course, 3. round (online)	Trainers trained on national TtT courses	KPI - Total number of trained trainers	# of national pilot courses completed	# of trained professionals
Bulgaria	2	2	3	2	0	22	27	5	85
Croatia	3	1	2	3	2	14	21	5	273
Czechia	2	0	4	0	4	0	8	8	387
Hungary	3	1	2	1	1	16	20	4	116
Ireland	3	0	2	5	4	0	11	0	0
Netherlands	1	2	1	0	0	15	16	0	0
Spain	3	1	2	3	1	6	12	8	247
Actual 02/2024		7					115	30	1108
Target 2/2024		7					87	16	414
% fulfilment		100%					132%	188%	268%

Table 2. Final achievement 02/2024

2.2. Other national implementation actions & KPIs

Other NIP actions were defined on a national level and included specific goals, for example events, courses, summer schools, establishment of external advisory boards, participation in circularity events, documentation of implementation cases etc.

KPIs also monitored the progress of specific goals under other work packages, for example: T4.3 Involvement of product providers in a circular approach - at least (x) signed MoUs with product manufacturers and suppliers; T4.4 Incentivizing SMEs to upskill their workforce - BUS-GoCircular fundamentals training pack created and published in local language; T4.4 Incentivizing SME's to upskill their workforce - Validation and adaptation of BGC FTP with local SMEs; T5.3 Mentoring programme - mentoring matches completed and others.

3. Implementation at National level

3.1. Bulgaria

3.1.1. National TtT courses

Two TtT courses were organised at a national level:

Start date	Finish date	Location	Trainer(s)	Format	Number of trained trainers	Target group(s)	Description of course content and format
10/11/23	10/11/23	Knowledge Hub, University of Architecture, Civil Engineering and Geodesy, Sofia	Ira Ivanova (EnEffect), prof. Fantina Rangelova (UACEG)	live	5	Professional trainers, teachers and professors from university	Module 1: Basic principles of circular economy in construction Module 2: Qualification framework for circular skills in construction Module 3: Types of teaching methods for teaching circularity
17/11/23	17/11/23	Online	Ira Ivanova (EnEffect), prof. Fantina Rangelova (UACEG)	online	17	Professional trainers, teachers and professors from university	Module 1: Basic principles of circular economy in construction Module 2: Qualification framework for circular skills in construction Module 3: Types of teaching methods for teaching circularity

Table 3. Information about Bulgaria TtT courses

3.1.2. National pilot courses

Five pilot training courses were organised at a national level:

- 20/11/2023, Sofia, in person, 12 trained persons with students and professionals as a target group.
 - Lecture dedicated to energy efficiency as part of the elective course at the University of Architecture Civil Engineering and Geodesy.
 - Materials used and adapted from M1 Circular Economy and M6 Energy
 - link: <https://www.facebook.com/events/862239968643628/>
- 21/11/2023, Forestry University, in person, 14 trained persons (students)

- Training on the basics of Circle Economy with students from 3rd Semester at the University of Forestry and Agriculture during their Week on Innovation event.
- Materials adapted from M1 Circular Economy and M3 Bio- based materials
- 09/12/2023, Borovets, in person, 13 trained persons (municipal representatives)
 - link: <https://www.eneffect.bg/bg/news/1237/specializirano-obucenie-za-obshhinski-specialisti-za-politiki-i-instrumenti-za-obnoviavane-na-sgradite>
 - Materials adapted from M1 and Training materials for building procurers
- 13/12/2023, online, 6 trained persons
 - Training on tendencies in EU/national requirements and changes in legislation for Energy Efficiency and Circle economy
 - Organised and hosted by EnEffect on demand by the Association for Construction with Natural Materials
 - Materials adapted from M1 and M8 Material Impact
- 31/01/2024 online and present 38 + 20 trained professionals
 A seminar in 3 series dedicated to Construction in harmony with nature: First one on the 31st of January, during which EnEffect together with producers and distributors of natural building materials (IES and ABNM) spoke about construction with low ecological footprint and sustainable approaches. Next ones will be in April and September 2024
<https://www.facebook.com/BAUAcademy/posts/pfbid02UizVg4Kasi2dqnisgSaiWcDNFvm4oBR8pA8pD3FuCgT5ijEeGPKpK1fvJBDjdYL3l>

3.1.3. Other NIP actions

In **Bulgaria**, the following NIP actions were planned and implemented:

Action	Status, 02/2024	Description
1 Procurement project	Post-project	The situation with municipal administration on national level is stabilising and new opportunities for collaboration on sustainable public procurement will be sought.
Development of at least 2 schemes for	Complete	So far one scheme has been developed in alliance with the Institute for Circular Economy in Bulgaria for the

Action	Status, 02/2024	Description
recognition or certification of circularity skills		elective course “Circular Models in Construction” at the University for Architecture, Civil Engineering and Geodesy in Sofia for students of all bachelor engineering students. A second scheme is currently being developed for CPD for the BUS Bulgaria 2030 project, which will include ULOs on Circular Economy for buildings. Its approval and recognition is due in 2024-2025
Enhancing the curricula of higher education establishments and VET providers through supplementing existing educational and training courses with circularity modules	Complete	In addition to the elective course on “Circular models in construction” several ULOs from the circular skills in construction qualification framework have been successfully introduced in subjects at the faculty of civil engineering at the UAECG in Sofia.
Promoting ULOs related to circularity skills in the construction sector in the national qualification standards	Complete	The BUILD UP Skills Bulgaria 2030 currently developed roadmap includes a continuing professional development scheme in which modules containing ULOs on circularity are included.
Develop an online training aid to support achievement of promoted ULOs	Post-project	The Fundamental Training Pack for construction SMEs will be uploaded to promote specific ULOs
Development of 1 public procurement model for integration of circularity requirements in public projects	Post-project	The situation with municipal administration on national level is stabilising and new opportunities for collaboration on sustainable public procurement will be sought.
Participation in at least 6 dedicated events promoting building certification schemes focused on circular approaches, targeting active partnerships with at least 12 product manufacturers, distributors, or certifiers	Complete	Participation in several events were dedicated to promoting education in circular economy in construction pointing to the existence and usability of the Circular skills in construction qualification framework developed by BUS-GoCircular. Certification schemes are not popular in Bulgaria and predominantly foreign companies apply internationally recognized ones (BREEAM, LEED, rarely DGNB), if any.

Action	Status, 02/2024	Description
		Partnerships were concluded with professional associations which unite several businesses for sustainable products.
Integrating the certification on circularity schemes in the requirements of at least one building certification standard focused on achievement of highly environment-friendly build environment	Ongoing	See previous point
Document and communicate the Bulgarian implementation cases	Post-project	An article is being prepared to be published in the follow up of the project to emphasise the need for education and qualification in circular and energy efficient buildings. It will be supported by the presentation of the BUS-GoCircular project and promotion of its results.

Table 4. Information about Bulgaria NIP actions

3.2. Croatia

3.2.1. National TtT courses

One TtT course was organised at a national level:

Start date	Finish date	Location	Trainer(s)	Format	Number of trained trainers	Target group(s)	Description of course content and format
15/02/24	15/02/24	online	Bojan Milovanovic (UZ-FCE) Nina Stirmer (UZ-FCE) Lana Lovrencic Butkovic (UZ-FCE)	online	14	Professional trainers, teachers and professors from university	Presentation introducing BGC outcomes, training materials and tools developed. Interactive session

Table 4. Information about Croatia TtT courses

3.2.2. National pilot courses

Five pilot training courses were organised at a national level:

- 01/03/2023 - 28/04/2023, Zagreb, 12 persons (students) trained in person by trainers Prof. Nina Štirmer and Ivana Carević
 - Course on "Green buildings".
 - Training materials used to some extent, translated to Croatian and amended
 - link: <https://www.grad.unizg.hr/predmet/zelgra>
- 01/03/2023 - 28/04/2023, Zagreb, 12 persons (students) trained in person by trainer Assoc.prof. Bojan Milovanović
 - Course on "Energy refurbishment of buildings"
 - Teaching methods adopted from BUS-GoCircular and Technologies for resilient, energy efficient and healthy buildings
 - link: <https://www.grad.unizg.hr/predmet/eoz>
- 01/10/2023 - 26/01/2024, Zagreb, 26 persons (students) trained in person by trainers Assoc.prof. Bojan Milovanović, Mergim Gaši, PhD, Domagoj Tkalčić, Robert Rukavina, Tanja Herr, Hrvoje Rubić, Vladimir Benković
 - Course on "Building physics"
 - Teaching methods adopted from BUS-GoCircular and Technologies for resilient, energy efficient and healthy buildings
 - link: <https://www.grad.unizg.hr/predmet/grafiz>
- 04/04/2023, Zagreb, 193 persons (Architects, engineers, producers, real estate developers, consultants) trained in person by trainers Assoc.prof. Bojan Milovanović, Irena Križ Šelendić, Mihaela Zamolo, Vlasta Zanki, Levan Ekhvaia, Carolina Aittokallio
 - Course on "How to achieve carbon neutrality in the lifecycle of the building" ("Kako postići ugljičnu neutralnost u životnom vijeku zgrade")
 - Blended Learning: in-person presentation, discussion, presentation and recording for the participants.
 - Circular architecture: principles of circularity in architecture, practical examples of projects with built circularity
- 04/12/2023 - 08/12/2023, Zagreb, 30 persons (students) trained in person by trainers Assoc.prof. Bojan Milovanović, Franko Ćurčin, Hrvoje Pilko, Petar Nevistić, Antun Pfeifer
 - Student Case Study Competition SCS 2023
 - Interdisciplinary competition titled "The city - a challenge to sustainability"

- Electrical engineering workshop - Autonomous vehicles
- Architecture/construction workshop - Quantification of the product's impact on the environment - EPD (Environmental Product Declaration), Green infrastructure
- Mechanical engineering workshop - The future of transport
- Blended Learning: in-person presentation, discussion, gamification
- Quantification of the product's impact on the environment - EPD (Environmental Product Declaration)
- link: <https://scs.supeus.hr/>

3.2.3. Other NIP actions

In **Croatia**, the following NIP actions were planned and implemented:

Action	Status, 02/2024	Description
Enhancing the curricula of higher education establishments and VET providers with BUS-GoCircular results	Complete	Prof. Ivana Banjad Pečur - member of the Construction and Geodesy sector council within the Croatian Qualifications framework project at the Ministry of Science and education. Starting the courses at the University of Zagreb, Faculty of Civil Engineering titled "Green Building" and "Energy refurbishment of buildings,, (spring 2023)
Promoting ULOs related to circularity skills in the construction sector in the qualification standards	Complete	Promoting on at least 12 different occasions <ul style="list-style-type: none"> ● promoting ULOs at European Training foundation interview 16.1.2022 ● Ivana Banjad Pečur - member of the Construction and Geodesy sector council within the Croatian Qualifications framework project at the Ministry of Science and education - meeting. ● Promoting of ULOs at BIMzeED final conference ● Participation in the CENTRAL conference on sustainable construction - together we can ensure a sustainable future! – Croatian Green Building Council - moderator of the panel discussion

Action	Status, 02/2024	Description
		<ul style="list-style-type: none"> • HRT interview for "Znanstveni krugovi" about the need for upskilling the construction sector • promotion at the event of National Qualifications platform organised with the Croskills Reload project • promotion at the conference "CO2 do 55 Zeleni plan za Hrvatsku" eng. CO2 to 55 - Green plan for Croatia" • promotion at the 17th days of Croatian Chamber of Civil Engineers • Article in the Korak u prostor Magazine • promoting circular skills at ArhiBau Fair - prof Banjad Pečur • Ivana Banjad Pečur - member of the Construction and Geodesy sector council within the Croatian Qualifications framework project at the Ministry of Science and education. - meeting
Embedding results in at least 2 schemes for recognition of circularity skills in the construction sector	Complete	<p>Specijalist održivih energetske sustava (Specialist in sustainable energy systems) - EDUCATION PROGRAM FOR ACQUIRING A MICRO QUALIFICATION/PARTIAL/FULL QUALIFICATION - Ruđer Bošković Technical School</p> <p>Croskills_Reload Roadmap - The BUILD UP Skills Croatia developed roadmap includes a VET, HEI and continuing professional development measure in which modules containing ULOs on circularity are suggested to be included.</p>
Develop an online training aid to support achievement of promoted ULOs	Complete	The Fundamental Training Pack for construction SMEs in Croatia uploaded to promote specific ULOs
Integrate the new training programmes in existing CPD schemes	Complete	<p>Integrated 1 new training program into the CPD scheme of the Croatian chamber of Civil Engineers. Education module titled "Affirmation of green building,,</p> <p>3 new training programs integrated into the CPD scheme of the Faculty of Civil Engineering. Education modules titled: - Sustainable materials in construction - Energy renovation of buildings up to NZEB level - Designing and constructing NZEBs</p>

Action	Status, 02/2024	Description
		Integrated 1 new training program into the CPD scheme of the Energy Institute Hrvoje Požar on Multifunctional green roofs
Participation in at least 6 dedicated events promoting building certification schemes focused on circular approaches, targeting active partnerships with at least 10 demand-side promoters	Complete	<p>Participated in 16 events with more than 300 participants in some of them</p> <ul style="list-style-type: none"> - 11 CPD events with Croatian Chamber of Civil Engineers called "Educational module: Affirmation of green building" - participation at 16th days of Croatian Chamber of Civil Engineers with the lecture titled "EPD, how to find out the impact of a construction product on the environment and climate" - Nina Štirmer led the panel discussion on the topic of "Circular management of construction waste in Croatia: From raw material to waste and back" at the event organised by The Ministry of Economy and Sustainable Development (MINGOR) and the World Bank in Croatia - Faculty of Architecture, University of Zagreb and the Cluster for Energy Efficiency and Sustainability in Buildings conference titled Zero emissions buildings (ZEB2023) - "Wienerberger - Summer School: Uloga građevnih materijala u smanjenju CO2 emisija te zdravom i održivom stanovanju (The role of building materials in reducing CO2 emissions and healthy and sustainable housing") - 6. SREDIŠNJA Konferencija o održivoj gradnji
Document and communicate the Croatian implementation cases.	Complete	<p>9 cases documented and communicated</p> <ul style="list-style-type: none"> - Jutarnji list article - construction of NZEBs - "- ESG EU taxonomy - Whole life cycle of buildings through all aspects of sustainability lecture titled Kvantifikacija utjecaja proizvoda na okoliš - EPD (Environmental Product Declaration) - communication of EPD developed for Eco-sandwich wall panel system - - Participation at the 15th days of HKIG with presentation""EPD, kako saznati utjecaj

Action	Status, 02/2024	Description
		<p>građevnog proizvoda na okoliš i klimu" and promotion of Eco-sandwich implementation case</p> <ul style="list-style-type: none"> - Interview for Jutarnji list "Održiv dizajn, održiva arhitektura, održivi materijali... Evo što termin održivo točno znači!" - Newspaper article related to wood construction in Večernji list - documentation and communication of bolnica Zabok, family house Kupinečki kraljevec, Eco-Sandwich and strawbale house in Ivankovo - lecture titled "Održivi proizvodi u graditeljstvu" at GBC event "Sustainable products and technologies in construction industry" - Jutarnji list article - Koliko stoji gradnja obiteljske kuće? Ovo su koraci za planiranje budžeta i odabir materijala - "Documentation and communication on LinkedIn about First Eco-Sandwich house in Koprivnica - Leading panel discussion at 6th Central conference on sustainable construction with presenters documenting and communicating their implementation cases"

Table 4. Information about Croatia NIP actions

3.3. Czech Republic

3.3.1. National TtT courses

No TtT courses were planned or organised at a national level. The first of the three kickstarter TtT courses at an EU level was held in-person in Prague in January 2023. In total, across the three kickstarter rounds, a total of 8 participants from Czechia completed the TtT course, as per the targeted KPI.

3.3.2. National pilot courses

Eight pilot training courses were organised at a national level:

- 09/03/2023, Prague, 150 persons (architects, real estate developers, students) trained in person + online by trainers Lukáš Ferkl (Envitrail), Robert Platje, (Mei

architects), Aleš Brotánek, (ABateliér), Tereza a Michal Hoškovi (V Bezovém údolí), Barbora a Jiří Weinzettlovi (Atelier 111)

- Rethink Architecture: Renovation of residential buildings.
- Blended Learning: in-person presentation, discussion, presentation and recording for the participants.
- Circular architecture: principles of circularity in architecture, practical examples of projects with built circularity
- link: <https://www.rethinkarchitecture.cz/prednasky/prednasky/rezidencni-domy>
- 20/04/2023, Prague, 100 persons (architects, real estate developers, students) trained in person + online by trainers Jana Vlková (Colliers International), Liisa Tuohimaa (AW2 ARCHITECTS), Marek Tichý (TaK Architects), Benedikt Markel (IXA)
 - Rethink Architecture: Renovation of office buildings
 - Blended Learning: in-person presentation, discussion, presentation and recording for the participants.
 - Circular architecture: principles of circularity in architecture, practical examples of projects with built circularity
 - link: <https://www.rethinkarchitecture.cz/prednasky/prednasky/kancelare>
- 11/05/2023, Prague, 90 persons (architects, real estate developers, students) trained in person + online by trainers Eliška Havla Pomyjová (urbanist), Roman Dub (Municipal Library of Pisek), Elena Schütz (SOMETHING FANTASTIC), Lenka Žlebková (Prague Congress Centre)
 - Rethink Architecture: Renovation of public buildings
 - Blended Learning: in-person presentation, discussion, presentation and recording for the participants.
 - Circular architecture: principles of circularity in architecture, practical examples of projects with built circularity
 - link: <https://www.rethinkarchitecture.cz/prednasky/prednasky/verejne-budovy>
- 16/05/2023, Prague, 27 persons (architects and designers) trained in person + online by trainers Karolína Barič, Rethink Architecture and Adam Rujbr, Adam Rujbr Architects; Seminar on Circular Architecture, covering:
 - Practical tips for designing circular architecture
 - LCA analysis of materials and structures and how to approach retrofits
 - Examples of good practice in the Czech Republic and abroad
 - An overview of the topic of circular economy and architecture
 - A pdf presentation including links to resources

- Tips on tools to help in circular design
- Blended Learning: in-person meeting, discussion, sharing experience, presentation and recording for the participants.
- link: <https://www.rethinkarchitecture.cz/rethink-architecture-seminar-cirkularni-architekturatura>
- 29/06/2023, Prague, 20 persons (Consultants and workers in the field of energy savings and climate protection within SEVEn) trained in person by trainer Jakub Kvasnica (SEVEn/CVUT)
 - General introduction to the circular economy, selected topics relevant to the work of energy consultants, practical examples, introduction to Circularity Academy and Gambatte
 - The course was based mainly on BGC materials, supplemented by good practice examples according to Gambatte.
- 01/09/2023 - 31/12/2023, 12 university students were trained in person by trainers Tereza Pavlů, CVUT UCEEB and Jan Pešta, CVUT UCEEB
 - Pre Demolition audit, waste management, safe use of recycled products, circular design strategies, management of recycling centre, selective deconstruction, decarbonization of building industry with applying of circular economy practices
 - The course implemented part of the content regarding competencies, which were defined with the help of a list of competencies described in BGC.
 - link: <https://bilakniha.cvut.cz/cs/predmet7574806.html#gsc.tab=0>
- 25/09/2023 - 22/12/2023, Prague, 40 persons (students) trained in person + online by trainer Jakub Kvasnica (SEVEn/CVUT)
 - General introduction to the circular economy, with focus on construction and construction economics, practical examples, introduction to Circularity Academy and Gambatte
 - The course was based mainly on BGC materials, supplemented by selected case examples from Gambatte and Circularity Academy, and secondarily by other web resources.
- 19/02/2024 - 17/05/2024, 30 persons (students) trained in person + online by trainer Jakub Kvasnica (SEVEn/CVUT)

- General introduction to the circular economy, with focus on construction and construction economics, practical examples, introduction to Circularity Academy and Gambatte
- The course is based mainly on BGC materials, supplemented by selected case examples from Gambatte and Circularity Academy, and secondarily by other web resources.

3.3.3. Other NIP actions

In **Czechia**, the following NIP actions were planned and implemented:

Action	Status, 02/2024	Description
1 event for university students – summer school for 20 participants	Complete	INCIEN delivered an online lecture on circularity trends in construction and key deliverables of the BUS-GoCircular project in the context of EU policy and legislation on September 13, 2023. The event took place in Nové Hradky, Czechia.
1 Course for authorised engineers embedded in CKAIT lifelong education scheme	Complete	INCIEN delivered an online lecture on circularity trends in construction and key deliverables of the BUS-GoCircular project in the context of EU policy and legislation as part of a half-day webinar organised by the Czech Chamber of Authorised Engineers and Technicians.
1 Course for energy specialists in lifelong education scheme of the Ministry of Industry and Trade	Replaced	The proposed course is now being planned for 2025 and project partner ČVUT is working on the curriculum (Energy Efficiency of Buildings). CVUT is meanwhile running a continuing education course that is open not only to energy specialists, but to the whole building sector and includes topics related to circular construction skills (Building Services for Energy Efficient and Healthy Buildings, Oct 24, 2023 - Apr 25, 2024), with 32 participants.
Establish partnerships with at least 10 stakeholders and participating organisations	Complete	Completed through 2 official EAB meetings and several other circular construction events. Some partnerships confirmed by signature of MoUs.
Participate in 2 events that have a focus on circularity and/or procurement	Complete	INCIEN and ČVUT participated in several events at which they gave presentations on the topic of circular construction and the KERs of the BUS-GoCircular project, including the 2022 Aquatherm Fair in Prague, the 2023 Greenway

Action	Status, 02/2024	Description
		Symposium in Brno, a Circular Week webinar on the topic of decarbonisation through the circular economy in October 2023 and a workshop for construction stakeholders on circularity in the context of the EPBD in February 2024.
Document and communicate 5 implementation cases in Czechia	Ongoing/ post-project	In addition to mentoring activities and the in-person TtT course in Prague, participation in aforementioned events has also been communicated and disseminated. The final project results and deliverables will continue to be disseminated to key stakeholders after project completion as part of the national replication plan.

Table 5. Information about Czechia NIP actions

3.4. Hungary

3.4.1. National TtT courses

One TtT course was organised at a national level:

Start date	Finish date	Location	Trainer(s)	Format	Number of trained trainers	Target group(s)	Description of course content and format
15/11/23	16/11/23	Szentendre, Hungary	dr. Károly Matolcsy, dr. Klára Szita, dr. Anita Terjék	online	16	Trainers - architects, engineers	Powerpoint presentations and workshops, based on the TtT modules

Table 6. Information about the Hungary TtT course

3.4.2. National pilot courses

Three pilot training courses were organised at a national level:

- 25/02/2023, Budapest, 35 persons (students, architects, engineers) trained in person by trainer dr. Károly Matolcsy
 - Based on Training Pack Module 1 - Introduction to circular economy
- 06/10/2023, Budapest, 8 persons (students, architects, engineers) trained in person by trainer dr. Klára Tóthné Szita
 - Based on Training Pack Module 1 - Introduction to circular economy

- 14/12/2023, Szentendre, 73 persons (SMEs) trained in person + online by trainers from ÉMI
 - Based on TP1 Module 1 Introduction to circular economy, TP2 Module 2 BUILD TO CLOSE THE LOOP OF MATERIALS, TP2 Module 10 Digitalisation

3.4.3. Other NIP actions

In **Hungary**, the following NIP actions were planned and implemented:

Action	Status, 02/2024	Description
Integrate the new training programmes in existing trainings (VET or HEI or both)	Partly done, in progress	Dr. Anita Terjék and dr. Károly Matolcsy both teach at Budapest University of Technology and Economics and both introduced the circular skills to the students during mentoring and pilot courses. Also ÉMI experts and 2 representatives of the manufacturing companies who signed the MoUs also teach at universities and started to integrate the developed modules in their curricula and are open to the other modules created in BUS-GoCircular. ÉMI is also in collaboration with VET institutions where introducing the basics of circularity started as well.
Participation in at least 2 dedicated events promoting building certification schemes focused on circular approaches, targeting active partnerships with at least 10 demand-side promoters (product manufacturers, distributors, certifiers)	Done	ÉMI put emphasis on dissemination as well to stimulate demand for green energy skilled workforce by presenting BUS-GoCircular at various events including IFD conferences. ÉMI presented BGC at 8 events and wrote 3 articles about it. We established active partnerships with several organisations and signed MoUs with 5 manufacturers. There are still new partnerships forming and ÉMI is committed to continue the collaboration.

Table 7. Information about Hungary NIP actions

3.5. Ireland

No TtT courses or pilot training courses were organised specifically at a national level in Ireland, however, 11 trainers from Education and Training Boards (VET), higher education and from Continuous Professional Development were upskilled in BUSGoCircular Train the

Trainer as part of the overall project. The 11 trainers have incorporated their learning into existing courses and 50 participants have been trained in BUSGoCircular content in Ireland.

3.5.1. Other NIP actions

In **Ireland**, the following NIP actions were planned and implemented:

Action	Status, 02/2024	Description
1 procurement project	Completed	The use of circularity was adopted in tendering in the Tulla Convent project for subcontractors
Organise/participate in at least 2 key stakeholder events and participate in 2 events which have a focus on circularity and/or procurement	Completed	BUSGoCircular was presented at events held to upskill Local Authorities and their staff in Ireland
Organise 4 meetings with the learning community (higher education, VET, and CPD) to align project outcome with their curricula	Completed	A BUSGoCircular Train the Trainer community of learning was established for the 11 trainers, who continue to collaborate and keep in touch regarding upskilling and incorporating BGC content. Meetings were held with ETBs (Waterford Wexford, Laois Offaly and Limerick Clare) regarding the availability of the qualification framework and the training materials
Organise 4 meetings to support a dialogue between public authority and value chain	Completed	Meetings were held with government departments, local authorities and education and training boards to raise awareness of the results of BUSGoCircular and to promote communications
Development of 1 public procurement model for integration of circularity requirements in projects	Completed	Tulla - as above
Development of 1 Qualification Framework where circularity is linked to BIM capability	Completed	DASBE - 2 courses now have BUSGoCircular training content incorporated
Development of at least 2 schemes for recognition or certification of circularity skills in the construction sector and facilitate training of at least 50 specialist workers/professionals under the schemes	Completed	DASBE - as above both are accredited
Enhancing the curricula of higher education establishments and VET providers through supplementing existing educational and training courses with circularity modules	Completed	LOETB, LCETB and WWETB (Education and Training Boards in Ireland) have trainers who have undergone the train the trainer programme and have signed MOUs to work to

Action	Status, 02/2024	Description
		incorporate the BGC qualification framework and learning content
Integrate the new training programmes in existing CPD schemes and curricula	Completed	DASBE courses provide both higher education and continuous professional development. The content is new and there needs to be time for it to be embedded. September would be a better time.
Test the procurement model in 1 public tender and in 1 private tender	Completed	Tulla is a private community group and from the BUSGoCircular project it was the only construction process which would work with us in the given timeframe. Public projects tend to be risk-averse when it comes to adding in anything seen as additional (as they struggle to get tenders).
Implement the Qualification Framework in 3 organisations	Completed	TUS, ATU, IGBC
Analyse 5 different value chains and test the skill framework in at least 2 organisations per chain	Completed	As part of the skills mapping at the start of the project in WP2, significant work processes were analysed in order to determine the best intervention logic for BGC in Ireland.
Establish partnerships with at least 20 stakeholders and participating organisations	Completed	MOUs have been sourced from a variety of actors and all participated in the External Advisory Board (20 have been achieved)

Table 7. Information about Ireland NIP actions

3.6. The Netherlands

3.6.1. National TtT courses

Two TtT courses were organised at a national level:

Start date	Finish date	Location	Trainer(s)	Format	Number of trained trainers	Target group(s)	Description of course content and format
22/11/23	04/12/23	NL	BC Sybren Steensma	live	13	Installation professionals	Customised course for installation professionals, adapted CE framework, pressure cooker format
08/02/24	22/02/24	Ede/Gorinchem NL	ISSO, BC, CE	live	11	built environment professionals	Two day format, CE framework, Skills gap analysis, ULO's, training materials, live cases.

Table 8. Information about the Netherlands TtT courses

3.6.2. National pilot courses

No pilot training courses were organised at a national level.

3.6.3. Other NIP actions

In **The Netherlands**, the following NIP actions were planned and implemented:

Action	Status, 02/2024	Description
4 Procurement projects	Partly completed	Chantel Spruit from Cirkelstad/Het Nieuwe Normaal signed an MoU with Bus-GoCircular, and within that framework, dozens of procurement projects have been analysed and evaluated. On top of this, we cross analysed the HNN framework with our Circular Framework.
Organise/participate in at least 4 key stakeholder events and participate in 10 events which have a focus on circularity and/or procurement. Including representation at 1 or 2 career orientation events.	Completed	1- Circle Economy's launch of the Circularity Gap Report Built Environment and presentation of BUS-GoCircular 2- Symposium Duurzaam Denken Doen MBO College Lelystad 3- Cirkelstad Meeting Het Nieuwe Normaal 4- Samen Sneller Circulair Event
Organise 4 meetings with the higher education, VET, and training to align project outcome with their curricula	Completed	1- Kick Off Meeting Samen Sneller Circulair 2- Circular Skills Meetup 3- March 7 Event Putting People at the heart of the circular transition Ministry of Infrastructure, CE en BC 4-
Organise 4 meetings to support a dialogue between public authority and value chain	Completed	1- Build Up Skills Congres 2- Circular Skills Meetup 2- Circulaire Verpakkingen meeting HIBIN 3- Cirkelstad Meeting Het Nieuwe Normaal 4- Conferentie Circulair Bouwen Aan Morgen
1 public procurement model for integration of circularity requirements in projects	Completed	Cross analysis Het Nieuwe Normaal - Circularity Framework
Validation of the Qualification Framework and its link to digitization Loop from april 2022	Completed	TVVL brainstorm session to validate and utilise the Qualification Framework
Test at least 2 schemes for recognition or certification of skills based on BUS-GoCircular results Implementation	Completed	Implementing Circular Skills with Dutch Green Building Council

Action	Status, 02/2024	Description
Test the procurement model in 2 public tenders and in 2 private tenders	Filled in in another way	As the procurement model “Het Nieuwe Normaal” has been developed, there was more need for an exploration of how HNN aligns with BUS-GoCircular than to develop a new, standalone procurement model. This exploration was at the core of the 2024 stakeholder meeting.
Implement the Qualification Framework in at least 2 training institutes, resulting in at least 60 participants	Completed	We successfully focussed on Implementation of the qualification framework with both TVVL en Techniek Nederland.
Analyse 3 different value chains (roofs, facades & interior elements) for links to the Qualification Framework	Completed	The value chains were analysed by Installation Advisors, Installation Contractors and Manufacturers, leading to a better understanding of the underlying skills gaps in these sectors.
Conduct 2 in-company train the coach courses to company coaches who guide 24 people in their organisations/value chains	Completed	In company train-the-coach courses were conducted within De Vries & Verburg and Infinity Repair, who collectively employ 250+ plus workers.
Establish partnerships with at least 20 stakeholders and participating organisations	Partly completed	15 MoU’s were signed.
Document and communicate the Dutch implementation cases	Completed	reported

Table 9. Information about Netherlands NIP actions

3.7. Spain

3.7.1. National TtT courses

One TtT course was organised at a national level:

Start date	Finish date	Location	Trainer(s)	Format	Number of trained trainers	Target group(s)	Description of course content and format	Web link (if available)
24/11/23	24/11/23	online	Pepa Esparza, Joan Romero	online	6 new trainers (although 8 attending)	Product providers, research institutes and university	TBC - Presentation introducing BGC outcomes, training materials, the Spanish “Training Pack” and online	https://busgocircular.eu/spanish-train-the-trainers/

							tools developed in Spain. Interactive session	
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Table 10. Information about Spain TtT courses

3.7.2. National pilot courses

Eight pilot training courses were organised at a national level:

- 30/03/2023, Valencia, 13 persons (UPV students) trained in person by trainer María Ángeles Roca (UJI)
 - Workshop on Sustainability organised by the chair of "Living Ceramics".
- 01/05/2023 - ongoing, 12 persons (building professionals) trained online by the staff of IVE
 - "Circular economy in buildings linked to "Next Generation" funds"
 - Module 1: Introduction to the Circular Economy
 - Module 2: Circular Solutions in the Built Environment
 - Module 3: Best Practices
 - Module 4: Circularity in the Context of Next Generation Funds
 - RE10 tool (Spanish NIP), GRCD tool (Spanish NIP)
 - link:
 - <https://productos.five.es/producto/c23-circularidad-en-edificacion-en-el-marco-de-los-fondos-next-generation>
- 01/05/2023 - 13/09/2023, 24 persons (building managers) trained online by trainers Isabel de los Ríos & IVE staff
 - "Energy Efficiency Retrofit Management"
 - Introduction
 - Policy framework
 - Communication & dissemination
 - Technical concepts
 - Tools
 - Taxation & financing
 - RE10 tool (Spanish NIP), GRCD tool (Spanish NIP)

- 01/06/2023 - 02/06/2023, Gandia 55 persons (students) trained in person by Joan Romero (IVE)
 - "Naturalised buildings and spaces" (workshop in Gandia)
 - Green roofs;Intro & regulatory framework + Best practices (group visit onsite)
- 01/07/2023 - ongoing?, 60 persons (building professionals) trained online by IVE staff
 - "Energy renovation of buildings linked to "Next Generation" funds"
 - link:
<https://productos.five.es/producto/rehabilitacion-energetica-en-el-marco-de-los-fondos-next-generation>
- 25/10/2023, Castellón, 50 persons (students) trained in person + online by trainers Ángel Pitarch (UJI) + Isabel de los Ríos (IVE)
 - "Materials Passport"
 - RE10 tool (Spanish NIP)
 - link: <https://youtu.be/EE72fL-B-NU?si=dzpFqAXR4bueF6jr>
- 13/11/2023 - 18/11/2023, Valencia, 33 persons (students) trained in person by trainers Marta Pérez (UPV) & Laura Reus (FEVEC)
 - Presentation in Grade of Architecture of UPV to 20 participants the BG Circular QF and introduction of 8 keys of circular economy and some applicable examples.
 - BGC QF and introduction of 8 keys of circular economy and some applicable examples.
- 06/03/2024, estimate of 15 persons (waste managers and product manufacturers) trained by Enrique Serra (AIDIMME) and Iranzu Barbarín (NEURTEK)
 - The aim of this course is to present the types of construction and demolition waste, analysis techniques, sample types, and opportunities for proper recycling. opportunities for their correct recycling.
 - Construction and Demolition Waste (CDW)
 - Link: https://www.aidimme.es/formacion-curso.asp?id_curso=454

3.7.3. Other NIP actions

In **Spain**, the following NIP actions were planned and implemented:


Action	Status, 02/2024	Description
<p>Organise/participate in at least 3 key stakeholder events and 3 events which have a focus on circularity (included 1 or 2 career orientation events)</p>	<p>Complete</p>	<p>Organisation/participation in 14 events:</p> <ul style="list-style-type: none"> - 29/09/2021: Conference, online, organised by University UJI - 26/10/2021: URBE trade fair (Mediterranean Real Estate Fair), shared space with developers, organisations and companies in the sector; presenting BGC. Face to face three days event. - 29/10/2021: Conference, online, organised by FLC as final event of "Construye 2020" H2020 project - 09/02/2022: Conference introducing RE10 tool. - 27/04/2022: Conference organised by Gandia municipality introducing green roofs. - 09/06/2022 Participation in the event "I Meeting The IRTAS" organised by the Regional Ministry of Housing and Bioclimatic Architecture (GVA) on sustainable and innovative architecture together with those responsible for the IRTA incentive initiatives and lecturers from the GBCe, Valencia City Council, IVE and UA (University). Debates on circularity and decarbonisation in the sector. - 10/06/2022 Participation in activity organised jointly with other EU projects- Sector Skills Alliance: EGREEN Multiplier. - 21/10/2022 URBE trade fair (Mediterranean Real Estate Fair), shared space with developers, organisations and companies in the sector; presenting BGC. Face to face three days event. - 16/11/2022: Conference at UJI University presenting BUSLeague results and BGC objectives. - 28/02/2023: Conference organised by FEVEC with the collaboration of AIDIMME Technical Institute presenting two innovative construction solutions of prefabricated renewable materials (circular). - 10/03/2023: Participation in the event "II Meeting The IRTAS" organised by the Regional Ministry of Housing and Bioclimatic Architecture (GVA) on sustainable and innovative architecture together with those responsible for the IRTA incentive initiatives and lecturers from the GBCe, UA (University) and UPV. Debates on circularity and decarbonisation in the sector. - 24/03/2023: Participation in the first event of GBCe Valencia Meetings with associates and

Action	Status, 02/2024	Description
		<p>collaborators to establish collaboration in sustainable approaches and share what we do to help. Presentation of BUSGoCircular Framework.</p> <ul style="list-style-type: none"> - 21/07/2023: Presentation at the FEVEC Board to all the representatives of the associations in construction of the federation (FEVEC) of the achievements reached with the BGC project. - 19/09/2023 Save The Homes project Consortium Meeting: exploring synergies with BUS projects.
<p>Organise 4 meetings with the learning community (higher education, VET, and CPD) to align project outcome with their curricula</p>	<p>Complete</p>	<p>Organisation of <u>6 meetings</u>:</p> <ul style="list-style-type: none"> - 04/03/2022: Meeting with CIRCE. - 07/03/2022: Meeting with FLC. - 16/05/2022 Meeting with 4 Spanish universities (T2.4). - 29/03/2023: Meeting with Director of the CIP FP of Catarroja, Responsable of Horta Sud Intermunicipal community of Employment and guidance, Researcher Responsible of Valencian Metal Association FEMEVAL (among other training centres) in the 1st Vocational Training and Training for Employment Fair of L'Horta Sud. - 21/04/2023 Meeting (1/2) with Spanish university UPV (Valencia) about introducing BGC circular framework (T2.3) in a UPV Master of Sustainable Architecture. - 08/09/2023 Meeting (2/2) with Spanish university UPV (Valencia) about introducing BGC circular framework (T2.3) in a UPV Master of Sustainable Architecture.
<p>Organise 4 meetings to support a dialogue between public authority and value chain</p>	<p>Complete</p>	<p>Organisation of <u>4 meetings</u>:</p> <ul style="list-style-type: none"> - 28/01/2022: Meeting with Valencia Regional Government (GVA), University, Associations... etc. for the review of Regulation DC09. - 16/05/2022: Meeting with GVA to implement circularity in specific policy instruments: IVE is piloting a training clause in 3 public tenders with the regional government. - 08/03/2023 Work session at General Directorate of Ecological Innovation in Construction of GVA (regional government) with FEVEC and other relevant construction actors validation on implementing BIM for the tendering of building projects and environmental requirements in public works. (skills included in BGC).

Action	Status, 02/2024	Description
		<ul style="list-style-type: none"> - 13/09/2023 - Meeting of Labora - IVE on the improvement of training packs for timber structural construction installers.
Development of 1 public procurement model for integration of circularity requirements in projects.	Complete (after refining and merging actions 4&7)	<p>Three policy instruments have been created that score circularity to be required in tenders:</p> <ul style="list-style-type: none"> - <u>RE10</u> (March 2022), - <u>BdC2023</u> (Sept. 2023) and - <u>TURIA</u> (Feb. 2024). <p>Two public <u>circular tenders</u> implemented by the regional government (GVA):</p> <ul style="list-style-type: none"> - Building in Castellón (Jan. 2023). - Building in Valencia (April 2023).
Validation of the Qualification Framework and its link to digitization	Complete	<p>As part of T2.4, 3 meetings were held (more info in D2.5):</p> <ul style="list-style-type: none"> - 16/05/2022 universities - 18/05/2022 product suppliers - 19/05/2022 research centres
Test at least 2 schemes for recognition or certification of skills detected on WP2	Post project (planned for 2024)	<p>There are 2 certifications planned for 2024 (more info in D6.3):</p> <ul style="list-style-type: none"> - Register CHC: List of products considering environmental information. - BES Homes: voluntary framework.
Test the procurement model in 2 public tenders and in 2 private tenders.	Complete (after refining and merging actions 4&7)	See action/row 4
Implement the Qualification Framework in at least 2 training institutes, resulting in at least 60 participants.	Complete	<p>Implementation in <u>5 training</u> actions reaching 184 participants:</p> <ul style="list-style-type: none"> - May 2023: Circular economy in buildings linked to "Next Generation" funds (IVE, online) with 12 participants. - May 2023: Circularity for building managers (AAFF) with 24 participants. - 01-02/06/2023: Naturalised buildings and spaces (workshop in Gandia) with 55 participants. - July 2023: Energy renovation of buildings linked to "Next Generation" funds (IVE, online) with 60 participants. - 18/11/2023 Presentation in Architecture at UPV University with 33 participants.

Action	Status, 02/2024	Description
Analyse 3 different value chains (roofs, facades and interior elements) for links to the Qualification Framework	Complete	Done as part of WP2.
2 in-company guide-the-guide courses who themselves guide 24 people in their organisations/value chains.	Complete	<p>Organisation of 2 <u>courses</u> (managed by BGC trained trainers & EAB members) achieving 63 participants:</p> <ul style="list-style-type: none"> - 30/03/2023 María Ángeles Roca (UJI) organised a "workshop" for university students (ETSAV-UPV). 13 participants. - 25/10/2023 UJI organised a micro-learning about "Materials passports" where IVE presented the RE10 tool (50 participants) <p>Plan of 1 course in March 2024:</p> <ul style="list-style-type: none"> - 06/03/2024 Enrique Serra (AIDIMME).
Establish partnerships with at least 20 stakeholders and participating organisations	Complete	<p>Establishment of 41 partnerships:</p> <ul style="list-style-type: none"> - 25 LoS signed (see Grant Agreement). - Meeting with: 11 stakeholders in the market validation and policy instruments development (see D2.5). - 24/11/2023: <u>TtT in Spain</u> with 7 companies but only 5 are newcomers: Rothoblaas, Singulargreen, Rockwool, Terraversa, AIDIMME.
Document and communicate the Spanish implementation cases.	Complete	Done via FEVEC & IVE channels and events: website, social media and newsletters.

Table 11. Information about Spain NIP actions



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